



BASEL CONVENTION REGIONAL CENTRE
for SOUTH-EAST ASIA

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CONVENTION

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PROGRAMME

Japan
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of Sciences

**Inter-Agency Workshop on the Sound Management of Industrial
Chemicals, with Special Emphasis on Asbestos,
for the Asia-Pacific Region
in collaboration with the 7th International Seminar of the Asian Asbestos
Initiative (AAI-7)**

Jakarta, Indonesia,

29 September - 1 October 2014

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Introduction

Background

The earthquake that generated the great Indian Ocean tsunami of 2004 is estimated to have released the energy of 23,000 Hiroshima-type atomic bombs, according to the U.S. Geological Survey (USGS). By the end of the day more than 150,000 people were dead or missing and millions more were homeless in 11 countries, making it perhaps the most destructive tsunami in history. Big infrastructural damages resulted from the tsunami.

In the post-tsunami activities, the use of asbestos cement roofing products in tsunami reconstruction projects, particularly in Sri Lanka, was confirmed. During rebuilding, workers may be handling damaged asbestos sheeting without knowledge of the risks, and such sheeting may have been disposed of without due regard to the immediate hazards posed by such loose or damaged material. As a consequence, possible widespread contamination of the environment with potential for future health problems may occur.

Numerous countries in the world have used asbestos as an industrial resource for nearly a century. For several decades, however, the adverse health effects of asbestos, including carcinogenicity, have been known. As the health risks associated with asbestos become more apparent, many developed countries, reduced or banned the use of asbestos. The heavy burden of ARDs in these countries is attributable to their heavy dependence on asbestos several decades earlier. Asia is in the midst of rapid industrial growth and has now become the world's center for asbestos consumption. Efforts for transition to abandon asbestos use are hampered in these countries due to irresistible economic incentives compounded by a false sense of reassurance caused by long latency period before disease manifestation and inadequate surveillance systems.

The Rotterdam Convention aims to protect human health and the environment as well as to promote proper chemicals management by providing relevant information for the Parties. However, information on hazardous chemicals, such as chrysotile asbestos, which are not listed on Annex III of the Convention, cannot be adequately provided within the framework of the Convention. Therefore, Japan considered that it was useful to supplement to the framework of the Convention by funding a project on the "Sound management of industrial chemicals with special emphasis on asbestos."

Objective

The objectives of this workshop are:

- a) To present and discuss common issues found as a result of the pilot projects carried out in the Philippines, Indonesia and China;
- b) Raise awareness on the recently developed universally accessible toolkit for the elimination of asbestos-related diseases (ARDs). The toolkit will thus serve as a core resource to provide information on the management of asbestos at all stages of its lifecycle, especially the risks associated with continuing exposure to asbestos, while countries develop strategies to limit uses;
- c) To encourage participants to develop draft proposals to improve industrial chemicals management infrastructure and activities, particularly those related to asbestos.

This workshop will also contribute to the efforts by countries in the Asian Pacific region to strengthen their capacities to meeting their obligations under the WHO and the Basel, Rotterdam and ILO Conventions and thus, minimize asbestos-related diseases (ARDs).

Proposed countries for participation:

China, India, Indonesia, Malaysia, Mongolia, Philippines, Sri Lanka, Thailand, Vietnam

Countries in the region that could be invited for the purposes of sharing experiences:

Australia, Japan, Singapore and South Korea.

Participants:

3 participants per country – from Ministries of Environment (Designated National Authorities for Rotterdam Convention); Ministries of Health; Ministries of Labour/Trade -- for the eight countries will be invited and funded to attend the workshop. The representatives of the WHO, IARC, ILO, Basel Convention Regional Centers, UNEP Regional Cluster Coordinators, and other relevant experts could also be invited to the meeting to cover health and environmental risk assessments and impacts issues.

Duration of meeting: 3 Days

Approach

The consultation operated through a series of plenary sessions and discussion.

(Policy makers, Ministry of Health, Ministry of Labour, DNAs.)

Session 1 : Opening and Introduction

Presentations include scope, purpose and structure of the meeting and recommendations of the first workshop by BRS Secretariat.

Session 2. Principles and elements for national policies on the management of asbestos

Presentation by representatives from BCRC China, BCRC-SEA and Philippines on the results of the pilot projects on asbestos and from UOEH, Japan and Japan Occupational Safety and Health Resource Center on the toolkit for the elimination of ARDs.

Session 3 : Status of industrial chemicals (especially asbestos) management in the region

Presentation by international expert from WHO on update from WHO on activities on chrysotile asbestos and country presentations by representatives from China, India, Indonesia, Korea, Malaysia, Mongolia, Philippines, Sri Lanka, Thailand and Vietnam on status of asbestos management in the countries, including production, application, import and export, and disposal.

Session 4 : Programs and actions by UN organizations

Presentation by ILO on its policy and action towards the elimination of ARDs.

Session 5 : Developed country experiences – Sharable knowledge & technologies

Presentation from representatives from BRS Secretariat, Australia, India, Korea and experts in asbestos and other chemicals from Hong Kong, Japan, Korea, Malaysia and Singapore.

Presentations on :

- the support of accurate diagnosis on ARD by digital pathology network.
- the utility of low dose CT for the regular checkup for asbestos exposed workers
- the utilization of job exposure matrix
- asbestos management policies in Korea
- activities to protect workers' health in Korea and international collaboration activities
- financial burden of ARDs in Australia
- asbestos waste management in Singapore
- the economics of asbestos

- Rotterdam Convention and the PIC procedure
- research on asbestos related diseases and implications
- myths, lies and half-truths of asbestos and asbestos related diseases
- country presentation on asbestos management
- guidance on calculation of age adjusted mortality rate and training on the toolkit for the elimination of ARDs.
- Perspectives and future of the Asian Asbestos Initiative

AGENDA



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Emphasis on Asbestos, for the Asia-Pacific Region
in collaboration with the 7th International Seminar of the Asian Asbestos Initiative (AAI-7)
29 September to 1 October 2014**

PROVISIONAL AGENDA

Time	Activity	Presenter
Day 1		
Session 1:	Opening and introduction	Chair: Indonesia
Morning	Registration of participants	
08:30 - 10:15	Opening Remarks – Representative of the Government of Indonesia	
	Opening Remarks:	
	-Secretariat for the Rotterdam Convention/Basel convention	
	-WHO	
	-ILO	
	-7th International Seminar of the Asian Asbestos Initiative (AAI-7)	
	Scope, purpose and structure of the meeting	<i>BRS Secretariat</i>
	Recommendations of the first workshop	<i>BRS Secretariat</i>
10:15 - 10:30	Break	
Session 2	Principles and elements for national policies on the management of asbestos	Chair: Sri Lanka
10:30 - 12:15	BCRC China – pilot project presentation	
	BCRC-SEA – pilot project presentation	
	Philippines pilot project presentation	
	Discussion	
12:30 - 13:30	Lunch	Chair: Vietnam
Session 2 (continued)	Principles and elements for national policies on the management of asbestos (continued)	
13:30 - 14:00	Demonstration of the Asbestos Toolkit	<i>Ms. Taeko Yamada (Japan), Mr. Sugio Furuya (Japan), Dr. Eun-Kee Park (Korea)</i>
Session 3 (1)	Status of industrial chemicals (especially asbestos) management in the region	
14:00 - 14:20	Update from WHO on activities on chrysotile asbestos	Lesley Onyon, WHO
14:20 - 14:50	The carcinogenicity of chrysotile asbestos	Dana Loomis, IARC
14:50 - 15:30	Status of countries with respect to the recommendations from the previous workshop (1) / <u>Country Reports</u>	<i>Country presentations - China, India, Indonesia, Korea (EKP), Malaysia (SA, NBT)</i>

15:30 - 15:45	Coffee Break	
Session 3 (2)	Status of industrial chemicals (especially asbestos) management in the region	
15:45 - 17:30	Status of countries with respect to the recommendations from the previous workshop (2) / <u>Country Reports</u>	
Day 2		Chair: Sri Lanka
Session 4	Programs and actions by UN organizations	
8:30 - 10:00	ILO action towards the elimination of asbestos-related diseases	<i>Dr. Igor Fedotov, ILO Geneva</i>
Session 3(3)	Status of industrial chemicals (especially asbestos) management in the region	
10:00 - 10:30	Status of countries with respect to the recommendations from the previous workshop (3) / <u>Country Reports</u>	<i>Mongolia (DN, NTs), Philippines (JM), Sri Lanka, Thailand (KS), Vietnam (NDT, LMA, NTT, TAT)</i>
10:30 - 10:45	Break	
10:45 - 12:30	Status of countries with respect to the recommendations from the previous workshop (3) / <u>Country Reports</u> Awareness-raising on the SAICM asbestos projects in Thailand	<i>Thailand</i>
12:30 - 13:30	Lunch	Chair: Philippines
Session 5 (1)	Developed country experiences - Sharable knowledge & technologies	
Afternoon	Support of accurate diagnosis on asbestos-related disease (ARD) by digital pathology network	<i>Prof. Kouki Inai (Japan)</i>
13:30 - 15:00	Clinical diagnosis and management of ARD (TBC)	<i>Prof. Takumi Kishimoto (Japan)</i>
	Utilization of Job Exposure Matrix (TBC)	<i>Mr. Sugio Furuya (Japan)</i>
	Discussion on sharable knowledge & technologies	
15:00 - 15:15	Break	
15:15 - 17:15	Asbestos management policies in Korea Activities to protect workers' health in Korea & international collaboration activities of KOSHA –Dr. Seung-Hyun Park	<i>Korea Administration (Mr. Kyung-Bin Lee, Dr. Seung-Hyun Park)</i>
	Asbestos use in the past: Financial Fallout in Australia	<i>Prof. Ken Takahashi (Japan)</i>
	Asbestos waste management in Singapore	<i>Dr. John Wah Lim (Singapore)</i>
	The economics of asbestos : health vs trade	<i>Prof. Syed Aljunid (UNU / Malaysia)</i>
	Discussion on sharable knowledge & technologies	

Day 3		
Session 5 (2)	<i>Developed country experiences - Sharable knowledge & technologies</i>	
8:30 - 10:30	Rotterdam Convention and the Prior Informed Consent procedure Research on Asbestos Related Diseases and Implications Myths, lies & misunderstandings of asbestos issues Country Report Training Session on Descriptive Epidemiology (1) Calculation of age adjusted mortality rate	<i>Rotterdam Secretariat</i> <i>Prof. Ignatius Tak-Sun Yu (Hong Kong)</i> <i>Prof. Ken Takahashi (Japan)</i> <i>India</i> <i>Dr. Odgerel Chimed-Ochir & Ms. Taeko Yamada (Japan)</i>
10:30 - 10:45	Break	
10:45 - 12:00	Discussion on sharable knowledge & technologies Training Session on Descriptive Epidemiology Calculation of age adjusted mortality rate Perspectives and future of the Asia-Asbestos Initiative	<i>Ms. Taeko Yamada & Dr. Odgerel Chimed-Ochir (Japan)</i> <i>Prof. Ken Takahashi (Japan)</i>
12:00 - 13:00	Lunch	
	<i>Conclusions and Recommendations of the Inter-Agency Workshop</i>	
13:00 - 14:00	Lessons learned – next steps. Proposals from the region?	<i>Participants</i>
14:00 - 14:45		
14:45 - 15:15	Closing ceremony	

General Workshop Recommendations 2014

1. It would be desirable if all participating countries could undertake national actions to eliminate asbestos-related diseases and set up immediate, medium and longer term goals to reduce the use of asbestos and ultimately prevent asbestos-related diseases. Such strategies should be given higher priority in the national strategies for chemicals management and be implemented in a consistent way so as to safeguard occupational safety and health.
2. Asia Pacific countries need to build their capacities for the sound management of asbestos, particularly in the following areas:
 - a. Control of asbestos exposures through engineering and safety measures;
 - b. Health/medical surveillance, early diagnosis and management of asbestos-related diseases; Experience sharing in good practices and in histopathology and telediagnosis with the developed countries would be beneficial for the region.
 - c. Workplace monitoring of asbestos fibers in the ambient air of occupational and other spaces;
 - d. Asbestos abatement and the environmentally sound management of asbestos containing wastes; (Many buildings contain a variety of asbestos-containing materials as insulation, etc. Best practices for the demolition and safe disposal of asbestos containing wastes).

Access to the ongoing international training programmes in the above areas would be beneficial for the region as well as technical and logistical support including capacity building on all the above areas.

3. It is necessary to strengthen the collaboration at national level and to build strategic partnerships and alliances with other stakeholders, such as, trade unions, representatives of employers and workers, business and industry, environmental and health NGOs, as well as the academia for sound management of asbestos and for the elimination of asbestos-related diseases. Use of recent information, education and communication (IEC) materials for raising awareness among the stakeholders.
4. There is a need to strengthen multilateral and inter-country collaboration on the sound management of asbestos making better use of the existing mechanisms of WHO, ILO, UNEP, the Basel and Rotterdam Convention and the Strategic Approach for International Chemicals Management. That is, support to strengthen the international regulatory mechanisms for the sound management of asbestos through the inclusion of chrysotile in the Annex III of the Rotterdam Convention; implementation of the Basel Convention requirements with regards to asbestos; ratification and implementation of ILO conventions 139, 162 and 170. It would be useful to have regional fora for such dialogue and collaboration.
5. Special international assistance to countries is needed in the following areas:
 - a. provision of tools for sound management of asbestos and elimination of asbestos-related diseases and building capacities for their implementation;
 - b. exchange of experiences between countries regarding national situation, progress made and solutions applied;
 - c. awareness raising to decision-makers so as to get political commitment for sound management of asbestos and elimination of asbestos-related diseases;
 - d. facilitating the transfer of technologies for the use of alternative / substitute materials, and for the removal and sound disposal of asbestos containing materials;
 - e. Support for mobilizing international donor assistance for sound management of asbestos.

PRESENTATIONS

SESSION 1

BRS Secretariat



Scope, Purpose and Structure

Scope


- Legal, regulatory and administrative infrastructural frameworks required to support national multi-sectoral industrial chemicals (specifically asbestos) management programmes;

Purpose

- Assist Parties improve capacity to manage asbestos at all stages of its lifecycle, contributing to meeting the obligations under the ILO, WHO, Basel and Rotterdam Conventions and protect human health and the environment from the adverse effects of these chemicals .
- Provide an opportunity for countries to share experiences in the management of asbestos and promote improved cooperation and collaboration at the national and sub-regional levels.
- Strengthen the capabilities of Parties to assess risks associated with asbestos and ultimately reduce them.
- Provide tools and approaches for Parties to use to apply precaution in industrial chemicals management.

Structure

- Principles and elements for national policies on the management of asbestos;
 - Pilot projects!!
 - Asbestos Toolkit demonstration
- Status of asbestos management in the region ;
 - Country presentations
 - WHO activities on chrysotile asbestos
- Developed country experiences - Sharable knowledge & technologies;
- Asia Asbestos Initiative
- Next steps




General Recommendations from the Asbestos meeting in 2010 Bangkok, Thailand.




Countries:

- China
- India
- Indonesia
- Malaysia
- Philippines
- Sri Lanka
- Thailand
- Vietnam




- The Asia Pacific Region is the main user of asbestos in the world with the highest number of people at risk of developing asbestos-related diseases.
- Difficulties to ensure complete protection of human health during manufacture, use and disposal due to constrained resources.



1. All participating countries to undertaken national actions to eliminate asbestos-related diseases and set up immediate or longer term goals to reduce the use of asbestos and ultimate phase out.


- Mainstreaming of chemicals management.
- Link the sound management of asbestos and elimination of asbestos-related diseases to the national agenda on climate change mitigation and adaptation.




3. All countries to build capacities for sound management of asbestos in the following areas:

- (a) Early diagnosis and management of asbestos-related diseases;
- (b) Monitoring of asbestos fibers in the air and other components of the environment;
- (c) Asbestos abatement (demolition, disposal).


Access to the ongoing international training programmes in these areas should be ensured.



4. Strengthen the collaboration across governments and build strategic partnerships and alliances with other stakeholders, such as, trade unions, employers, business and industry, environmental and health NGOs, as well as the academia for sound management of asbestos and for elimination of asbestos-related diseases. Additional information and advocacy for legislators and mass-media are needed.




5. There is a need to scale up multilateral and inter-country collaboration on sound management of asbestos making better use of the existing mechanisms of WHO, ILO, UNEP, the Basel and Rotterdam Convention and the Strategic Approach for International Chemicals Management. It would be useful to have regional forum for such dialogue and collaboration.



6. International assistance to countries is needed in the following areas:

- (a) provision of tools for the management of asbestos and elimination of asbestos-related diseases plus capacity-building for their implementation;
- (b) exchange of experiences between countries regarding national situations, progress made and solutions applied;
- (c) awareness-raising and enhancement of political commitment for sound management of asbestos and elimination of asbestos-related diseases;
- (d) facilitation of transfer of technologies for alternatives/substitution and removal of asbestos;
- (e) mobilizing donor assistance for management of asbestos.



7. Further support by countries is needed to strengthen the international regulatory mechanisms for the management of asbestos through inclusion of chrysotile in the annex III of the Rotterdam Convention, implementation of the Basel Convention requirements with regards to asbestos, ratification and implementation of ILO conventions 139, 162 and 170.



8. The participating countries kindly invite the government of Thailand to circulate these recommendations among concerned governments in the Asia Pacific Region.

SESSION 2

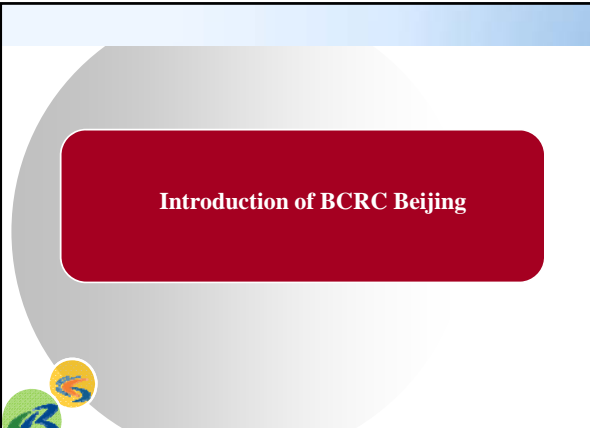
BCRC China

Inter-Agency Workshop on the Sound Management of Industrial Chemicals, with Special Emphasis on Asbestos, in the Asia-Pacific Region, in collaboration with the 7th International Seminar of the Asian Asbestos Initiative (AAI-7) Jakarta, Indonesia, 29 September to 1 October 2014



Overview of the BCRC Beijing's Project on ESM of Asbestos Wastes


Qingyin DONG, Program Officer
Basel Convention Regional Center for Asia & Pacific (BCRC Beijing)
29 Sep. 2014



Introduction of BCRC Beijing

1 Introduction of SCRCAP/BCRC Beijing

巴塞尔公约区域中心
Basel Convention Regional Centres



14 BCRCs and BCCCs (4 in Asia-Pacific Region)

- 《巴塞尔公约》第14条规定：根据不同区域和次区域的需要，缔约方应建立区域或次区域的危险废物和其他废物管理和废物减量化培训和技术转让中心。
- Article 14 of <Basel Convention>: The Parties agree that, according to the specific needs of different regions and subregions, regional or sub-regional centres for **training and technology transfers regarding the management of hazardous wastes and other wastes and the minimization of their generation** should be established.

- 2002年第六次缔约方大会确立的区域中心职能：培训、技术转让、提供信息、咨询服务和宣传
- Function of BCRCs: Training, technology transfer, information, consulting, awareness-raising

1 Introduction of SCRCAP/BCRC Beijing

斯德哥尔摩公约区域中心/Stockholm Convention Regional Centres

- 《斯德哥尔摩公约》第12条第4款规定，区域或次区域中心应提供能力建设和促进技术转让，以协助发展中国家缔约方和经济转型缔约方履行《斯德哥尔摩公约》的义务。



16 SCRCs (5 in Asia-Pacific Region)

In accordance with paragraph 4 Article 12 of Stockholm Convention, regional and subregional centres should **provide technical assistance and promoting the transfer of technology** to assist developing country Parties and Parties with economies in transition to fulfil their obligations under this Convention.

1 Introduction of SCRCAP/BCRC Beijing

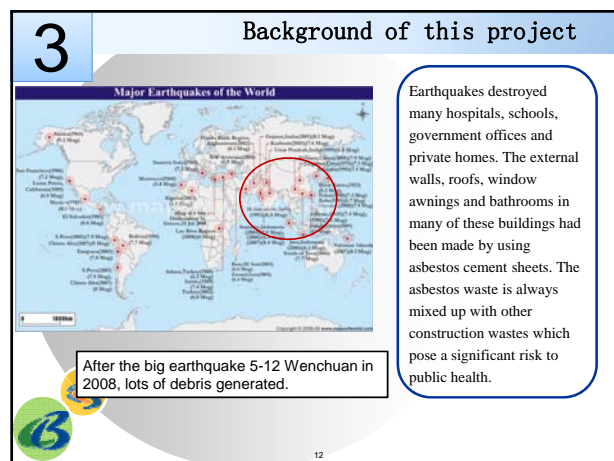
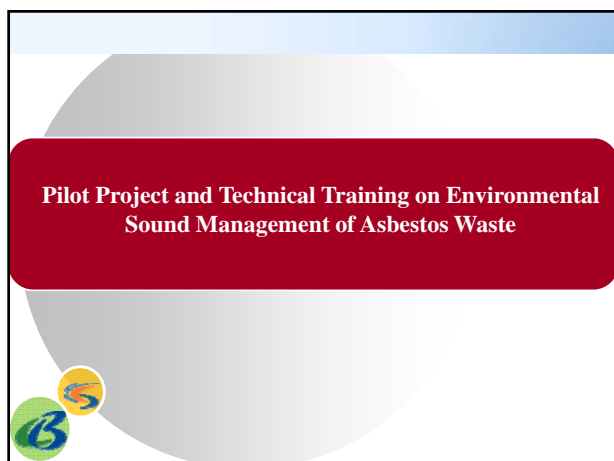
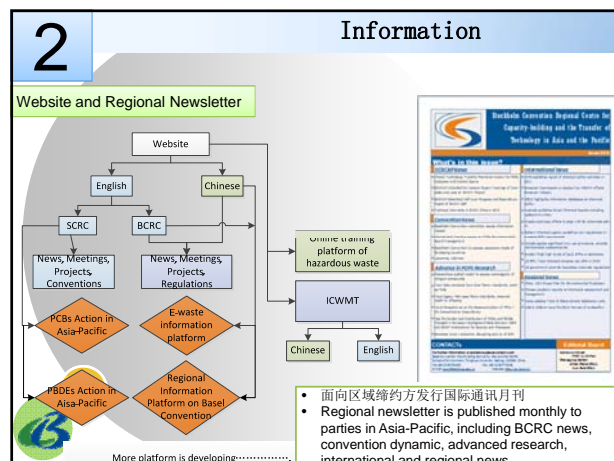
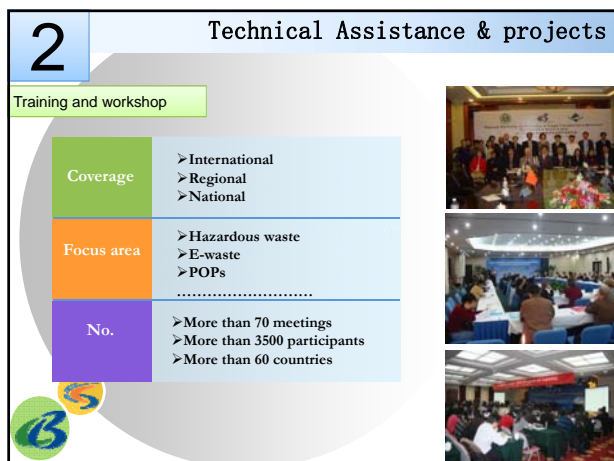
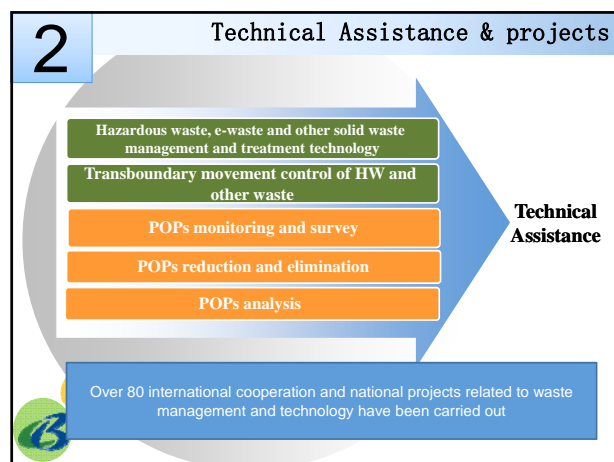
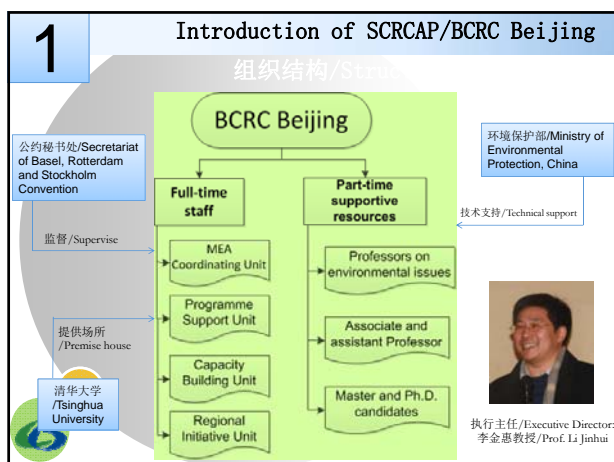
History of BCRC Beijing

1993	1997	2009	2011
国家环境保护局批准在清华大学环境工程设计研究院设立中国有害废物管理和处置培训与技术转让中心 China SEPA established National Training and Technology Transfer Center for Hazardous Waste Management and Disposal of China (NTTTC), in Tsinghua University	巴塞尔公约亚太区域中心在中国有害废物管理和处置培训和技术转让中心基础上成立 BCRC Beijing was established based on the NTTTC	斯德哥尔摩公约COP4确认其为斯德哥尔摩公约区域中心 BCRC Beijing was approved as the Stockholm Convention Regional on COP4 to Stockholm Convention.	《关于建立巴塞尔公约亚太太平洋地区培训和技术转让区域中心的框架协议》签署，正式确立中心法律地位 Framework Agreement of BCRC Beijing was signed, and identified legal status

1 Introduction of SCRCAP/BCRC Beijing

Functions of BCRC Beijing

- Core functions
 - training
 - technology transfer
 - information
 - consulting
 - awareness-raising
- Acts as a Basel Convention coordinating centre in Asia and the Pacific
- Acts as on behalf of a regional centre of Stockholm Convention



3 Objectives of this project

Duration: March to December 2010

Target

The project will promote the environmental sound management and capacity of asbestos waste in Asia and the Pacific, especially in China in order to implementation of Basel Convention.

Specific objective

- Accumulate management and treatment experience of asbestos waste through pilot project including demolition, collection and transportation scheme of asbestos waste.
- Share information by technical training of asbestos waste identification and disposal to developing countries in Asia and the Pacific;
- Heighten consciousness of environmental and health protection of relevant authorities and companies who deals with asbestos waste.

<http://en.bcrc.cn/col/12571526160469011/01/24/1295832610007.html>

3 Activities of this project

To survey and study current situations of dealing with asbestos waste in pilot city

- To survey the collection and treatment experiences and relevant management policies of asbestos waste after the earthquake in pilot city;
- To survey the treatment technology and facility of asbestos waste;
- To analyse and evaluate the technical deficiency in dealing with the asbestos waste.
- To investigate the state on demolishing, producing, collecting, transporting and classifying of the asbestos waste;
- To analyse the existing problem on the collection and treatment of asbestos waste, especially on the health and safe aspects.

3 Activities of this project

Implementation of a pilot project on the environmental sound management of asbestos waste

- To select and determine 1 site for asbestos waste collection in pilot city
- To develop the demolition, collection and transportation, disposal schemes
- To conduct practice of identification and remove of the asbestos waste from debris;
- To conduct the practice of packaging of the asbestos waste;
- To conduct the practice of disposal of asbestos waste in the landfill site.

3 Activities of this project

To supply technical internship to 2 officials from 1-2 developing countries in Asia and the Pacific region

- The 2 officials who are in charge of the disaster prevention or asbestos waste from the countries which suffered from big earthquakes in recent years will be invited to China to accept the technical training and to participate in related projects of the Centre
- The main tasks include learning Chinese experience of the management, policies and technologies of asbestos waste and supporting the project implementation.
- The participating officials will study the Chinese experience of the management of asbestos waste in earthquakes; then they will be invited to join the pilot project and take a role in preparing relevant documents and reports to accumulate experiences
- The participating officials will be invited to participate in the technical training workshop under Activity 4 below.

3 Activities of this project

To organize a technical training workshop on asbestos waste treatment

- To deliver the outcomes and the experience of the pilot project
- To introduce the types, uses and health effects of asbestos and the precaution measures
- To introduce the current policies and experiences on asbestos management and technology
- The duration of the workshop will be 2 days

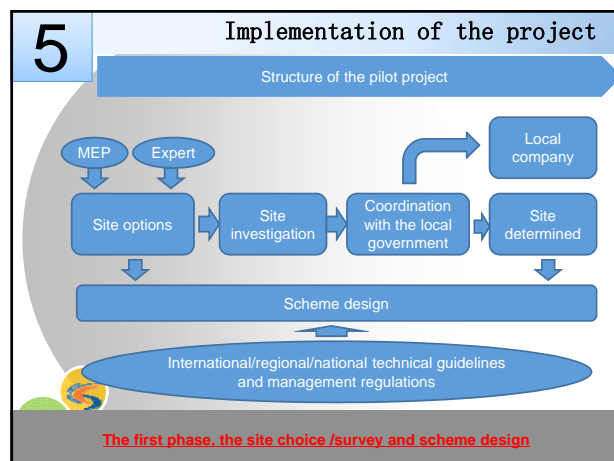
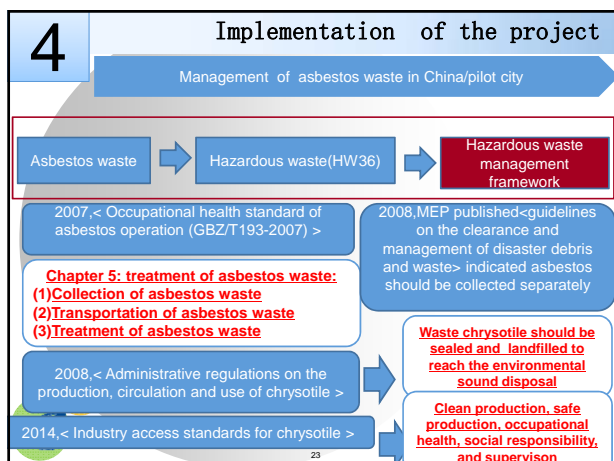
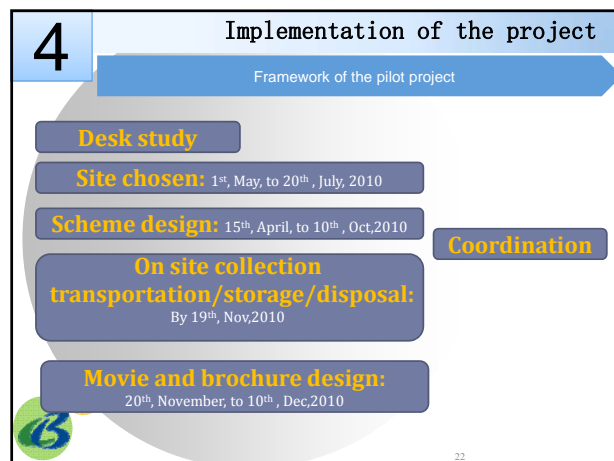
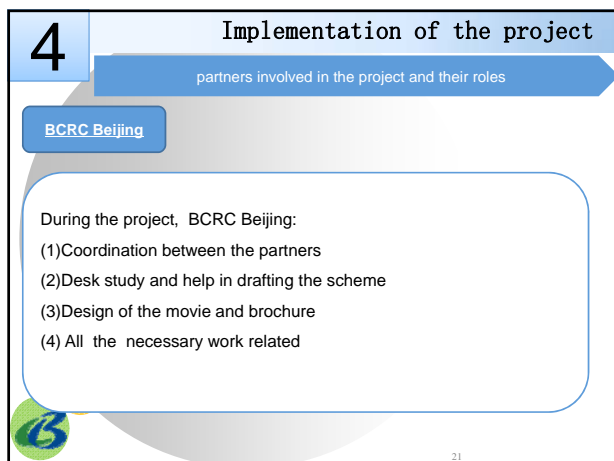
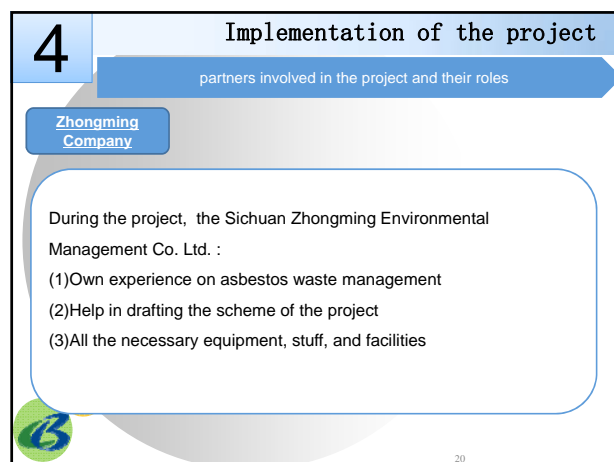
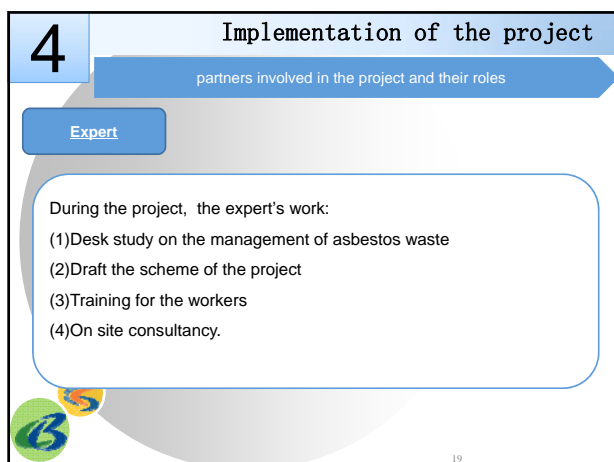
4 Implementation of the project

partners involved in the project and their roles

Government

During the project,

- (1)MEP supported the implementation of the project and make coordination between the local government and BCRC Beijing
- (2) The Environmental Protection Bureau of Sichuan Province supplied the administrative support and recommend the local company which is qualified to deal with asbestos waste.
- (3)The Environmental Protection and Tourism Authority of Shifang Town, assisted in investigating the site and necessary support.



5 Implementation of the project

Site selected of the pilot project

After the big earthquake of May 12, 2008, lots of debris were left to be disposed, some of which were piled without any treatment.

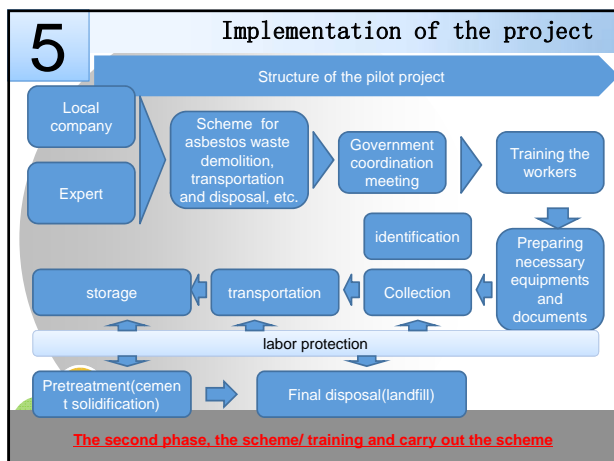
Location	Availability in disaster debris	Transportation	Local asbestos waste disposal facilities
Shifang, Deyang city, Sichuan province	Yes, heavily affected by the earthquake in 2008. The former chemical factories were preserved to commemorate the big earth quake	Not very good; nearly 150 miles from city, hazardous waste construction truck is able to arrive	Yes, a comprehensive hazardous waste construction facility exists which can landfill asbestos waste.
Wenchuan, Sichuan province	Not sure, most of the debris were collected after 2 years	Not good. Some roads are blocked.	No, need nearby facilities located in other places
Chengdu, Sichuan province	Not sure, most of the debris were collected after 2 years	Good, capital of the province	Yes, hazardous waste disposal facility exist

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5 Implementation of the project

Site selected of the pilot project

Shifang Chemical Plant, Shifang, Deyang city, Sichuan Province



5 Implementation of the project

Scheme of the project

Identification

The key for asbestos waste identification is to distinguish the typical materials containing asbestos waste.
 The identification should follow these procedures:
Site inspection and primary evaluation: the professional staffs implement the site inspection in the debris, collect typical building debris containing asbestos waste, judge the components of debris containing asbestos waste, make timely marks, and set isolation belt and warning labels.
Sampling and detecting: Regarding of the waste which can't be evaluated whether containing asbestos waste or not, they should be gathered enough and delivered to the third party with qualification of specialized examination using phase contrast microscope or electron microscopy.
Training for clearing workers: The professional staff will train the workers, tell the areas containing asbestos waste, the characteristics of debris containing asbestos waste, the technical points for clearing, self-protection and environmental protection, and prepare typical debris samples for the workers to identify.

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5 Implementation of the project

Scheme of the project

Identification

In building debris, asbestos may appear in the listed components of the debris:

Equipment and structure:
 Asbestos insulating layers and thermal insulating layers in boilers, vessels, fireproof doors and other industrial equipment; Asbestos sprayed-on fireproofing/soundproofing in the cement boards or steel structure.

Asbestos blanket:
Asbestos textured ceilings:
Asbestos-cement and other materials:

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5 Implementation of the project

Scheme of the project

Collection

Engaging in this process should submit **the scheme** to the department which is in charge of environmental protection, and the scheme should contain necessary equipments and materials, measures protecting the safety of workers, regulations preventing asbestos fibers effusion to the environment, procedures for transportation, treatment scheme for collected asbestos waste, and emergency accidents. If entrusted, the cooperation protocol and contract should be offered.

The separate barriers and obvious labels should be set around the debris containing asbestos waste. Minimize the disturbance of asbestos fibers. For the debris unable to implement the cleaning process, it should be covered by tarpaulins.

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5 Implementation of the project


Scheme of the project

Collection

The workers should wear the whole set of protective clothing, including hair-caring hat, antitoxin non-bleed protective clothes, antitoxin non-bleed gloves, work shoes or gaiters, goggles, and breathing apparatus with filter covering the whole face and body

Before working, the workers must:

- Enter the clean room storing the casual clothes, take off the casual clothes, put them in the chest, and wear breathing apparatus.
- Pass the shower room(if possible), enter the room storing protective clothes, wear goggles, and the protective clothes (including work shoes, gloves)
- Leave the space storing protective clothes, and enter the working site.



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5 Implementation of the project

Scheme of the project

Collection

The debris containing asbestos waste must be thoroughly wet before clearing.
The asbestos waste cleared should be sealed in double layer plastic bags or containers.



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5 Implementation of the project


Scheme of the project

Transportation

Asbestos waste must be packed on site before transportation. Before transportation or storage, be sure that the packages are undamaged and the surface without any asbestos waste dust or fibers. During packing, the amount of waste loaded should be less than 2/3 of the capacity.

The packaging bags and sealed containers loading asbestos waste must be marked with obvious labels noticing that asbestos waste are contained.

Transportation of asbestos waste should be agreed by the local authority of environmental protection, approved by company of waste disposal, transportation department, and receiving unit, and managed as hazardous waste.



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5 Implementation of the project

Scheme of the project

Transportation

The workers should be trained and be familiar with the personal protective clothes and emergency equipment.

The vehicle of transporting the asbestos waste must be special-purpose vehicle and should be allocated with shovels, brooms, personal apparatus for breath, protective clothes, wetting agent, and enough plastic bags and so on.

During the transportation, if the bags or containers are damaged leading to the effusion of asbestos waste, the workers should repair or alter the bags or containers or repack the asbestos waste immediately.

In the case of the leakage happens, the workers should adapt proper measurements in the leakage area; for the small amount of leakage, the workers should collect the waste and load them into the packages; for the large amount and most of which are dusts, the workers should wet the dust, cover the dust if possible, and clear the leakage waste. While in the process of clearing, the workers must adopt necessary safely protective measurements such as wearing protective clothes and breathing apparatus.

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5 Implementation of the project

Scheme of the project

Storage

In principle, the asbestos waste gathered from the debris should not be stored at other places rather than hazardous waste disposal site.

Lay temporary protective layers on the ground, maintain barriers and warning signs around the storage place, and cover the waste with tarpaulins. Clear the outer place, equip with shovels, sandy soil, spraying apparatus, washing water with surfactant, brooms, cloths, vacuum cleaners, spare packaging bags and so on.



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5 Implementation of the project

Scheme of the project

Disposal

Disposal of asbestos waste should meet the requirements for hazardous waste. And it must be disposed by qualified hazardous waste treatment unit.

The disposal of asbestos waste is mainly landfill, and the advantages are no exposure of asbestos fiber, and no open fire in the landfill site.


The pretreatment measures(cement solidification) to reduce the possible effusion of asbestos waste are encouraged to prevent possible effusion

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5 Implementation of the project

Scheme of the project

Disposal

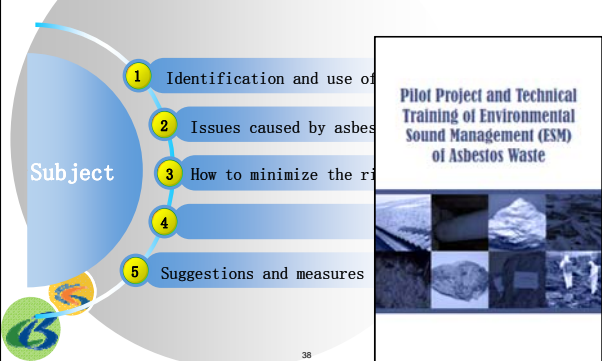


Asbestos waste must be located on the bottom of landfill site, the ditch, or the hole. Measurements should be adopted to prevent the leakage of asbestos. In the process of deposit, except the waste with high density, the waste could be covered with the acceptable height (such as 20-25m), and after the daily work, no asbestos waste would be left.

The final mantles should be more than 60cm preventing the excessive erosion or frost, and waste no more than designed landfill volume are dumped.


6 Outcome of the project

Brochure of the pilot project



6 Outcome of the project

Movie of the pilot project



6 Outcome of the project

Technical internship for the Asia-Pacific countries

Tasks	Description
Long-term	Technical Internship report by the trainees
Mid-term	International / Regional / National review and study of the experiences on post-disaster debris, asbestos waste, emergency management, etc
Short-term	Report / Presentation
Temporary	Other concerned activities which may occur during the internship

2 delegates were invited to participate the technical internship.

- Noor Ul Hadi, Ministry of Environment, Pakistan
- Lekha Nath Bagale, Department of Hydrology and Meteorology, Ministry of Environment, Government of Nepal

6 Outcome of the project

Technical internship for the Asia-Pacific countries



6 Outcome of the project

Workshop(16-17th December, 2010)

Capacity-building and Awareness-raising Workshop on Environmentally Sound Management (ESM) of Asbestos Waste in Asia and the Pacific

- 16th-17th December 2010
- Beijing, China
- 14 delegates from 5 countries including China, Japan, Nepal, Pakistan and the Philippines
- 12 delegates from international organizations, including Secretariat of the Basel Convention(SBC), World Health Organization(WHO) Representative Office in China, International Labor Organization(ILO) Office for China and Mongolia, United Nations Environmental Programme(UNEP) China Office, Basel Convention Coordinating Centre for Asia and the Pacific(BCRC China), Basel Convention Regional Centre in Tehran (BCRC Iran), and Basel Convention Regional Centre for South-East Asia (BCRC-SEA)

6 Outcome of the project

Workshop(16-17th December, 2010)

<http://en.bcr.cn/col/1257488855984/2010/12/201293154975073.html>

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6 Outcome of the project

Reports & Papers

Table of content

<p>1. Background</p> <p>1.1 Introduction of asbestos</p> <p>1.2 Asbestos-containing material and asbestos waste</p> <p>1.3 Health threat of asbestos and asbestos waste</p> <p>1.4 Significance of implementing the project</p> <p>2. Asbestos waste management in China</p> <p>2.1 Generation, Accumulation</p> <p>2.1.1 Mining & processing asbestos waste</p> <p>2.1.2 ACB waste</p> <p>2.2 Asbestos management regulations in China</p> <p>2.3 Current asbestos waste management in China</p> <p>2.4 Problems and challenges in the asbestos waste management</p> <p>3. Implementation of the pilot project on environmental sound management of asbestos waste in China</p> <p>3.1 Background of the pilot project</p>	<p>3.1.1 Objectives</p> <p>3.1.2 Principles in designing the project</p> <p>3.1.3 Technical framework of the pilot project</p> <p>3.2 Selection for the site and disposal techniques</p> <p>3.2.1 Selection for the site</p> <p>3.2.2 Selection for the asbestos waste disposal company</p> <p>3.2.3 Selection of the asbestos waste disposal technique</p> <p>3.3 Implementation progress</p> <p>3.3.1 Desk study</p> <p>3.3.2 Identification</p> <p>3.3.3 Collection</p> <p>3.3.4 Transportation</p> <p>3.3.5 Storage</p> <p>3.3.6 Disposal</p> <p>3.4 Outputs of the pilot project</p> <p>4. Conclusions</p>
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6 Outcome of the project

Reports & Papers

Asbestos and asbestos waste management in the Asian-Pacific region: trends, challenges and solutions. Jinhui LI; Qingyin DONG; Keli YU; Lili LIU. *Journal of Cleaner Production*, Volume 81, 15 October 2014, Pages 218-226

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Expectations

Through the implementation of the project, BCRC Beijing would like to:

- 1 Enhance the consciousness of environmental and health protection of relevant authorities and companies who deals with asbestos waste
- 2 Share experience and spread the appropriate management and treatment technology of asbestos waste
- 3 Facilitate the management and disposal capacity construction in Asia-Pacific region

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The 9th International Conference on Waste Management and Technology

October 29-31, 2014 Beijing, China

<http://2014.icwmt.org>

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Basel Convention Regional Centre for Asia and the Pacific,
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THANKS FOR YOUR ATTENTION!

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- ❖ Website: <http://en.bcr.cn/>

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BCRC-SEA



**BASEL CONVENTION REGIONAL CENTRE
for SOUTH-EAST ASIA**

The Environmentally Sound Management (ESM) of Asbestos Wastes in Tsunami-Affected Countries in South and Southeast Asia

Inter-Agency Workshop on the Sound Management of Industrial Chemicals, with Special Emphasis on Asbestos, for the Asia-Pacific Region in collaboration with the 7th International Seminar of the Asian Asbestos Initiative (AAI-7)

Jakarta, Indonesia, 29 Sept-1 Oct 2014

Cynthia Indriani
Executive Secretary



INTRODUCTION TO BCRC-SEA – PAST & CURRENT ACTIVITIES

Trainings / Workshops / Meetings

- **Organizer / Resource Person/ Participant**
- **National, Regional, International**
- **Cooperation with : UN bodies, governments/ministries, universities, regional/international institutions/secretariats, commercial institutions**
- **Topic : overview & synergy of 3 Conventions (Basel, Stockholm, Rotterdam), hazardous waste management, illegal trade prevention of hazardous waste, POPs**

Download report & presentation materials :
<http://bcrc-sea.org/?content=publication&cat=4>

PROJECTS

- Demonstration Project on National Inventory of Hazardous Waste in the Philippines (2005)
- Development of 2 (two) Technical Guidelines : TG on E-Waste Inventory and TG on 3 R (Reduce, Reuse, Recycle) of End-of-Life Electronic Products (2006)
- Project on Compilation of Information & Existing Technical Guidelines on Environmentally Sound Management (ESM) of Asbestos Wastes (2009)
- Pilot Project on ESM of Asbestos Wastes in Indonesia (Tsunami-affected area) (2010 - 2011)
- Development of Regional Database on E-Wastes (2010-2013)
- Desk Study for the Asian Network Workshop 2013
- Enabling Activities to Review and Update the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs) in Indonesia (ongoing)

Download : <http://www.bcrc-sea.org/?content=publication&cat=2>.

The Environmentally Sound Management (ESM) of Asbestos Wastes in Tsunami-Affected Countries in South and Southeast Asia (1)

In cooperation with :

- Secretariat of the Basel Convention (UNEP/SBC)

Funded by

- Ministry of Foreign Affairs of Japan

Administered by
Secretariat of the Rotterdam Convention

Duration
December 2009-February 2011

Part of the “Sound Management of Industrial Chemicals with special emphasis on asbestos in Asia and Pacific Region” project funded by the Ministry of Foreign Affairs of Japan and administered by the Secretariat of the Rotterdam Convention.

The Environmentally Sound Management (ESM) of Asbestos Wastes in Tsunami-Affected Countries in South and Southeast Asia (2)

Background

- Tsunami disaster (2004) - major damages in some parts of several countries in south and southeast Asia region
- Earthquake & tsunami in Indonesia (2006) – Pangandaran, West Java Province
- Regional Workshop for the ESM of Asbestos Containing Materials (19 Dec 2006) - issues on post-disaster asbestos waste management, e.g :
 - little or no asbestos waste clean-up programmes initiative in disaster areas
 - general lack of proper asbestos wastes handling, etc.

Download : <http://bcrc-sea.org/?content=publication&cat=4>

3 Activities :

No	Activities
1	Collection of existing information and guidelines for the environmentally sound management of asbestos wastes
2	Pilot project on the environmentally sound management of asbestos wastes within Indonesia
3	Regional Training Workshop on ESM of asbestos wastes

1. Collection of existing information & guidelines for the ESM of asbestos wastes, esp. handling, transportation & disposal of asbestos waste & publication of the information on the BCRC-SEA's website

- Information on asbestos waste management was collected online from internet sources
- Email request to Focal Points of the Basel Convention
- Email request to each source to validate information on its website
- Organized in 2 parts : information on asbestos & asbestos waste management guidelines
- Asbestos waste management guidelines : countries, organizations/agencies & UN organizations

BCRC-SEA's website

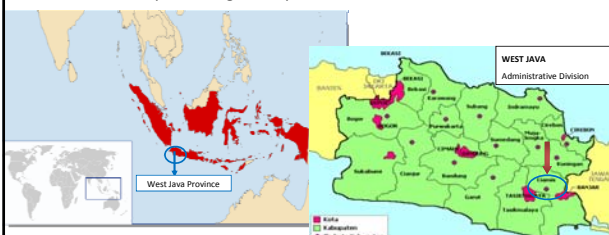
<http://bcrsea.blogspot.com/>

UNEP/SBC's website (under other publications)

<http://archive.basel.int/pub/pub.html>

2. Pilot Project on the Environmentally Sound Management of Asbestos Wastes within Indonesia (January 2010 – August 2011)

- In cooperation with West Java Environmental Management Agency (EMA) and National Institute of Technology (ITENAS)
- Located in Pangandaran, Ciamis District, West Java Province, Indonesia, experiencing earthquake & tsunami in 2006

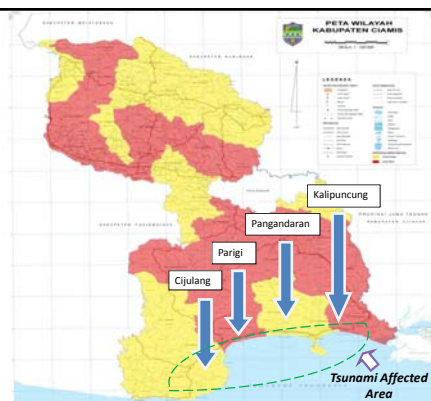


Preparation Phase

- Initial communication with local government
- Initial discussion with PT. PPLI – Waste Management Indonesia (integrated hazardous waste management facility) on survey and sampling plan
- Conduct 2 workshops (local & provincial) to discuss project implementation incl. awareness raising

Site Assessment (1)

- **Objectives :**
to select the most appropriate location which can be used as a site target for the project
- **Criteria**
 - Operational Criteria : topography and road condition
 - Administration Criteria : permit and further usage
 - Technical Criteria
 - Financial Criteria
- **Step :**
 1. Initial field observation / survey to find alternatives location
 2. Feasibility analysis to find the most suitable targeted area for pilot project



Map of the Initial Field Observation Location

Site Assessment (2)

- Surveys, observations, interviews, meetings and discussion
- Sampling for laboratory analysis to identify type of asbestos waste
- 2 alternative locations:
 - Pananjung Sari Hotel
 - Social Agency Building



Asbestos Ceiling in Pananjung Sari Hotel



Asbestos Ceiling in Social Agency Building

Site Assessment (3)

No	Criteria	Pananjung Sari Hotel	Social Agency Building
1	Asbestos Waste Quantity	± 100 m ²	± 580 m ²
2	Asbestos waste form	Friable, Ceiling Board	Friable, Ceiling Board
3	Asbestos waste existence	<ul style="list-style-type: none"> • Scattered, in buildings and floor, mixed with other waste and dust. • In Buildings : 1 main building (lobby) contain a large quantity and 16 small buildings (cottages) contain small quantity ± 4m² each. • All of the buildings are open structured 	<ul style="list-style-type: none"> • Rather in a unite / gathered location. • Consists of 4 main buildings with fully structured.
4	Building structure	The structure condition of the buildings are already fragile	The structure condition of the buildings are still quite good
5	Area conditions	Open area Surrounded by informal traders	Rather closed area Concrete wall
6	Budget Availability	High cost on removal preparation	Budget adequate for 1 building of four.

Site Assessment (4)

- Selected location : Social Agency building



Work Description Identification & Preparation

- Identification of asbestos waste : visual inspection/survey, sampling and laboratory analysis
- Method for asbestos removal : US OSHA-29 CFR 1926.1101 and Asbestos Hazard Emergency Response Act (AHERA)-40 CFR 763 procedures/standards
- Personnel qualification : general hazardous waste handling and certified training specified for asbestos handling

Work Description Site Preparation (1)

- Safety tool box briefing (remind all crew about hazards and risk)
- Barricade line installation (location of project is a limited and restricted area)



Work Description Site Preparation (2)

- Equipment preparation (air sampling equipment, PPE, asbestos removal equipment: water spray pump, surfactant, safety line, tags, vacuum cleaner, blower, polyethylene plastic liner, electric generator, water pump, etc)



- Air monitoring with small air pump (battery powered), 3 hours with filtered air volume ± 900 L.
- Laboratory analysis result : 0.05620 fibre/ml

Work Description Site Preparation (3)



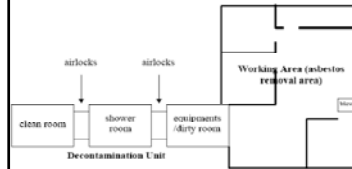
- Cleaning the surface inside the building (vacuum cleaner with HEPA filter, efficiency 99.97% at filtering particles of 0.3 micrometers in diameters)

- Plastic barrier installation (2-3 plastic liners for wall surface, 1 layer for floor surface)



Work Description Site Preparation (4)

- Installation of Decontamination Unit



Work Description Site Preparation (5)



- Exhaust Blower Installation
- PPE (protective clothing, respirator, rubber boots, rubber gloves, eye protection)



Work Description Removal Process



- Using wet method
- Entering the working area (through decontamination unit)
- Wetting the Asbestos Ceiling (low pressure mist with amended water)
- Removing the asbestos ceiling

Work Description Packaging, Storage and Labelling (1)

- Asbestos containing waste was packed in double liner plastic incl. plastic barrier, disposable coverall and gloves
- Due to long distance to disposal location, plastic wrapped material were further contained in wooden boxes



Work Description Packaging, Storage and Labelling (2)



- Indonesian Regulation Head of BAPEDAL's decree No. Kep-05/BAPEDAL/9/1995 : packaging of asbestos waste were completed with hazardous waste labels and symbols

Work Description Packaging, Storage and Labelling (3)

- Indonesian Regulation Head of BAPEDAL's decree No. Kep-02/BAPEDAL/9/1995 : prior to transportation, a hazardous waste manifest was prepared for tracking purpose

Work Description Final Air Sampling

- After the abatement work was completed, final air sampling was performed to check asbestos fiber in the air
- Laboratory analysis result : 0.05891 fibre/ml



Work Description Exiting the Working Area and Dismantling the Decontamination Unit



- **Exiting the working area**
 - entry equipment/dirty room
 - proceed to shower
 - proceed to clean room
 - decontamination unit was dismantled, together with other disposable materials e.g plastic liners, was handled and packaged as asbestos containing material

Work Description Transportation and Final Disposal



- Asbestos waste was placed in transportation vehicle (open lorry truck with cover) and transported to disposal location
- Load was weighed (680 kgs) and documentation checked; after physical inspection, waste was loaded and delivered to secure landfill

Work Description Transportation and Final Disposal (2)

- Waste was carefully placed in excavator's bucket and slowly dumped into the landfill category 2
- All waste and activities were documented and recorded in operation computerized database, Laboratory Information Management System (OLIMS)
- The secure landfill owned and operated by PT PPLI complies with the standard requirements for final disposal of hazardous waste as stipulated in Head of BAPEDAL's decree No. Kep-4/BAPEDAL/9/1995 and US-EPA standard



Project Result (1)

- Audiovisual recording of the demonstration project for training purposes
community in surrounding area watched the abatement process via TV to raise awareness of proper way of handling asbestos in the local community
- Development of comprehensive programme on ESM of asbestos waste in the pilot project area by West Java-EMA
 - to provide a framework for asbestos and asbestos waste management in the pilot project area

Project Result (2)

- the programme is expected to be used as reference for other areas/countries on ESM of asbestos waste in tsunami-affected areas
- It was found out that most people in the community lacked knowledge and awareness on asbestos, its waste and health impacts

3. Regional Training Workshop on ESM of Asbestos Wastes (1)

Jakarta, Indonesia, 19 – 21 October 2010



- Co-organized by the UNEP/SBC and BCRC-SEA, hosted by the Ministry of Environment of Indonesia
- General objective : to raise awareness as well as to provide technical and practical knowledge on ESM of asbestos wastes, especially in the collection, transportation, and disposal practices, including the health and safety aspects

3. Regional Training Workshop on ESM of Asbestos Wastes (2)

Jakarta, Indonesia, 19 – 21 October 2010

- 37 participants : Indonesia, Malaysia, Maldives, Sri Lanka and Thailand, UNEP/SBC, UNEP-DMB, ILO, WHO, BCRC-SEA, BCRC China, resource persons from local environmental agency and university and observers from several ministries and local environmental management agencies in Indonesia, universities, and private companies
- Country presentations on national regulations, asbestos management and post-tsunami handling



3. Regional Training Workshop on ESM of Asbestos Wastes (3)

Jakarta, Indonesia, 19 – 21 October 2010

- 2 working groups to discuss the Demo Technical Operation and its possibility for replication
- Each country discussed the essential elements for the development of a draft of comprehensive programme on the ESM of asbestos waste resulting from tsunami and other similar sources in each country
- Site visit to PT. Prasadha Pamunah Limbah Industri (PPLI) in Cileungsi, Bogor, West Java Province

Download report and presentation materials :

<http://bcrc-sea.org/index.php?content=publication&cat=4>

THANK YOU


Visit Our Website :
www.bcrc-sea.org


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Philippines

National Program on Asbestos Related Diseases (NPEAD) Project: Philippines




With funding support from the Rotterdam Convention Secretariat/Japanese Government
With support from the WHO Philippines Office




National Program for the Elimination of ARDs

- The institutional framework for action to eliminate ARDs in the Philippines
- To be implemented by the Inter-agency Committee on Environmental Health (IACEH), with the Department of Health as the focal point.




Objectives

1. Build up political commitment for developing the NPEAD
2. Generate data/information for the National Asbestos Profile
3. Review relevant existing policy, rules and regulations on asbestos and recommend amendments
4. Upgrade manpower capability in the early recognition and identification of ARDs
5. Develop a sufficient level (or increase the level) of awareness of health risks posed by asbestos





Project Components

1. Development of an Institutional Framework for the NPEAD
2. Development of a National Asbestos Profile for the Philippines (NAP)
3. Review and Development of Legislations, Regulations, and Guidelines Relevant to the Elimination of ARDs in the Country
4. Medical Surveillance



I. National Asbestos Profile (Philippines)


- provides regulatory agencies with background information on the importation, use, handling and disposal of asbestos in the country
- Inter-Agency support
- Funding support from the Rotterdam Convention Secretariat
- Project Lead: UP-College of Public Health
 - Departments of Health, Labor and Employment, Environment and Natural Resources, Finance, Science and Technology, industry, labor union
- Secondary data gathering from government agencies and non-government organizations

National Asbestos Profile

Based on the WHO-ILO guidance document for the development of national programs for the elimination of ARDs

- Compiles all relevant information reflecting the current situation in the Philippines
- Defines the baseline situation regarding the:
 - consumption of the various types of asbestos, asbestos-related diseases, populations at risk from current and past exposures to asbestos
- To be updated periodically
- Basis for monitoring progress in terms of program implementation



Methodology



- Secondary data gathering from government agencies and non-government organizations – DOLE, LCP-DOH, WHO-Philippines, NSO, BOC, ECC, GSI, SSS, ACIP, EMB-DENR & ROs, PCS, POEA, DTI, MGB, NHA, CSC, BFP-DILG
- Key informant interviews for data validation
- Review of local literature/research
- Consultative meetings with key agency representatives/experts

Project completion: March, 2013

1. Current Regulations on Asbestos

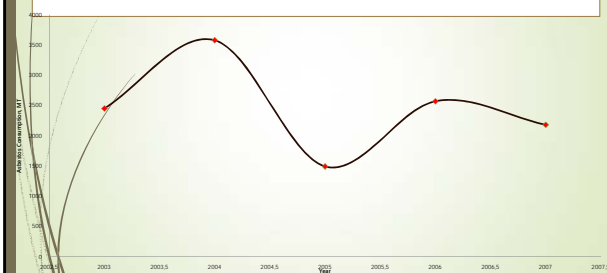
- Chemical Control Order (CCO) for Asbestos, 2000
- National Building Code, 1972
- Occupational Safety and Health Standards, 1978
- DENR Administrative Order (DAO) 2005-27 : [Revised Priority Chemical List](#), 2005
- DAO 2004-36: Procedural Manual for Hazardous Waste Management, 2000
- Proposed House Bill 479 and 896: "An Act Banning the Importation, Manufacture, Processing, Use or Distribution in Commerce of Asbestos and Asbestos-Containing Products", 2010

Chemical Control Order (CCO) for Asbestos

- Enacted in 2000 under Republic Act 6969 (Toxic Substances and Hazardous and Nuclear Wastes Act) and DENR Administrative Order No. 29 series of 1992.
- To control and regulate the use of asbestos and its disposal into the environment
- CCO addresses the ban on amphibole asbestos while still allowing specific uses of chrysotile asbestos.
- Covers the treatment, storage and disposal of asbestos containing materials and asbestos containing wastes.

2. Importation of Asbestos

Asbestos consumption in the Philippines between 2003 and 2006 ranged from 1,490 MT in 2005 and 3,580 MT in 2004.



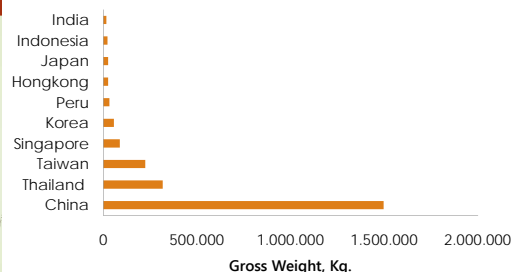
Source: U.S. Geological Survey

By type of ACM

Description	Gross Weight (Kg.)
Brake linings and pads	1,157,661
Clothing, clothing accessories and headgear	16,596
Clothing, clothing accessories and footwear	13,669
Compressed asbestos fiber jointing,	320 sheets/rolls
Cords and string, whether or not plaited	7,891
Fabricated asbestos fiber	125,916
Woven or knitted fabric	961
Yarn and thread	74,455
Gaskets	6,620
Shingles and roofing	11,288
Others	377,319

Source: National Statistics Office, 2010

10 Major Exporters of ACM



Other exporters: Malaysia, Germany, UK and N. Ireland, USA, Netherlands, Sweden, Australia, Spain, France, Finland, Canada, Mexico, Greece

Japan and Korea has totally banned asbestos in 1995 and 2009, respectively.
Source: National Statistics Office, 2010

5. Estimated Total Number of Workers Exposed to Asbestos

Directly Exposed	664	12.55%
Indirectly Exposed	645	12.20%
Potentially Exposed	3,980	75.25%
TOTAL	5,289	100

Source: Association of Chrysotile Industries in the Philippines (ACIP), 2012 and Occupational Safety and Health Center (OSHC), 2008

6. Full list of industries where exposure to asbestos is present and list of industries with the largest numbers of workers potentially exposed to asbestos

CATEGORY	NO.	PERCENTAGE
Distributors of ACMs	4	2.79
Importers and Distributors of Asbestos/ACMs	70	48.95
Importer, Manufacturer and Distributor of Asbestos/ACMs	34	23.78
Users of Asbestos/ACMs	35	24.48
Total	143	100

Source: Association of Chrysotile Industries in the Philippines (ACIP), 2012 and Occupational Safety and Health Center (OSHC), 2008

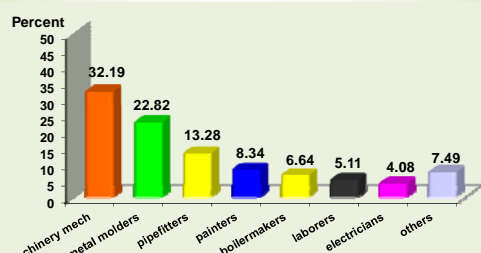
7. Industries with high risk of exposure and estimated total number of workers at high risk

- * Work environment measurement performed by the OSHC-DOLE in 27 companies/industries with a total of 3,966 workers
- * **No exceedances in asbestos concentration**
- * Philippine standard (2 fibers/cc, 5 micrometer in length) is high which results in an underestimation of the number of workers at high risk of exposure to asbestos.

9. Prevalence of asbestosis (total number of workers with diagnosed asbestosis, asbestos-related lung cancer and mesothelioma to-date)

- Asbestosis
 - 387 out of the 1,542 workers from the former Subic Naval Facility have asbestosis (LCP-DOH)
 - 12 out of the 86 workers from 4 companies that use asbestos as a raw material for manufacturing manifested changes suggestive of asbestosis (Asbestos Country Report, OSHC-DOLE)
 - 19 reported cases between 1997 to 2003 (TUCP)
 - 10 workers (welder, pipefitter, painter, laborer, carpenter and air compressor operator, foreman marine machinist, crane operator/foreman, boiler maker/shipboard/ship work repair, welder) (SSS)

LCP Asbestos Screening Program, 1992-1996 Percentage Distribution by Occupation



Diaz, D. Asbestos-related diseases in the Philippines: The Lung Center of the Philippines Asbestos Screening Program, *Acta Medica Philippina* 2009, 43 (3): 64-69

Malignant Mesothelioma

LUNG CENTER OF THE PHILIPPINES

Patients with a Malignant Mesothelioma (Pleural): 2000-2012

11 cases: Age range: 49-74 years old

Philippine Cancer Society

There are 33 registered cases of Mesothelioma in the Philippine Cancer Society.

According to the PCS, the information provided are "not sufficient to be analysed further to indicate any cause-effect relationships, hence no conclusion at this point can be made accordingly."

11. Estimates on the percentage of house stock and vehicle fleet containing asbestos

- 1940 – The Philippine Homesite and Housing Corporation (PHHC) has constructed dwelling units using asbestos as roofing in seven cities all over the country, namely: Quezon City, Caloocan, Tagaytay, Tacloban, Iloilo, Bacolod, Roxas City
- 1975 - National Housing Authority (NHA) was established and took over the functions of the PHHC, they have ceased the use of asbestos in all its housing projects.
- does not have available data on the quantity and type of asbestos used on the projects built before 1975.

12. Total number of workers eligible for compensation for ARDs, such as asbestosis, lung cancer and mesothelioma (per year) and the number of individuals compensated yearly

Type of Disease	Number of Workers who Filed for Compensation
Asbestosis	10
Asbestos-Related Diseases (ARDs)	9
Mesothelioma	1
Total	20

Source: SSS, 2012

Under P.D. 626 : Employees' Compensation and State Insurance Fund

13. National enforceable occupational exposure limits

Table 8d
Human Carcinogens

Asbestos, all forms.....2 fibers/cc.
5 micrometer in length

- Based on the Occupational Safety and Health Standards of DOLE
- Does not single out the chrysotile type of asbestos

Major Studies on Epidemiology of ARDs

- A study of former shipyard workers at the Subic naval base (Diaz, Dina V., 2009)
 - Lung Center Asbestos Screening Program from 1993-1996
 - The U.S. Naval facility closed in 1991
 - Total of 1,542 workers screened for ARDs by chest X-ray
- Mean duration of employment – 24.07 years
Mean Age range – 62.18 (43-84 years)
Percent smokers – 92.74%
- Completed tests/total no. screened – 796/1,542 = 58.75%
(+) Chest x-ray or HRCT scan/Evaluable cases – 302/587 = 51.44%

Diaz, D. Asbestos-related diseases in the Philippines: The Lung Center of the Philippines Asbestos Screening Program, *Acta Medica Philippina*, 2009, 43 (3): 64-69

Medical Surveillance: PNPEAD

- I. Purpose of the Surveillance
- II. Surveillance Team
- III. Components
- IV. Program Evaluation

Medical Surveillance: PNPEAD

- III. Components
 - Industry-Based Surveillance
 - Sentinel health care provider-based or Physician-based surveillance
 - Procedures
 - Case definitions
 - 1) asbestosis without pleural disease
 - 2) asbestosis with pleural disease
 - 3) asbestos-related pleural disease
 - 4) asbestos-related malignancy
 - Medical Examinations
 - Baseline evaluation
 - Periodic Evaluation
 - Definition for abnormal tests
 - Workplace Dust Sampling Surveys
 - Data Inventory/Collection
 - Data Analysis/Interpretation of Results
 - Feedback Procedures

Institutional Framework on Asbestos

Development of an Institutional Framework for the NPEAD

- Policy
 - DENR – CCO (phase-out plan?), Code of Practice, GHS
 - DOLE – workplace standards, compensation for ARDs
 - DOH – Medical Surveillance
 - DOST/DTI – alternatives/research
 - DOF (Bureau of Customs) –importation
 - Labor groups /academe– education and awareness
 - Academe – researches



Issues/problems

- No. of patients with ARDs possibly underreported
- Health surveillance system for ARDs – legally mandated or voluntary?
- The process of selecting subjects for screening and surveillance is unclear
- Lack of trained physicians (B readers) to accurately interpret X-ray results



CHALLENGES

- Unavailability and inaccessibility of data
 - Estimate of the economic losses due to ARDs
 - Data from the informal sector: unregistered car repair shops
 - Burden of disease due to ARDs
 - Estimates on the percentage of house stock and vehicle fleet containing asbestos
- Limited number of epidemiologic studies on ARDs
- Philippine standard for asbestos is high
 - The proportion of workers at high risk of exposure to asbestos is underestimated



CHALLENGES

- Lack of trained medical personnel (B readers) results in poor health surveillance
- Lack of capability to conduct exposure assessment among the informal sectors
- Lack of education and awareness of the public regarding asbestos and the health hazards it poses



RECOMMENDATIONS

- Data banking to improve access to information
- More studies on ARDs should be undertaken
 - Provide opportunities for this field of study through adequate funding, government support and linkages for massive involvement
- Review and revise the current standard to protect worker's health
- Education of the public to increase awareness



Way Forward

- Ethically, with mounting international scientific evidence, and movement by countries to ban all asbestos including chrysotile
- Philippines cannot risk maintaining its status quo, and allow an estimated 5,289 employees annually to die from preventable occupational hazards and leaving their families to suffer from repercussions from a serious debilitating disease and financial burden.
- With the focus on Universal Health Care or “Kalusugang Pangkalahatan” of the Aquino Administration, the country cannot ignore and allow these Filipinos while contributing to the national economy to suffer incurable and fatal ill-health.
- Support from the labor union



Policy Review on Asbestos, UP-CPH, unpublished, 2013

Way Forward.....

- Inter-Agency Technical Advisory Committee chaired by the Department of Environment and Natural Resources to revisit these regulations and work towards the review and enactment of regulations for the substitution and phasing out of specific uses of chrysotile asbestos in the workplace by replacing them with less dangerous substances.
- Department of Health, the issuance of Administrative Order No. 2013-0009 on the National Chemical Safety Management and Toxicology Policy addresses the need for strategic approaches in chemicals management to protect human health and the environment



Way Forward.....

- need for stronger regional and inter-sectoral collaboration and cooperation
- participation of a wide range sectors in our society who represent divergent interests and perspectives must take into full account a wholistic and convergent approach towards these initiatives.
- build upon the momentum and opportunities presented in this conference and continue our partnerships towards implementing the national program on the elimination of asbestos-related diseases.



References

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- Diaz, D. Asbestos-related diseases in the Philippines: The Lung Center of the Philippines Asbestos Screening Program, *Acta Medica Philippina*, 2009, 43 (3): 64-69
- Association of Chrysotile Industries in the Philippines, A Powerpoint Presentation: Chrysotile – The Safe Asbestos, 2001
- Department of Health. Inter-agency awareness-raising workshop on the sound management of industrial chemicals, with special emphasis on asbestos, for the Asia-Pacific Region. 2010.

Images:

- <http://trade.indiamart.com/details.mp?offer=1911078>
- <http://www.legal-mesothelioma-help.com/whatisasbestos.html>
- <http://researchcopy.blogspot.com/2010/05/lung-center-of-philippines-basic->



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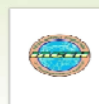
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- National Statistics Office. (2012). *Foreign Trade Statistics*.
- Romero, C. (2013, February 10). Conduct of Research on the National Profile on Asbestos. *Letter*. Bureau of Fire Protection.



Updates on Asbestos and other Industrial Chemicals: Philippines




Inter-Agency Committee on Environmental Health



- Steering Committee under the Occupational Health and the Toxic Substances and Hazardous Waste Sectors (IACEH)
 - Formulate mandates, responsibilities and accountability
 - Manage the development, implementation and evaluation of the NPEAD
 - Chaired by the Department of Labor and Employment (DLE) and the Department of Environment and Natural Resources (TSHW)
 - Secretariat – Department of Health
 - Members include the Departments of Science and Technology, Trade and Industry, Finance (Bureau of Customs), National Economic Development Authority, academe (UP-CPH), labor groups and industry representatives, WHO/PHI Office





DOH AO 2013-0009
(March, 2013)
National Chemical Safety Management and Toxicology Policy (NCSMPT)
- National Profile
- Framework on the NCSMPT
UNEP-SAICM QSP

Asbestos

Manpower Capability on Asbestos

- Training of Health Personnel on the Early Recognition and Management of ARDs in cooperation with WHO Philippine Office (DOH and Lung Center of the Philippines)
- Training on Asbestos Analysis sponsored by KOSHA
 - DOLE -
 - DOH - 2
 - DENR
- Forwarded request to ILO for the Training in Reading Pneumoconiosis Radiographs according to ILO Classification
 - Forwarded request to the MOPH Thailand for the B reader training (Air Pnuemo Project) - December 16-18, 2014
 - @ 3-4 pax (last tranche from the Rotterdam Secretariat Project of \$10,000)

WHO support for training to be held in Manila (?)

AAI VI

Department of Health (DOH), in collaboration with the World Health Organization, the International Labor Organization, the University of Occupational and Environmental Health-Japan
With support from DOLE, DENR, DOST, DOF, UP-Manila, etc

211 participants from 30 countries participated

DOH Hosts International Meet for Asbestos-free World
<http://news.pia.gov.ph/index.php?article=2131384677661>



6TH INTERNATIONAL SEMINAR ON THE ASIAN ASBESTOS INITIATIVE
November 14-15, 2013
Pan Pacific Manila, Philippines
"Strategic Approaches Towards the Elimination of Asbestos Related Diseases"

Health Advisory on Asbestos Health Hazards During Disaster Clean-Up

Republic of the Philippines
Department of Health
OFFICE OF THE SECRETARY

DEC 18 2010

DEPARTMENT CIRCULAR
No. 2013 - 0009

FOR: ALL UNDERSECRETARIES, ASSISTANT SECRETARIES, DIRECTORS OF BUREAUS, CENTERS FOR HEALTH DEVELOPMENT, SERVICES AND SPECIALITY, HOSPITALS, CHIEFS OF MEDICAL CENTERS AND HOSPITALS AND CHIEFS CONCERNED

SUBJECT: Health Advisory on Asbestos Health Hazards During Disaster Clean-Up for Urgent Dissemination

In the light of the impact of Typhoon Yolanda on infrastructures in the affected communities, this Office is issuing the following health advisory, for urgent dissemination to clean-up workers, responders and the general public.

For information and guidance:

By Authority of the Secretary of Health:

ENRIQUE T. OCHOA, MD, FPMID, PHSAE, CESO III
Assistant Secretary for Health
Support to Service Delivery Technical Cluster II

Employees' Compensation Commission (ECC) Board Resolution No. 12-09-18

- amended the conditions for compensability of pneumonia, bronchial asthma, pneumoconiosis and asbestosis and other pulmonary conditions.
- amendment expands the coverage and conditions for compensability of occupational respiratory diseases in accordance with recent scientific, clinical and diagnostic updates.

Other Chemicals



Chemical Control Orders



DENR Administrative Order No. 97-38 - "The Chemical Control Order for Mercury and Mercury Compounds".

This regulates the importation, manufacture, processing, use, transport and distribution of mercury and its compounds.



DENR Administrative Order No. 97-39 - "The Chemical Control Order for Cyanide and Cyanide Compounds".

This regulates the importation, manufacture, processing, use, transport and distribution of cyanide and its compounds.



DENR Administrative Order No. 2000-18 - "The Chemical Control Order for Ozone Depleting Substances".

This regulates the importation, manufacture, processing, use, transport and distribution of ozone depleting substances.



DENR Administrative Order No. 2000-02 - "The Chemical Control Order for Asbestos".

This is to control and regulate the use, import, storage, transport and disposal of asbestos.



DENR Administrative Order No. Chemical Control Order for Polychlorinated Biphenyls (PCB).

This regulates the importation, manufacture and industrial uses of PCBs. It also addresses the storage and disposal of wastes including the containers and discarded materials contaminated with this chemical.

Chemicals

Initiatives on

- GHS
- Metals
 - Lead
 - Mercury – Minamata Convention
 - Arsenic
 - E-waste
- POPs (Dirty Dozen)
- POPs (Nasty Nine +1)
- Chemical Emergencies
 - National Oil Spill Contingency Plan
 - Alerting and Notification
- Children's Environmental Health



Activities

- Governance
- Risk Reduction Initiatives
- Capacity Building and technical cooperation
- Research
- Knowledge and Information



UOEH, Japan and Japan Occupational Safety and Health Resource Centre

Toolkit for Elimination of Asbestos-Related Diseases

Taeko Yamada¹, Sugio Furuya², Eun-Kee Park³
Ken Takahashi¹

¹University of Occupational and Environmental Health, Japan

²Japan Occupational Safety and Health Resource Center

³Kosin University

7th Asian Asbestos Initiative, Jakarta, Indonesia

Sep. 29 to Oct. 1, 2014

Memorandum of Understanding

1. **Identify** relevant information from existing information materials
2. Review and select information that are of importance and **relevance to developing Asian countries**
3. Write **annotation** to each document
4. Write **introduction** to each section of the document
5. Synthesize and reflect comments provided by **piloting countries** in the final version of the toolkit

Signed with: UNEP represented by the Rotterdam Convention Secretariat
Lead organization: UOEH, Japan
Co-lead organization: OSHRI, KOSHA, Korea

7th Asian Asbestos Initiative, Jakarta, Indonesia

Sep. 29 to Oct. 1, 2014

Chapters

1. Asbestos Exposure Assessment, Risk Identification, and Substitutes
2. Asbestos-Related Legislations and Regulations
3. Diagnostic Tools for ARDs (asbestos-related diseases)
4. Economic Cost/Burden Incurred by Asbestos Exposure and ARDs
5. Risk Communication

Coherent with presentations at AAI International Seminars

7th Asian Asbestos Initiative, Jakarta, Indonesia

Sep. 29 to Oct. 1, 2014

Chapter 1 and 2

1: Asbestos Exposure Assessment, Risk Identification, and Substitutes

Subcomponents	Examples
1-A. Asbestos Hazard Identification	Types of asbestos, their physical & chemical properties, hazard information, e.g., IPCS Environ Health Criteria, IARC Monograph
1-B. Asbestos Exposure Assessment and Control in Occupational Settings	Environmental monitoring, industrial hygiene, common exposure levels, e.g., WHO methodology, HSE asbestos essentials
1-C. Epidemiology of ARDs	Literature review, global/regional-level estimate burden of ARDs
1-D. High Risk Occupation and Industries in regards to ARDs	Finnish J-E matrix, WHO-GBD, ILO Table for occupations
1-E. Asbestos Substitute	Use, cost, advantage/disadvantage, toxicology & epidemiology

2: Asbestos-Related Legislations and Regulations

Subcomponents	Examples
2-A. Case Studies of Asbestos-Related National Legislations	Documents on asbestos-related legislations & regulations, e.g., Thailand, Korea, Japan
2-B. Asbestos-Related Policies in International Organizations	Policies by WHO, ILO, Rotterdam C., Basel C., ISSA, World Bank, EU
2-C. Asbestos-Related Guidelines	Abatement procedures, exposure reduction, labeling, e.g., EU Labour Inspectors, OSHA (NIOSH) and WHO

Chapter 3 and 4

3: Diagnostic Tools for ARDs

Subcomponents	Examples
3-A. Existing International Diagnostic Criteria and Tools	Helsinki Criteria, ILO Classification of Pneumoconiosis, EU standard questionnaires
3-B. Clinical Diagnosis (CD) of Mesothelioma	Overview and summary of existing criteria and reference to screening
3-C. CD of Asbestos-Induced Lung Cancer	
3-D. CD of Asbestosis	
3-E. CD of Pleural Plaque, Pleural Thickening and Pleural Effusion	
3-F. Pathology of Mesothelioma	

4: Economic Cost/Burden Incurred by Asbestos Exposure and ARDs

Subcomponents	Examples
4-A. Economic Cost/Burden Incurred by Asbestos Exposure	Cost to control exposure in national situation presupposing continued use vs. banned use, e.g., abatement and removal
4-B. Economic Cost/Burden Incurred by ARDs	Cost of ARDs in one or several Asian countries accounting for, e.g., medical cost, income loss, compensation, YLL and loss of productivity

Chapter 5

5: Risk Communication

Subcomponents	Examples
5-A. Collection and/or Development of Awareness-Raising Materials Aimed at the General Public	Fliers, posters, audio-visual materials to raise awareness on hazards, risks, health check-ups, case-studies, chemical safety data cards, interviews
5-B. Collection and/or Development of Interview Films and Documented Testimonies of ADRs Victims	
5-C. Collection of Existing Education and Training Materials regarding Occupational Safety and Health Aimed at Workers Handling or with Possible Exposure to Asbestos	
5-D. Mesothelioma from the Patient's Perspective	

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Sep. 29 to Oct. 1, 2014

Example: Factsheet
Chapter 1-C-64: Cancer mortality in a surveillance cohort of German males formerly exposed to asbestos

● **Asian context**

The authors confirmed that fibrotic alterations of the pleura and lung are predictors of pleural mesothelioma as well as lung cancer.

Thus a surveillance program for these may be important to monitor future mesothelioma cases in Asian countries.

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Example: Factsheet
Chapter 1-C-64: Cancer mortality in a surveillance cohort of German males formerly exposed to asbestos

● **Critical appraisal**

A group of 576 highly exposed subjects identified in a registry of former employees exposed to asbestos dust were examined by HRCT and followed up through 2007. A high risk was observed for pleural mesothelioma (SMR 28.10; 15.73-46.36) and asbestosis was a significant risk factor for mesothelioma (RR 6.0; 2.4-14.7).

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Example: Factsheet
Chapter 1-C-64: Cancer mortality in a surveillance cohort of German males formerly exposed to asbestos

● **Unique keywords**

Mesothelioma,
lung cancer,
mortality,
asbestosis

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Example: Factsheet
Chapter 1-C-64: Cancer mortality in a surveillance cohort of German males formerly exposed to asbestos

● **Annotation**

Fact 1: In a German study of 576 highly exposed subjects identified from a registry of former employees exposed to asbestos dust, 15 male workers died from pleural mesothelioma (SMR 28.10; 15.73-46.36).

Fact 2: Pleural thickening and plaques at baseline were related with a non-significantly increased relative risk of 2.1 (0.9-4.9) for developing subsequent pleural mesothelioma.

Fact 3: Asbestos-related occupational disease, including asbestosis and pleural thickenings, was recognized among 13 of the 15 mesothelioma cases and associated with a significant subsequent mesothelioma risk (RR 6.0; 2.4-14.7).

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Production

- Two-volume set of books
- CD-ROM
- Website

Toolkit for the Elimination of Asbestos-Related Diseases

<http://envepi.med.uoeh-u.ac.jp/toolkit/index.html>

7th Asian Asbestos Initiative, Jakarta, Indonesia Sep. 29 to Oct. 1, 2014

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5. Risk Communication

Toolkit for Elimination of Asbestos-Related Diseases
Sugio Furuya

7th Asian Asbestos Initiative, Jakarta, Indonesia

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5. Risk Communication

- **5-A** Collection and/or Development of **Awareness-Raising Materials** Aimed at the General Public [JOSHRC]
- **5-B** Collection and/or Development of Interview Films and Documented **Testimonies of Asbestos-Related Disease Victims** [JOSHRC]
- **5-C** Collection of Existing **Education and Training Materials** regarding Occupational Safety and Health Aimed at Workers Handling or with Possible Exposure to Asbestos [JOSHRC]
- **5-D** Mesothelioma From the Patient's Perspective [UOEH]

7th Asian Asbestos Initiative, Jakarta, Indonesia

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5. Risk Communication A. Awareness-raising materials

Flyer/Poster

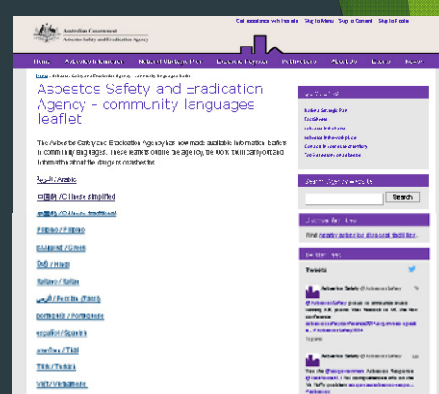


7th Asian Asbestos Initiative, Jakarta, Indonesia

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Community Languages Versions

Arabic
Chinese (simplified and Traditional)
English
Filipino
Greek
Hindi
Italian
Persian (Farsi)
Portuguese
Spanish
Thai
Turkish
Vietnamese



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A Brief Guide to Asbestos in Emergencies: Safer Handling & Breaking the Cycle

http://sheltercentre.org/sites/default/files/Asbestos_in_Emergencies.pdf

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Amankah Keluarga Anda?

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World Bank Group 2009
<http://siteresources.worldbank.org/EXTPOPS/Resources/AsbestosGuidanceNoteFinal.pdf>

Aus Embassy Direct Aid Program
<http://www.laos.embassy.gov.au/files/vtan/DAP%20Application%20form%202014-2015.pdf>

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ขอเมืองไทยไร้ใยหิน
 No asbestos in Thailand

การรณรงค์เผยแพร่

Thailand
<http://www.noasbestos.org/comic/index.html>

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石の綿

より多くの人にアスベストのことを知ってもらいたい！
アスベスト公害の 序章

Japan
http://www.kyoto-seika.ac.jp/researchlab/?post_type=publications&p=308

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2014 Japan: "Earthquake and Asbestos"
http://www.kobe-u.ac.jp/info/public-relations/book/1404_01_1.html

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Japanese
English
Tagalog
Chinese
Korean
Thai
Indonesian
Vietnamese
Russian



Asbestos and Children (FREA)
http://plaza.umin.ac.jp/~FREAKIDS/english/index_e.html

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5. Risk Communication
B. Testimonies of asbestos victims/families



Mr. Yoshikazu Hayakawa
I was diagnosed with pleural mesothelioma in January, 2004
<http://www.youtube.com/watch?v=9eJskpqDHvw>
 messages of japanese asbestos victims 02 messages english title

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Final product will be full color

2014 Japan: 10th anniversary book of Japanese national network of asbestos victims and their families

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<- 2011 Meeting with Minister of the Environment



2009 Public Hearing at National Diet ->



Korean national network of asbestos victims and their families

7th Asian Asbestos Initiative, Jakarta, Indonesia Sep. 29 to Oct. 1, 2014



5. Risk Communication

C. Educational and training materials

Bengali
Cambodia
Chinese
English
Hindi
Indonesian
Japanese
Korean
Laotian
Mongolia
Myanmar
Nepalese
Pakistan
Russian
Tagalog
Tamil
Thai
Vietnam



How asbestos fibers inhaled into the human lung can cause deadly diseases

<http://www.youtube.com/anroav>

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5. Risk Communication

D. Mesothelioma from patient's perspective

Clayson H, Seymour J, Noble B
Hematol Oncol Clin North Am 2005 Dec;19(6):1175-90

This study reports findings from qualitative semi-structured interviews with 15 patients who suffered from mesothelioma. The results are described under four headings that reflect the main themes that arose from the data: coping with symptoms (particularly breathlessness and pain), finding out about mesothelioma and its implications, the trauma of medical interventions, and psychosocial issues. The results illustrate the severe disease burden that is borne by people who have mesothelioma. It is hoped that a greater understanding of mesothelioma from a patient's perspective could inform the response of health care professionals.

Dr Clayson is now starting a breathlessness intervention project for asbestosis victims in India. ("SHWAAS", Sanskrit word "breathe")

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Toolkit for Elimination of Asbestos-Related Diseases

Taeko Yamada¹, Sugio Furuya², Eun-Kee Park³
Ken Takahashi¹

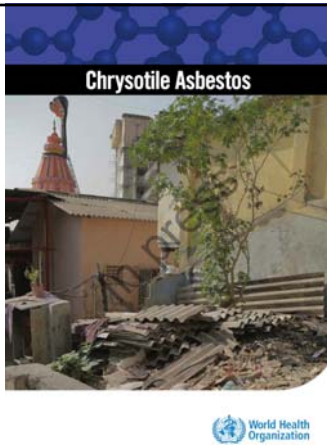
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SESSION 3

WHO



Chrysotile Asbestos

Contents

- Elimination of asbestos-related diseases
- Commonly-raised questions and answers
- Additional information
- Technical summary of WHO evaluation of chrysotile

? Is it true that chrysotile is not really a form of asbestos?

No. Chrysotile is one of six forms of asbestos, the others being crocidolite, amosite, tremolite, actinolite and anthophyllite.


? Can we be certain that the scientific evaluations of asbestos by WHO and IARC are wholly independent of outside influence?

Yes. In every case, measures were taken to ensure that potential conflicts of interest were identified and addressed, that the assessments were extremely rigorous and independent of the views of governments, national institutions and special interest groups, and that they took account of opinions from all regions of the world and were subject to extensive international peer review.

Film

Victims of Chrysotile Asbestos

Greg Atkins



Carcinogenicity of Chrysotile Asbestos

Dana Loomis, PhD

International Agency for Research on Cancer
Lyon, France

Inter-Agency Workshop on Sound Management of
Industrial Chemicals
Jakarta, 29 September 2014

Carcinogenicity of Asbestos IARC Evaluation


- **All forms of asbestos** (chrysotile, crocidolite, amosite, tremolite, actinolite and anthophyllite) **are carcinogenic to humans (IARC Group 1)**.
- There is *sufficient evidence* in humans for the carcinogenicity of **all forms of asbestos**. Asbestos causes mesothelioma and cancers of the lung, larynx and ovary.
- There is *sufficient evidence* in experimental animals for the carcinogenicity of all forms of asbestos.

IARC Monograph Vol 100C*
Evaluated 2009, published 2012
<http://monographs.iarc.fr/>

Asbestos Mineral Types

Asbestos

Serpentines
Chrysotile
(White asbestos)



Amphiboles

Actinolite
Tremolite
(Brown asbestos)

Amosite
Anthophyllite
Crocidolite
(Blue asbestos)

Other asbestos-like
mineral fibres

International Agency for Research on Cancer
World Health Organization

IARC Evaluations of Asbestos 1973-2009

IARC has evaluated asbestos 4 times with the same result:

- 1973 (Volume 2)
- 1977 (Vol 14)
- 1987 (Supplement 7)
- 2009 (Vol 100C)
- Result: sufficient evidence of carcinogenicity in humans and experimental animals (Group 1)
- Applies equally to all forms: actinolite, amosite, anthophyllite, **chrysotile**, crocidolite, tremolite

International Agency for Research on Cancer
World Health Organization

Other International & National Evaluations

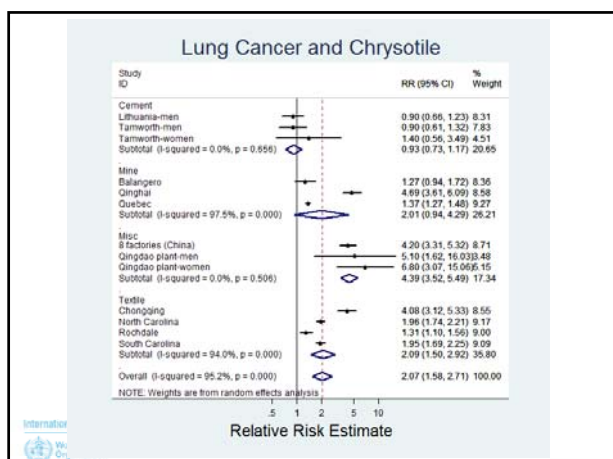
- USA NTP, 2005, asbestos and all commercial forms: known to be human carcinogen
- US-EPA, 1988-1993, asbestos: a human carcinogen
- Australia: category 1, established human carcinogen
- German MAK, 2004, asbestos all forms: K1
- ACGIH, 2004, asbestos, all forms: A1
- ICSC: chrysotile is carcinogenic to humans
- EU, January 2005, chrysotile asbestos ban

International Agency for Research on Cancer
World Health Organization

International Agency for Research on Cancer
World Health Organization

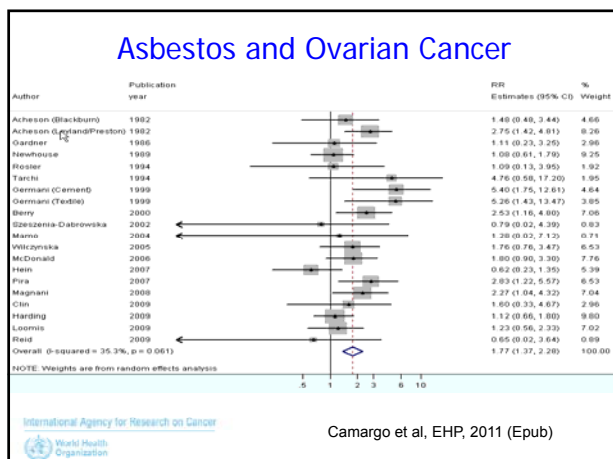
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1



Asbestos: Laryngeal cancer, V100C

- Fairly consistent findings in occupational cohort studies, but small numbers
- Positive associations in 14 of 15 case-control studies
- Evidence of positive exposure-response with cumulative exposure in several well conducted cohort studies.
- Meta-analyses of 29 cohort studies of 15 case-control studies of asbestos exposure and laryngeal cancer by the US Institute of Medicine (2006)
 - Overall RR for any exposure: 1.4 (95% CI 1.64-2.47)
 - RR for "high" exposure: 2.57 (1.47-4.49)



IARC Evaluations of Asbestos Other Cancer Sites

- There is *limited* evidence in humans for all forms of asbestos and cancers of the **pharynx, stomach and colorectum**.
- The Working Group classified the evidence for colorectal cancer as *limited* although the Members were evenly divided as to whether the evidence was strong enough to warrant classification as *sufficient*.

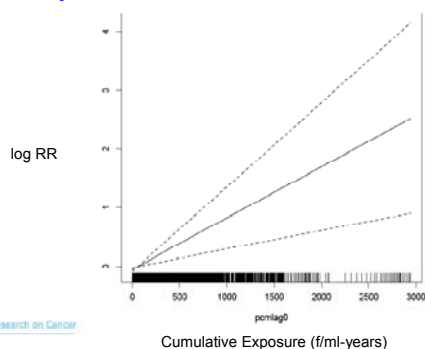
Evidence on Asbestos Since Vol 100C

- Evidence continues to accumulate and **supports all the conclusions of carcinogenicity**
- High-quality studies of workers exposed to chrysotile with individual exposure data
- Evidence for additional cancer sites
- New meta-analyses of the database

New Evidence on Chrysotile Respiratory Cancer

- Update of Balengero chrysotile miners (Pira 2009)
 - Lung cancer SMR 1.27 (0.93-1.70)
 - Plural cancer SMR 4.67 (1.27-11.96)
- Pooled analysis of Carolina textile cohorts (Elliott, 2012)
 - Analysis of fibre size and type by TEM (0.04% amphibole)
 - Lung cancer SMR 1.90 (1.70-2.11)
 - RR 1.10 (1.05-1.15) per 100 f.yrs/ml
 - Mesothelioma SMR 8.6 (1.8-25.2)
- Meta-regression analyses of asbestos and lung cancer
 - Influence of exposure data quality (Lenters 2012)
 - Shape of exposure-response (van der Bij 2013)

Lung Cancer Exposure-Response for US Chrysotile Textile Workers



International Agency for Research on Cancer
World Health Organization

New Evidence on Chrysotile Respiratory Cancer

- Chinese chrysotile miners (Wang 2013)
 - Essentially pure chrysotile (<0.01% amphibole)
 - Qinghai: 1589 men, 1981-2006
 - Lung cancer SMR 4.69 (3.61-6.09) overall
 - RR 1.47 (1.30-1.67) per 100 f.y/ml, adjusted for smoking
- Chinese chrysotile textile workers (Wang 2012; 2014; Deng 2012)
 - <0.001% tremolite
 - Chongqing: 586 men, 277 women, 1972-2006
 - Lung cancer RR 2.99 (1.30-6.91) high exposure men, smoking adj
 - RR ~ 1.2 (1.1-1.3) per 100 f.y/ml, adjusted for smoking
 - Larynx SMR 4.26 (1.17-15.52)

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World Health Organization

New Evidence on Chrysotile Digestive Cancer

- Chinese chrysotile miners (Lin 2014)
 - Stomach SMR 1.50 (0.91-2.47)
 - Oesophagus cancer SMR 1.45 (0.76-2.75)
 - Colorectum SMR 1.94 (0.76-4.99)
 - Significant exposure-response for stomach ($p < 0.001$) and oesophagus ($p = 0.009$)
- Chinese textile workers (Wang 2013, men)
 - Stomach SMR 0.43 (0.15-1.27)
 - Oesophagus SMR 1.25 (0.61-2.59)
 - Colorectum SMR 1.07 (0.36-3.15)

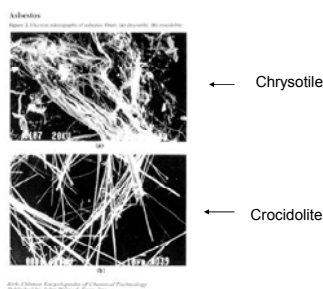
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World Health Organization

Open Scientific Questions

- There are long-standing scientific debates about the extent to which there are *potency* differences for the particular *forms* of asbestos (i.e. chrysotile versus amphiboles) and *sizes* (i.e. long and thin fibers).
- These questions do not alter the fundamental conclusion that ***all forms and sizes of commercial asbestos fibers are carcinogenic to humans.***

International Agency for Research on Cancer
World Health Organization

SEM images showing variation in fiber morphology



International Agency for Research on Cancer
World Health Organization

USGS Open File Report 02-149, Asbestos: Geology, Mineralogy, Mining and Uses

Open Questions: Lung Cancer

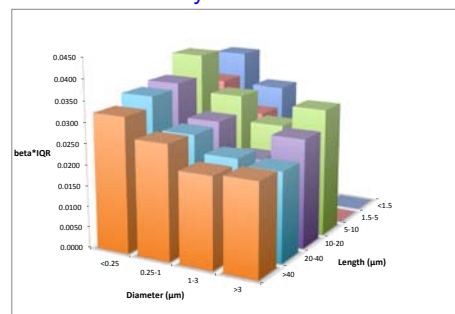
- Does potency for lung cancer vary by fibre type?
 - Complicated by large heterogeneity among studies
 - Meta-analysis by Hodgson & Darton (2000): 2-50x greater potency for amphibole relative to chrysotile, but excluded key studies
 - Meta-analysis by Berman & Crump (2008): no statistical difference in potency
 - Meta-regression analyses by Lash et al (1997) & Lenters et al. (2011): little difference in potency after accounting for industry and data quality
- Conclusion: differences in potency have not been clearly demonstrated for lung cancer

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World Health Organization

Open Questions: Lung Cancer

- Does potency for lung cancer vary by fibre size?
 - Experimental data suggest long, thin fibres are more potent (Lippmann, 1990; Berman et al., 1995)
 - Studies in chrysotile textile workers with TEM data on fibre size tend to show greater risk for long fibres and thin fibres (Stayner et al., 2008; Loomis et al., 2012)

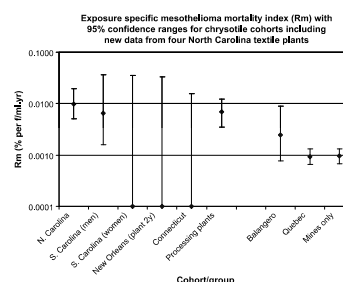
Lung cancer risk by fibre length & diameter: Carolina chrysotile textile workers



Open Questions: Mesothelioma

- Does mesothelioma potency vary by fibre type?
 - Substantial human & animal evidence that chrysotile is less potent than amphiboles, but...
 - Quantitative risk estimation of limited by small numbers and data quality
 - Increased risk observed in textile plants & mines, but range covers 2 orders of magnitude (Hodgson & Darnton, 2010)
- Does mesothelioma potency vary by fibre size?
 - No direct human data
 - Fibres <0.1 µm and >5 µm long appear more potent in animals (Lippmann, 1990)
 - Weak evidence from indirect analysis that long fibres are more potent (Berman & Crump, 2008)
 - Stronger associations & longer fibres in textile industry

Mesothelioma Potency of Chrysotile



Open Questions: Other Asbestiform Mineral Fibres

- Are other asbestos-like fibres carcinogenic?
 - Other fibrous minerals have not been commercialised as asbestos
 - Several (erionite, fluoro-edenite, "Libby amphibole") have resulted in human exposure
 - Erionite is IARC Group 1 (Vol 100C)
 - Fluoro-edenite is associated with high incidence of mesothelioma in an exposed community in Italy (to be evaluated for Vol 111)

Conclusions

- All IARC reviews since 1973 conclude that **all forms of asbestos cause cancer**
- The evidence is unequivocal and continues to accumulate
- Differences in potency by fibre type have not been established for lung cancer
- Amphiboles appear more potent for mesothelioma, but lung cancer is much more common, therefore more important
- Some evidence that thin fibres are more potent

China

 国家安全生产监督管理总局
State Administration of Work Safety

ADMINISTRATION OF OCCUPATIONAL HAZARD DUE TO ASBESTOS IN CHINA

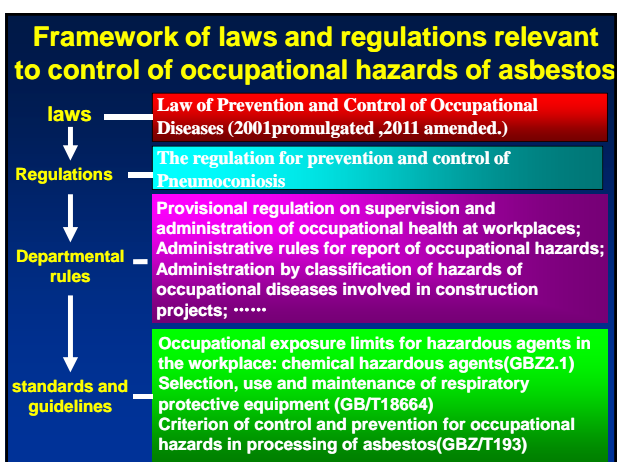
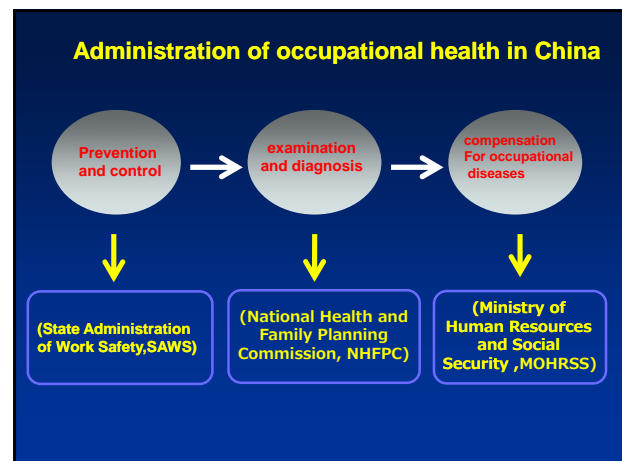
Haijiang Liao

Department for supervision and administration of occupational health, SAWS, P.R. China

CONTENTS

- Mainly ministries involved in Administration of asbestos in China
- Administration of occupational health in China
- Framework of laws and regulations relevant to control of occupational hazards of asbestos
- Policy and prescription related with control occupational hazards due to asbestos
- Recent affairs relevant to control of occupational hazards of asbestos in SAWS

2

**Policy and prescription related with control of occupational hazards due to asbestos****STATE POLICY & INDUSTRIAL POLICY**

- In 2002, Use of crocidolite was forbidden in China .
- In 2005, The List of prohibited cargos for imports and exports was issued, including all kinds of amphibole asbestos (crocidolite, amosite, anthophyllite, tremolite, actinolite).

6

Policy and prescription related with control of occupational hazards due to asbestos

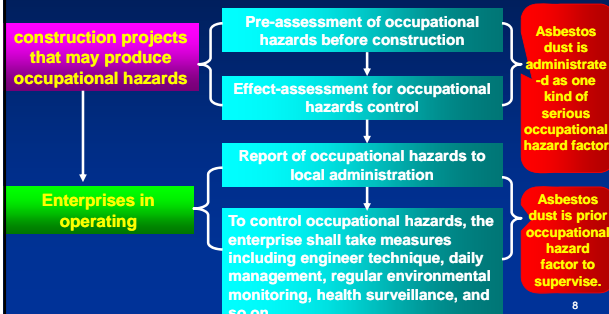
STATE POLICY & INDUSTRIAL POLICY

- In 2014, Ministry of Industry and Information Technology of PRC issued Access Requirements Rules for chrysotile industry (The 21th Proclamation in 2014).

7

Policy and prescription related with control of occupational hazards due to asbestos

Administration of asbestos in field of occupational health according to existing laws, regulations, departmental rules and standards in China.



8

Policy and prescription related with control of occupational hazards due to asbestos

Occupational exposure limits (OELs) of asbestos at workplaces (content of asbestos>10%)

- PC-TWA(8 hours):
dust—0.8mg/m³
fiber—0.8f/ml
- Excursion limits (15min-STE/8h PC-TWA) :2.0

9

Recent affairs relevant to control of occupational hazard of asbestos in SAWS

Five SAWS rules were issued in 2012 after Law of Prevention and Control of Occupational Diseases was amended in 2011.

- (1) The 47th SAWS rule: Provisional rule on supervision and administration of occupational health at workplaces.
- (2) The 48th SAWS rule: Administrative rule for report of occupational hazards
- (3) The 49th SAWS rule: Administrative rule of Occupational health surveillance .
- (4) The 50th SAWS rule: Administrative rule of Occupational health Institution for testing and assessment.
- (5) The 51th SAWS rule: Administrative rule of Occupational health " three simultaneousness" for the construction project.

10

Recent affairs relevant to control of occupational hazard of asbestos of SAWS

According the 21th Proclamation, if environmental protection ,safety, occupational health unable to meet the items, the chrysotile enterprise near cities will be closed by local government at the end of 2015.

In China, MIIT, MEP, SAWS and other ministries work together for hazard control of chrysotile industry . In China, MIIT, MEP, SAWS and other ministries work together for hazard control of chrysotile industry .

11

The activities

- Increase the access requirement of ACM;
- Inspection to ACM with emphasis on chrysotile mines;
- Decrease the number of the mines;
- Improve workplace by dust extraction equipments;
- Provide high quality PPE;
- occupational health examination enforcement.



THANK YOU!

谢谢！

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Indonesia



Indonesian policies on managing asbestos

Muchtaruddin Mansyur

Ministry of Health, Republic of Indonesia

AAI7 Jakarta, September 29th 2014

Outline of presentation

1. Introduction
2. Existing program on asbestos
3. Future plan
4. Conclusion

Asbestos as worldwide problem

- WHO (2010) estimated ~107,000 people in the world die each year from asbestos-related diseases resulting from occupational exposures
- All types of asbestos have been judged to be carcinogenic by WHO's IPCS and IARC
- Recently 55 countries have banned asbestos use and consumption in their countries (IBAS 2013)

Asbestos also a problem among ASEAN countries

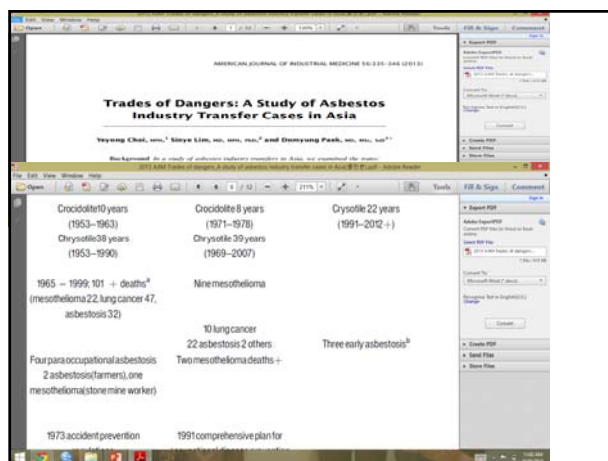
- Transfer of asbestos industry to developing countries
- Political issue
- Economic burden
- Publications about ARD cases
- National asbestos profile, plan and program (AAI6)

Asbestos in Indonesia (1)

- Asbestos has been used since late 1950s (except for crocidolite since 1985)
- Mainly (97.03%) use as roof, cement, plafond, partition. Remains are gaskets, brakes



- Total registered asbestos importir distributors & producers = 35 (MOI, in 2014)



Asbestos in Indonesia (2)

YEAR	IMPORTIR COUNTRIES	TOTAL OF IMPORT (Ton)	USE
2010	China, Rusia, Hongkong, Brazil, Cyprus, Singapore, Afrika Selatan, Inggris, China dan Canada	160.811,402	Wavy asbestos, sheet asbestos, plafond, partition, brake canvas, and compreesd fiber jointing sheet
2011		82.278,835	
2012		4.485.192,836	
2013		4.538.486,836	
Agustus 2014		4.565.669,84	
TOTAL		13.832.439,75	

Asbestos in Indonesia (3)

IMPORTIR COUNTRIES TO INDONESIA
January 2011 – Augustus 2014

SOURCE OF IMPORT	FREQUENCIES OF IMPORT
CHINA	209
INGGRIS	157
BRAZIL	116
RUSIA	22
HONGKONG	16
AFRIKA SELATAN	4
CYPRUS	2
CANADA	2

Current situation (1)

- User still demand on asbestos eventhough the non-asbestos contained products are available due to cheaper cost
- Very few industry use asbestos-subsitution material due to expensive cost-production and worse quality than asbestos ones
- No limitation in importing asbestos yet applied in Indonesia

Current situation (3)

- SAICM Project, 2011 – 2012 (supported by WHO);
 - National Strategy and Action Plan of Industrial Carcinogenic Chemical Substance (Asbes, Benzene, and Silica) established.
 - Target strategy;
 - All Industrial in risk have got technical provision of chemical carcinogen handling
 - All Industries in risk implement the chemical carcinogen management (CCM)
 - National Standard and regulations in relation with the CCM are available
 - Chemical Carcinogen related health disorders are reduced

Current situation (4)

- SAICM Project, 2011 – 2012 (supported by WHO);
 - Operational Strategy;
 - Strengthening of chemical carcinogen management capacity in Industry including;
 - Handling, resources, and networking

Regulations (1)

- Act No. **3/1992** (work insurance) and No **13/2003** (Labour), No. **18/2008** (solid waste management) No. **32/2009** (environmental protection and environmental management), No **36/2009** (health),
- Presidential regulation no. **12/2013** (health insurance)
- Presidential decree no. **22/1993** (work related diseases)
- Government regulation no. **18/1999** (hazardous waste management)
- Government regulation no. **74/2001** (hazardous and toxic substances management)
- Government regulation no. **50/2012** (implementation of OSH management)

Regulations (2)

- Manpower Ministerial Decree no. **2/1980** (occupational health examination)
- Manpower Ministerial Decree no. **3/1985** (asbestos management at workplace)
- Manpower Ministerial Decree no. **187/1999** (monitoring of hazardous chemical substances)
- Health Ministerial Decree no. **1405/2002** (health requirement for office and industrial workplace)
- Manpower Ministerial Decree no. **25/2008** (guideline of occupational diseases & injuries diagnose and disabilities assessment)
- Manpower Ministerial Decree no. **13/2011** (physical and chemical threshold limit value)

Future Challenge

- Asbes monitoring toolkit
- Exchanges of processing technology and raw material
- Asbestos Substitute material
- Asbestos storage management
- Asbestos handling management

Scope, Current Activities and Future Plan in Managing Asbestos in Indonesia, which involves the Cross Sectors (Ministry of Health, Ministry of Environment, Ministry of Manpower, Ministry of Industry, and Ministry of Trade)

SCOPE	CURRENT ACTIVITIES	FUTURE PLAN
REGULATION	Conduct scientific study to elaborate ARD among workers and community to provide evidence data for policy	- Review MOH decree no. 1405/2002 - Evidence based policy on monitoring asbestos impact on health
	- Household and industrial asbestos waste handling based on hazardous waste management regulation - Industrial asbestos waste water handling based on water quality management and pollution control regulation	On-going process on revision of Government regulation no. 74/2001
	- Review SOP, guideline - Arrange OSH draft regulation	OSH policy & law enforcement
		Arrange policy on asbestos import

SCOPE	CURRENT ACTIVITIES	FUTURE PLAN
PUBLIC EDUCATION	Socialize asbestos hazard awareness to workers	"Safe workplace by implementing proper asbestos management" campaign
	- OSH workshop for OSH officers, occupational doctors & nurses - Advocacy for industrial management	
PROCESS & SERVICES IMPROVEMENT	Workshop for frontliner practitioners about how to diagnose ARD	Provide health examination guideline for asbestos-exposed workers & community
	- Monitoring & supervision on asbestos level at workplace - Surveillance occupational health	OSH improvement on : - analysis, study & technological engineering - test, technical & informatical services
	- Registration of asbestos importers and producers - Monitoring and supervision for importer and producers	

SCOPE	CURRENT ACTIVITIES	FUTURE PLAN
PARTNERSHIP & COLLABORATION	- National : Government institutions, academic institution, hospital, NGOs - International : South Korea, WHO	- ASEAN network on occupational disease diagnose
	Joint research with South Korea and Japan	

Conclusion

- Asbestos as hazardous substances has been stated internationally
- Regulation on asbestos industrial and household usage and trading in Indonesia has been being reviewed
- Indonesia commit to protect community and environment from asbestos exposure by conducting initial evidence based national policy development on asbestos



Thank you

Korea

Country Report of Republic of Korea, AAI 7

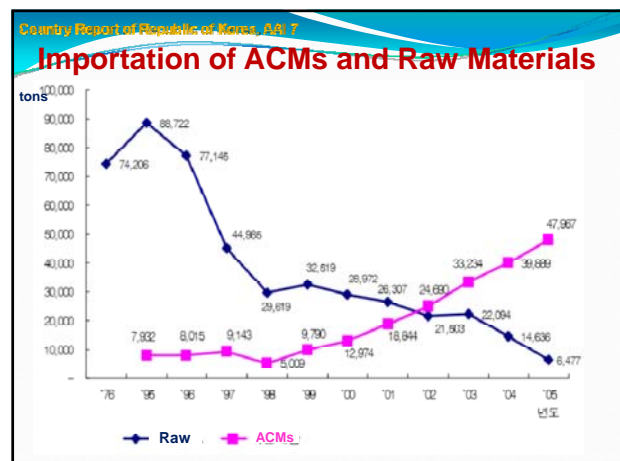
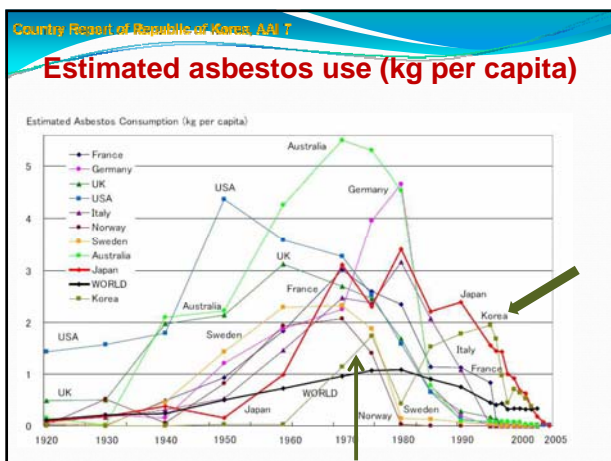
The Use Of Asbestos Is Banned - Now What ? -

Eun-Kee Park PhD, MASC
Dept Medical Humanities and Social Medicine
College of Medicine, Kosin University, Korea

Country Report of Republic of Korea, AAI 7

A History of Asbestos Use in Korea

- **Production**
 - Asbestos mines (mainly Chrysotile)
 - Chrysotile (145,543 tons) produced during 1944-90
- **Importation**
 - During 1976-2008 (around 2.3 Million tons)
 - White asbestos (Chrysotile)
 - Raw material and ACM from Canada
 - Construction (87%): slate roof
 - Brake (8%) & Textile (5%)



Country Report of Republic of Korea, AAI 7

What is the danger ?

- **Exposure is the danger (inhalation)**
- **Human Carcinogen (IARC group 1)**
 - Malignant mesothelioma
 - Asbestos-related lung cancer
 - Asbestosis
 - Diffuse pleural thickening
 - Pleural effusion
 - Laryngeal (Throat) / Ovary Cancer

Was asbestos a problem in Korea till 2000 ?

Country Report of Republic of Korea, AAI 7

Where is asbestos found in Korea ?

- **Construction sites**
 - Slate roof
 - Buildings (private / public sectors)
- **Industrial sites**
 - Heavy industry (ex ship building)
 - Automobile industry (ex brake)
 - Textile industry (ex cloths, rope)
 - Manufacturing (ex cement)

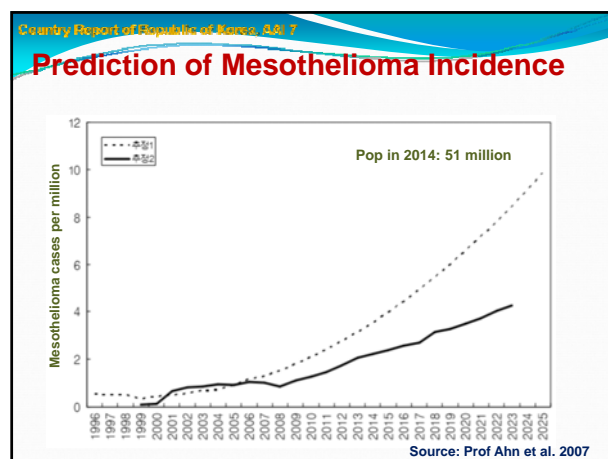
Is asbestos a problem in Korea ? A total ban in 2009

Country Report of Republic of Korea, AAI T

Asbestos Scandals Reported in Korea

- ARDs Cluster in Abandoned Asbestos Mine Areas (2008)
- Asbestos Textile Factory (2008)
- Baby powder containing talc (contaminated asbestos) (2009)
- Neighborhood Exposure during Building Demolition (2009)
- ACMs at Public Buildings (schools, subway) (2009~)

Is asbestos a problem in Korea now ?



Country Report of Republic of Korea, AAI T

Number of mesothelioma incidence cases in surveillance system (2001-2010)

Year	Incidence cases	Incidence rate (per million)	M/F
2001	13	0.27	3.33
2002	24	0.50	5.00
2003	20	0.42	3.00
2003	44	0.92	1.10
2005	36	0.75	2.27
2006	54	1.12	2.18
2007	59	1.22	1.46
2008	61	1.25	1.90
2009	45	0.92	2.00
2010	43	0.87	2.07
Total	399	0.83	1.96

Source: Am J Ind Med 2012

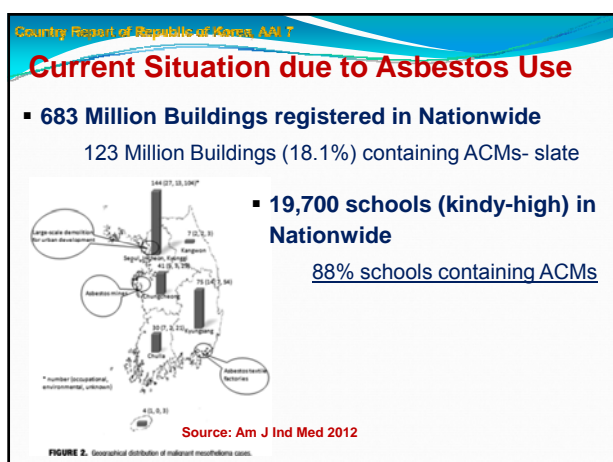
Country Report of Republic of Korea, AAI T

Confirmed occupational cancers caused by carcinogens in Korea

	2006	2007	2008	2009	Total
Total	57	69	97	170	393
Asbestos	26	17	24	47	114
DEE	12	15	33	39	99
Crystalline silica	5	26	15	37	83
PAHs	5	9	39	6	59
Hexavalent chromium	10	16	12	9	47
Radon	2	5	13	17	37
Nickel	7	14	6	8	35
Pesticide (carcinogenic)	0	0	1	23	24
Wood dust	7	2	1	10	20
Dioxin	3	3	4	5	15
Welding fume	1	3	1	7	12
Painting	0	0	4	6	10
Cadmium	1	2	3	2	8
Formaldehyde	7	1	0	0	8
Steel industry	1	0	4	0	5
Aluminum smelting	0	0	2	0	2
Rubber industry	0	0	1	0	1
Plastic manufacture	0	0	1	0	1
Arsenic	0	1	0	0	1

Adapted from Leem et al, 2010 SH@W

1 Asbestos (29%)
2 DEE (25%)
3 Silica (21%)
4 PAHs (15%)



Country Report of Republic of Korea, AAI T

Asbestos-related burdens in Korea

- Asbestos removal cost
- NOA management
- Insufficient licensed landfills for asbestos waste
- Public health concerns (fear/anxiety etc)
- Potential risk population management
- No alternative options to provide ARDs treatment
- Insufficient ARDs surveillance / registry system
- Limitation of ARDs treatment under health care coverage

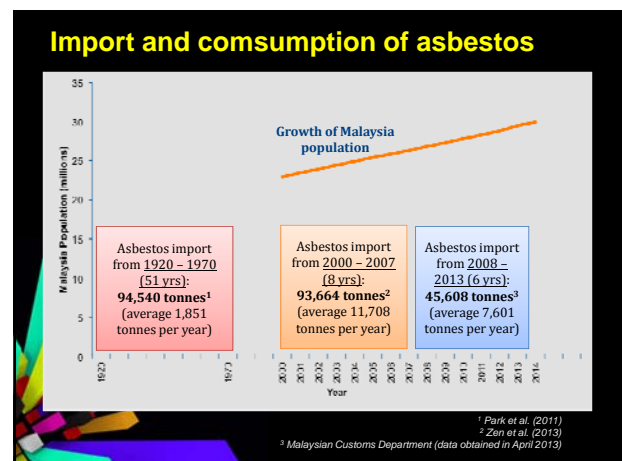
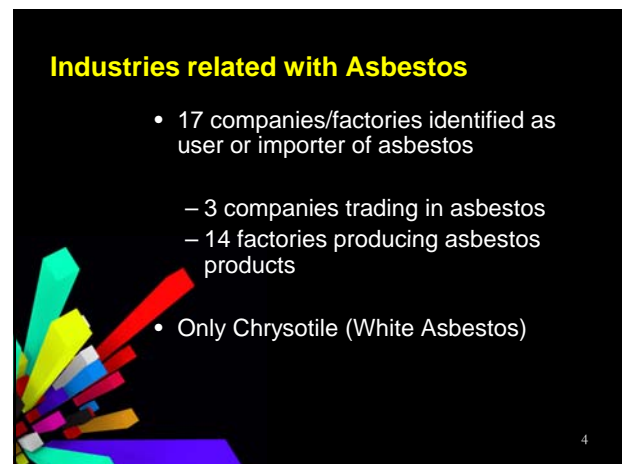
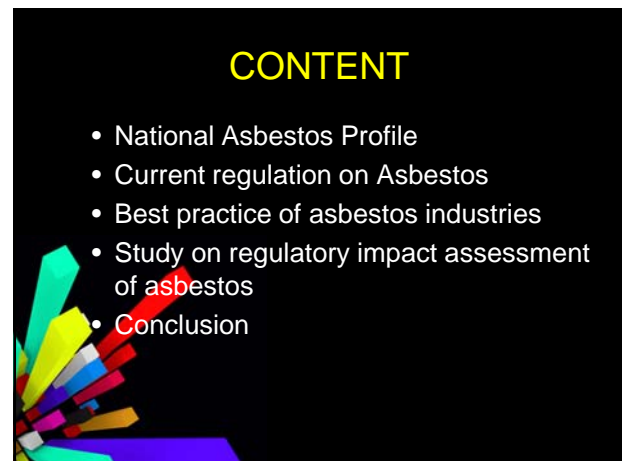
Country Report of Republic of Korea, S&IT

Challenge & opportunity in Korea

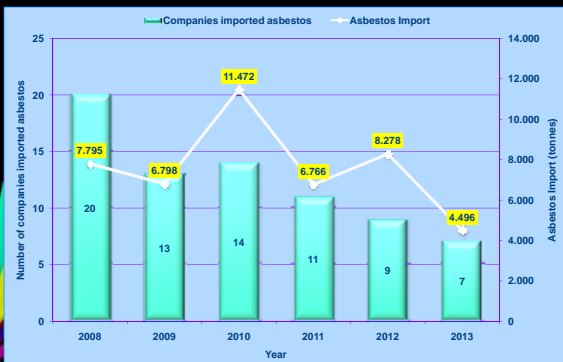
- Relatively less reported ARDs cases
- Construction of ARDs surveillance system
- IT-aided asbestos waste tracking system
- Awareness program & proper / effective safe training course (supervisor etc)
- New technologies for ARDs research
(current project using biomedical engineering)
- Int'l collaboration with know-how transfer

Thank you for listening

If any enquiry, please contact me on
ekpark@kosin.ac.kr



Asbestos Import and related companies



Total % imported asbestos (2008 vs 2013)



Product using Asbestos

- Brake lining
- Friction pad
- Disc Pad
- Gasket & Seal
- Small corrugated sheet
- Roofing (Ardex)
- Truck lining
- Piping (water supply)
- Insulation material
- Automotive paint

Current regulation on ASBESTOS in Malaysia

POLICY OF ASBESTOS USAGE IN MALAYSIA

- The use, handling, processing and production of asbestos product are allowed (except crocidolite) by strict control by the laws/regulations.

Asbestos Management Framework in Malaysia

Import

- Custom (Prohibition of Imports) Order 2012

Asbestos Management Framework in Malaysia

Handle and Use

- CLASS Regulation 2013
- USECHH Regulation 2000
- OSH (Prohibition of use of substance) Order 1999
- OSH (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Diseases) 2004
- FM (Asbestos Process) Regulation 1986
- FM (Building Operations and works of engineering construction (Safety)) Regulation 1986
- EQ (Clean Air) Regulation 1978

Asbestos Management Framework in Malaysia

Disposal

- EQ (Scheduled waste) Regulation 2005

Best practices in Asbestos industries in Malaysia

Best practices - Asbestos industries in Malaysia



Best practices - Asbestos industries in Malaysia

Cutting of wet roofing sheets according to size – the process runs automatically

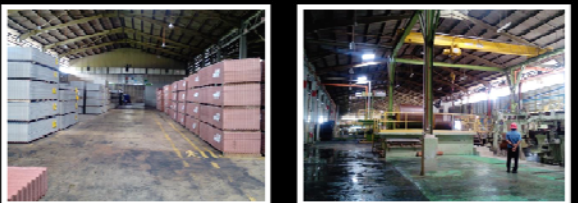


Excess asbestos sheet after cutting process



Asbestos sheet is cut and transferred automatically

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Best practices - Asbestos industries in Malaysia



Best practices - Asbestos industries in Malaysia

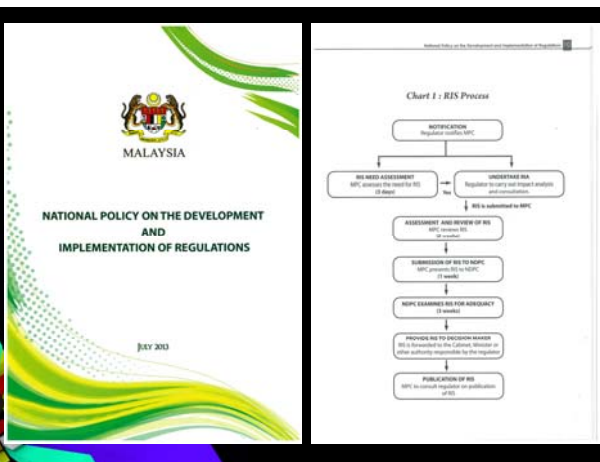
Asbestos storage area



Asbestos Label provided by employer

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Study on Regulatory Impact Assessment (RIA) on Asbestos in Malaysia



General Objective

- Potential Options to Effectively Halt the Risk of Asbestos Exposure.

Policy objective

- In light of the magnitude of the risk posed by asbestos exposure, there is a need to **effectively halt the spread of such risk**, especially for the protection of workers in occupational settings.

Survey findings

- Based on the survey conducted, we estimated **less than 150 workers handling pure asbestos** in Malaysia in 2013.
- Hence if pure asbestos is prohibited, **temporary disruption in the industry** that currently uses asbestos in their manufacturing and other processes will occur.
- The workers could suffer **temporary job loss** until they are re-trained for other type of work.

Potential Options

OPTION 1

Business As Usual

*Means 'Do Nothing'
*Keeps the existing framework and no additional obligations are imposed

OPTION 2

Review Existing Regulation

*Involving of the persons handling, manufacturing, processing, sale, and importing asbestos.
*Specifies of the amount imported

OPTION 3

Prohibition of asbestos

*All types of asbestos shall be prohibited
*No asbestos imports

Advantages

OPTION 1	OPTION 2	OPTION 3
Business As Usual	Review Existing Regulation	Prohibition of asbestos
<ul style="list-style-type: none"> no disruption to existing industrial activity' business and workings of both government entities and industries are unaffected 	<ul style="list-style-type: none"> better control of the total amount of asbestos circulation . enhances traceability and establishes an inventory of asbestos 	<ul style="list-style-type: none"> absolute halt of the risk of asbestos exposure. reduces the contraction of ARD

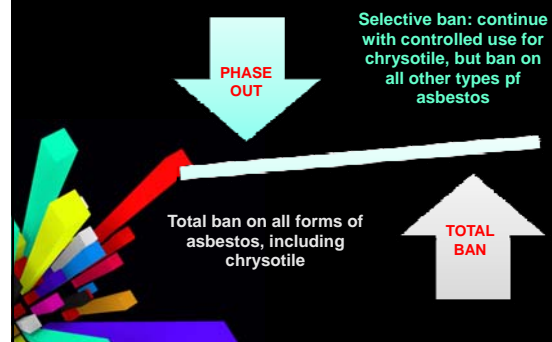
Disadvantages

OPTION 1	OPTION 2	OPTION 3
Business As Usual	Review Existing Regulation	Prohibition of asbestos
<ul style="list-style-type: none"> Incapable to halt the risks to asbestos exposure beyond human capacity to effectively track, monitor, control, and enforce the controlled use of asbestos 	<ul style="list-style-type: none"> government needs to invest in developing the system and maintaining the system. would not be able to achieve the policy objective of halting the spread of the risk of asbestos exposure 	<ul style="list-style-type: none"> Temporary disruption in the industry . Industry need to invest in the training of their workers

Impacts

OPTION 1	OPTION 2	OPTION 3
Business As Usual	Review Existing Regulation	Prohibition of asbestos
<ul style="list-style-type: none"> Minimal impact on the operation of the government, industry, NGOs, and professional bodies/research institution beyond human capacity to effectively track, monitor, control, and enforce the controlled use of asbestos 	<ul style="list-style-type: none"> Government and the industries would be the heaviest. Educate the general public of the relevant industries that uses asbestos 	<ul style="list-style-type: none"> Border check / inspection of imported goods Develop capacity to enforce the prohibition of the import and use of asbestos

Proposed Prohibition Strategies



Conclusions

- Mechanism to prohibit the use of asbestos must take into account all relevant aspects, e.g. existing stock, time needed for R&D and retrain employees.
- Economic incentives (e.g. temporary tax free, reduce tax on non-asbestos fibers) should be provided.
- The main challenge for option 3 is where it only prohibits import of asbestos but **NOT** ACM. However, more information are required for the costs, benefits and risks of each option.

THANK YOU FOR YOUR ATTENTION

We welcome your feedback, please contact us at :

✓ rosienda@mohr.gov.my

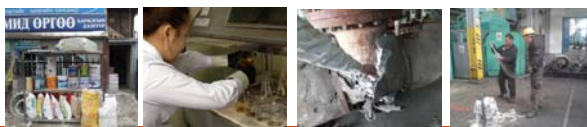
✓ noraita@mohr.gov.my

Mongolia



Main achievements and challenges in prevention and control of ARDs in Mongolia

NARANSUKH DAMIRAN, MPH, MSPH,
Lecturer, Department of Environmental and Occupational
Health, School of Public Health, Mongolian National University of
Medical Sciences



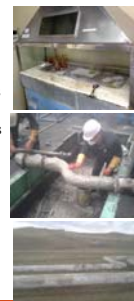
Current situation: Regulatory framework

Regulation on asbestos use and its control in Mongolia (Government Resolution №192, 2011)

- It banned 5 types of asbestos and ACM
- Thermal power plants exempted from the resolution
- However, many other industrial sectors including railway companies and analytical laboratories have been using ACM
- Asbestos and ACMs is available in the construction material markets

Regulation on asbestos use and its control has to be revised:

- Exposure limits for asbestos at workplaces and general environment
- Monitoring on asbestos exposure
- Surveillance of ARDs
- Compensation of ARDs
- Enforcement mechanism should be added.



Current situation: Import of ACMs

- Import of ACM reduced in 2011 after the government regulation endorsed and it has been slightly increasing since 2013.



Current situation: Asbestos exposure in main workplaces

- Exposure to asbestos at workplaces

Industries	PCME concentration f/cc		Number of samples
	Mean	Std.deviation	
Thermal power plants	0.96	0.70	62
Railway-Locomotive repair shop	0.38	0.15	4
Construction renovation site	0.02	0.02	6
Constr. Material market	0.04	0.02	4
Analytical laboratory	0.01	0.01	9
Average	0.72	0.72	85

Naransukh Damiran et al., 2014

Main achievements on asbestos control

Baseline study on asbestos exposure and its use:

- Study on asbestos usage in Mongolia, 2010, supported by WHO (published research report)
- National Asbestos Profile, 2012 supported by WHO (published report)
- Study on asbestos exposure assessment at workplaces 2012-2014, funded by Fogarty International Project, USA (2 articles submitted to an international journal)



Main achievements on asbestos control

Strategic action plan on control of ARDs incorporated into:

- The National Programme on Occupational Safety and Health (4th updated version, 2012)
- Objective 3:** To protect workers from asbestos exposure and to eliminate asbestos related diseases
- Safety instruction for workers being contacted with asbestos, 2012 (*developed and approval pending*)
- Occupational exposure limit for asbestos, 2013-2014 (0.1 f/cc 8 hr-TWA) established and embedded in MNS 4990 standard (*to be approved as a national standard*)
- Standard for Personal Protection Equipment for asbestos related works, 2014 (*under development*)

Main achievements on asbestos control

Development of sampling and analytical methods of asbestos and adapted threshold limits for workplaces:

- NIOSH 7400 Analytical method for asbestos translated and adapted as a guideline (2012)
- Standards for analytical methods of asbestos sampling and analysis translated (2013-2014) and submitted to National Agency for Standardization for national use
 - Phase contrast microscopy –ISO/DIS 8672
 - Transmission electron microscopy-ISO 10312
 - Detection of asbestos in Bulk material -ISO/IDS 22262
- Training program and manual on control of asbestos exposure in the workplace developed and training for workers who have direct contact to ACM (2013) conducted.

Main achievements on asbestos control

Development of laboratory capacity for monitoring of asbestos exposure and analysis of bulk samples:

- Analytical laboratory set in the National Center for Public Health supported by WHO, 2013
 - Air sampling equipment
 - Phase contrast microscope
 - Polarizing light microscope
 - Accessories for sample preparation
 - Basic training for laboratory staffs provided



Main achievements on asbestos control

Development on human resources:

- Training for Diagnoses of Asbestos related diseases
 - Short term trainings for medical doctors, 2010-2013
- Training on monitoring of asbestos exposures at workplaces
 - Short term training for specialists of occupational and environmental hygiene with support from WHO (STC), 2012-2013
- Training on use of PCM and PLM analytical methods
 - Short term training for laboratory specialists, 2013 (with support of WHO STC)



Main achievements on asbestos control

Public awareness raising activities on asbestos hazard:

- Brochure for public on awareness raising on asbestos hazard
- Booklet on prevention and control asbestos exposure at workplaces for workers
- Educational documentary video on prevention and control of asbestos exposure for community
- Training and awareness raising activities targeted employers and employees of the power plants and railroad companies (2013-2014).



Challenges to control asbestos and prevent ARDs

More advocacy is needed for environment and energy sectors

Inter-sectoral engagement is most important for banning 6 types of ACM and its enforcement

Existing regulation should be revised and regulation framework should include the followings:

- Inspection on asbestos in public places
- Asbestos abatement work
- Asbestos contained waste management
- Exposure monitoring for asbestos at workplaces and environment
- Compensation of asbestos related disease
- Medical surveillance of ARDs

Challenges to control asbestos and prevent ARDs

Challenges and demands for capacity building:

- Strengthening capacity of main professionals
 - Medical doctors, and health professionals
 - Occupational and environmental health professionals
 - Laboratory experts
- Strengthening laboratory and equipment capacity
 - Clinical laboratory for ARDs diagnosis
 - Analytical laboratory for asbestos fiber
- Development and adaption of
 - Guidelines for diagnoses of ARDs
- Establishment of national surveillance system
 - Guideline for surveillance system on asbestos and ARDs

Thank you for your attention!



Philippines

Updates on Asbestos and other Industrial Chemicals

MARIA LEONIE LYNN H. RUIZ
HAZARDOUS WASTE MANAGEMENT SECTION
ENVIRONMENTAL QUALITY DIVISION
ENVIRONMENTAL MANAGEMENT BUREAU
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES



The Environmental Management Bureau (EMB) – Department of Environment and Natural Resources (DENR)

- Formulate, implement and enforce environmental policies, rules and regulations;
- Advise the DENR Secretary on matters relating to environmental management;
- Issue permits/clearances under the different environmental laws and monitor compliance to the said laws ;
- Act as Focal Point or Authority to the various Multilateral Environmental Agreements/Conventions i.e., Stockholm, Rotterdam, Basel, SAICM, among others



Philippine Environmental Laws

Presidential Decree (PD) 1586: The Philippine Environmental Impact Statement (EIS) System [1978]

Republic Act (RA) 8749: The Philippine Clean Air Act of 1999

RA 9003: The Philippine Ecological Solid Waste Management Act of 2000

RA 9275: The Philippine Clean Water Act of 2004

RA 6969: Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990



Republic Act 6969 Toxic Substances and Hazardous and Nuclear Wastes Control Act

The Act directs the Department of Environment and Natural Resources (DENR) to establish rules, regulations, and programs for controlling chemical substances and hazardous wastes in the Philippines.



DENR Administrative Order (DAO) 29, Series of 1992 (Implementing Rules and Regulations of RA 6969)


- Chemical Management (Title II)
- Hazardous Waste Management (Title III)




Title II

CHEMICALS MANAGEMENT







Philippine Inventory of Chemicals and Chemical Substances (PICCS)




- A list of all existing chemicals which are stored, imported, exported, used, processed, manufactured, or transported in the Philippines.
 - chemical names (IUPAC)* and its Chemical Abstract Service Number (CAS No.)
 - CAS Registry Index Number
 - common name of the chemical or substance

***International Union of Pure and Applied Chemistry**



Pre-Manufacture and Pre-Importation Notification (PMPIN)

- Process applicable to all new industrial chemicals not listed in the PICCS
- screen toxic chemicals and chemical substances prior to its use, sale, and distribution in the Philippine commerce
- ensure that chemicals and substances found to be toxic or hazardous be denied of being manufactured, imported and placed under strict control, restriction, and limitation in its use including its possible release to the environment


Priority Chemical List (PCL)

- List of chemicals that are determined to pose significant or unreasonable risk to human health and the environment
- Chemicals and its compounds considered to be strictly regulated
- Requires special reporting due to its significant toxic effects either acute or chronic
 - carcinogenic
 - mutagenic
 - teratogenic
 - persistency
 - bio-accumulation

Chemical Control Order (CCO)

- Chemicals in the Philippine Priority Chemical List (PCL) that EMB determines should be regulated, controlled or phased out based on scientific, technical and management criteria.




Chemical Control Order (CCOs)

DAO 1997-38: CCO for Mercury and its compounds


DAO 1997-39: CCO for Cyanide and its compounds

DAO 2000-02: CCO for Asbestos

DAO 2000-18: CCO for Ozone Depleting Substances (ODSs)

DAO 2004-01: CCO for Polychlorinated Biphenyls (PCBs)

DAO 2013-24: CCO for Lead and Lead Compounds





Chemical Control Order (CCOs)

- **Registration (For importers, users, manufacturers and distributors)**
- **Import Clearance per shipment**
- **Reduction, Phase-out, Ban**




**Department Administrative Order No. 2000-02
Chemical Control Order (CCO) for Asbestos
(Chrysotile)**

- Strictly prohibits the use of amphibole asbestos while still allowing specific uses of chrysotile asbestos.
- The CCO applies to the importation and manufacturing of asbestos.
- Regulates the use and disposal of asbestos and asbestos containing products
- Requires industry/establishment to register with DENR, secure import clearance and submit annual report (production and management information)



ALLOWABLE USE	PROHIBITED USE
Fire proof clothing	Manufacture of Toys
Roofing felts or related products	Manufacture of Pipes & boiler logging
Asbestos cement roofing	Low Density Jointing Compounds
Asbestos cement flat sheet	Corrugated and Commercial Paper
High temperature textile products	Untreated Textiles
Friction materials	Flooring Felt and Covering
Gaskets	Rollboard
Mechanical packing materials	Specialty Paper
High-grade electrical paper	Other Low Density Products
Battery separators	
Other high density products	




Title III

HAZARDOUS WASTE MANAGEMENT




Policy on Hazardous Wastes

- Management of hazardous waste in a manner not to cause pollution of the environment and harm to public health and natural resources.
- Make the waste generators responsible for management and disposal of hazardous wastes and financially responsible for the cost of proper storage, treatment, and disposal of hazardous wastes they generate.



DAO 2013-22: Revised Procedures and Standards for the Management of Hazardous Wastes

- Generators, Transporters and Treatment, Storage and Disposal (TSD) Facilities must register with EMB.
- Transport of hazardous waste from the generator premises to the TSD facility is covered by a Permit-to-Transport and accompanied by a manifest.
- Import of hazardous wastes intended for disposal is prohibited. Import of recyclable materials containing hazardous substances intended for recycling and recovery may be allowed subject to the requirements of EMB and the Basel Convention.
- Export of hazardous wastes shall comply with the requirements of EMB and the Basel Convention.



Classification of Hazardous Wastes under DAO 2013-22

CLASS	WASTE NUMBER
A. Wastes with cyanide	A101
B. Acid wastes	B201 to B299
C. Alkali wastes	C101 to C399
D. Wastes with Inorganic Chemicals	D401 to D499
E. Reactive Chemical Wastes	E501 to E599
F. Inks/Dyes/Pigments/Paint/Latex/Adhesives/Organic Sludge	F601 to F699
G. Waste Organic Solvents	G701 to G704
H. Putrescible/Organic Wastes	H801 to H802
I. Oil	I101
J. Containers	J201
K. Immobilized Wastes	K301 to K303
L. Organic Chemicals	L401 to L406
M. Miscellaneous Wastes (M502 refers to all asbestos wastes)	M501 to M507



National Program on Asbestos Related Diseases (NPEAD) Project: Philippines



With funding support from the Rotterdam Convention Secretariat/Japanese Government
With support from the WHO Philippine Office



National Program for the Elimination of ARDs

- The institutional framework for action to eliminate ARDs in the Philippines
- To be implemented by the Inter-agency Committee on Environmental Health (IACEH), with the Department of Health as the focal point.



UPDATES ON ASBESTOS



DAO 2013-22: Revised Procedures and Standards for the Management of Hazardous Wastes (Revising DAO 2004-36)

- Under DAO 2004-36, only friable asbestos wastes are considered hazardous wastes.
- In December 2013, DAO 2013-22 classifies **all asbestos wastes** as hazardous wastes.
- To operationalize the on-line manifest system for hazardous wastes



Inter-Agency Committee on Environmental Health

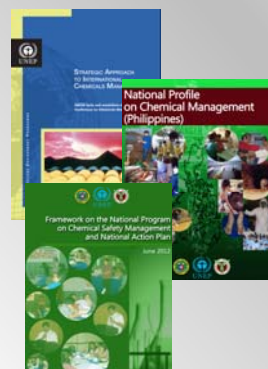
- Steering Committee under the Occupational Health and the Toxic Substances and Hazardous Waste Sectors (IACEH)

Formulate mandates, responsibilities and accountability
Manage the development, implementation and evaluation of the NPEAD

Chaired by the Department of Labor and Employment (OH) and the Department of Environment and Natural Resources (TSHW)


Secretariat – Department of Health

Members include the Departments of Science and Technology, Trade and Industry, Finance (Bureau of Customs), National Economic Development Authority, academe (UP-CPH) , labor groups and industry representatives, WHO/Phil Office




DOH AO 2013-0009
(March, 2013) National Chemical Safety Management and Toxicology Policy (NCSMPT)
- National Profile
- Framework on the NCSMPT

UNEP-SAICM QSP



Manpower Capability on Asbestos

- Training of Health Personnel on the Early Recognition and Management of ARDs in cooperation with WHO Philippine Office (DOH and Lung Center of the Philippines)
- Training on Asbestos Analysis sponsored by KOSHA
 - DOLE – 1
 - DOH – 2
- Forwarded request to ILO for the Training in Reading Pneumoconiosis Radiographs according to ILO Classification
 - Forwarded request to the MOPH Thailand for the B reader training (Air Pneumo Project) – December 16-18, 2014
 - @ 3-4 pax (last tranche from the Rotterdam Secretariat Project of \$10,000)
 - ILO/WHO support for training to be held in Manila (?)




AAI VI


Department of Health (DOH), in collaboration with the World Health Organization, the International Labor Organization, the University of Occupational and Environmental Health-Japan
With support from DOLE, DENR, DOST, DOF, UP-Manila, etc

211 participants from 30 countries participated

DOH Hosts International Meet for Asbestos-free World
<http://news.pia.gov.ph/index.php?article=2131384677661>



—6TH INTERNATIONAL SEMINAR—
ON THE ASIAN ASBESTOS INITIATIVE
November 14-15, 2013
Pan Pacific Manila Philippines
"Strategic Approaches Towards the Elimination of Asbestos Related Diseases"



Health Advisory on Asbestos Health Hazards During Disaster Clean-Up

FOR: ALL UNDERSECRETARIES; ASSISTANT SECRETARIES; DIRECTORS OF BUREAUS, CENTERS FOR HEALTH DEVELOPMENT, SERVICES AND SPECIALTY HOSPITALS; CHIEFS OF MEDICAL CENTERS AND HOSPITALS AND OTHERS CONCERNED

SUBJECT: Health Advisory on Asbestos Health Hazards During Disaster Clean-Up, for Urgent Dissemination



In the light of the impact of Typhoon Yolanda on infrastructures in the affected communities, this Office is issuing the following health advisory, for urgent dissemination to clean-up workers, responders and the general public.

For information and guidance.






Employees' Compensation Commission (ECC) Board Resolution No. 12-09-18



- amended the conditions for compensability of pneumonia, bronchial asthma, pneumoconiosis and asbestosis and other pulmonary conditions.
- amendment expands the coverage and conditions for compensability of occupational respiratory diseases in accordance with recent scientific, clinical and diagnostic updates.





PROPOSED POLICIES ON ASBESTOS



DRAFT CODE OF PRACTICE FOR ASBESTOS' MANAGEMENT AND CONTROL IN THE USE, DISMANTLING, HANDLING, TRANSPORT AND DISPOSAL OF ASBESTOS





Draft Code of Practice on Asbestos

- **DENR, DOLE and DOH**
- Management and Control in the Use, Handling, Transport and Disposal of Asbestos in the Workplace
- Initial Agreement Set on Total Ban of Chrysotile Asbestos on 2018
- From 2010-2018, Annual Medical Surveillance and Inspections of Workplaces will be strictly implemented

DRAFT CODE OF PRACTICE FOR ASBESTOS


- The Code of Practice for Asbestos aims to guide importers, manufacturers, users, transporters and treaters in the proper storage, handling, dismantling and disposal of chrysotile asbestos.
- Support and complement the preventive and mitigation measures to minimize if not avoid potential exposures risks and health related-diseases of asbestos to workers.
- Strengthen the enforcement of the CCO for Asbestos under DAO 2000-02 of Republic Act 6969 of the Toxic Chemicals and Hazardous and Nuclear Waste Act, Book IV of the Labor Standards PD 856 (Sanitation Code of the Philippines) and its Implementing Rules and Regulations.

Occupational Safety and Health Center:

“Proposed Guidelines for the Implementation of Asbestos Health and Safety Program in the Workplace”

- Requiring industries to develop their chemical safety program
- Updating the Threshold Limit Value (TLV) for asbestos from 2 fibres/cc to 0.1 fibres/cc




Proposed House Bills to Ban Chrysotile Asbestos

Proposed and awaiting approval are House Bills 479 and 896 entitled “An Act Banning the Importation, Manufacture, Processing, Use or Distribution in Commerce of Asbestos and Asbestos-Containing Products.”



Other Chemicals



 <p>DENR Administrative Order No. 97-38 - "The Chemical Control Order for Mercury and Mercury Compounds". This regulates the importation, manufacture, processing, use, transport and distribution of mercury and its compounds.</p>	 <p>DENR Administrative Order No. 97-39 - "The Chemical Control Order for Cyanide and Cyanide Compounds". This regulates the importation, manufacture, processing, use, transport and distribution of cyanide and its compounds.</p>	 <p>DENR Administrative Order No. 2000-18 - "The Chemical Control Order for Ozone Depleting Substances". This regulates the importation, manufacture, processing, use, transport and distribution of ozone depleting substances.</p>	 <p>DENR Administrative Order No. 2000-02 - "The Chemical Control Order for Asbestos". This is to control and regulate the use, import, storage, transport and disposal of asbestos.</p>	 <p>DENR Administrative Order No. 2000-02 - "The Chemical Control Order for Polychlorinated Biphenyls (PCB)". This regulates the importation, manufacture and disposal of wastes including the storage and disposal of the containers and discarded materials.</p>	 <p>DENR Administrative Order No. 2013-24 - "The Chemical Control Order for Lead and Lead Compounds". Develop the framework for proper implementation of appropriate prevention based programs to reduce and eliminate risks from the use of lead.</p>
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Chemicals





Initiatives on

- Globally Harmonized System of classification and labeling of chemicals (GHS)
- Metals
 - Lead
 - Mercury – Minamata Convention
 - E-waste
- POPs (Dirty Dozen)
- POPs (Nasty Nine +1)
- Chemical Emergencies
 - National Oil Spill Contingency Plan
 - Alerting and Notification
- Children's Environmental Health




Activities

- Governance
- Risk Reduction Initiatives
- Capacity Building and technical cooperation
- Research
- Knowledge and Information




THANK YOU VERY MUCH
FOR YOUR ATTENTION

<http://www.emb.gov.ph>




Sri Lanka

Management of Industrial Chemicals and Asbestos in Sri Lanka

Dr.Saranga Alahapperuma
Director General
Central Environmental Authority
Sri Lanka

Key tools being used for Chemical Management

- Implementation of Basel Convention
- Implementation of the Rotterdam Convention
- Implementation of Stockholm Convention
- Legislations- National Environmental Act and other Regulations –
Environmental Protection License
Scheduled Waste Management License

Main Chemicals related International conventions implementing in the country

Convention	Ratified in	Focal points	Competent Authority
Basel Convention	1992.08.28	Ministry of Environment	Central Environmental Authority of Sri Lanka
Rotterdam Convention	2006.01.19	Ministry of Agriculture	Pesticides- RoP
		Ministry of Environment	Ind.Chem -CEA
Stockholm Convention	2005.12.22	Ministry of Environment	Central Environmental Authority of Sri Lanka

Implementation of Basel Convention

- The National Coordinating Committee [NCC] for the implementation of BC is functioning under the Ministry of Environment
- Technical Expert Committee is functioning to discuss Technical and legal issues
- Participating institutions- TEC
 1. Sri Lanka Customs Department
 2. Central Environmental Authority
 3. Ministry of Environment
 4. Industrial Technology Institute
 5. Universities
 6. Ministry of Health
 7. Registrar of Pesticides
 8. BOI

Implementation of Rotterdam Convention

- A Technical Advisory Committee for the Management of Industrial Chemicals [TACMIC] in Sri Lanka was established in 2007 to ensure effective and efficient implementation of the obligations assigned to the CEA
- Participating institutions at the TACMIC
 1. Ministry of Environment
 2. Central Environmental Authority
 3. Sri Lanka Customs Department
 4. Department of Import and export
 5. Department of Government analyst
 6. Ministry of Industrial Development
 7. Industrial Technology Institute
 8. Universities
 9. Ministry of Health
 10. Ministry of Labour
 11. Registrar of Pesticides
 12. Board of Investment

Present Status of the industrial Chemicals

- The procedure implements through the designated national authorities
 - Registrar of pesticides [ROP] - for pesticides
 - CEA - for industrial chemicals
- Pesticides technical advisory committee established under the provisions of the control of pesticides Act No 33 of 1980
- In Sri Lanka no chemical production is carried out at present
- Almost all the chemical requirement is fulfilled by the importation
- A considerable number of chemical related industries are being carried out within the country
- A project (SAICM) is being implemented in order to
 - update the National Chemical profile of Sri Lanka
 - prepare a National Chemical Management Plan

Controlling of Asbestos in Sri Lanka

Present Status of the Asbestos

- Blue asbestos was brought under control under the provisions of the Import and Exports Control Act No. 1 of 1969 by the regulation No. 452/4 published on 06th May 1987
- Other types of Asbestos have been controlled under the Imports and Export Control Regulation No1813/14 of 05.06.2013
- No Asbestos mines in Sri Lanka and 100% imported from different countries
- In Sri Lanka there are 4 major Asbestos roofing sheet manufacturing industries
- As the asbestos is cheap and easy roofing material, it is commonly used within the country

- Safety measures during Manufacturing, transportation , building constructions, demolition and discarding is controlled through existing licensing procedures (EPL & SWML)
- Pure Asbestos had been used as thermal insulation material for industrial application.
- Some low quality automobile components such as brake shoes, brake pads & clutch plate may contained asbestos.) Asbestos Containing Material
- Possibility of finding Asbestos or ACM Inside some machineries.

Occupational Exposure to Asbestoses

- Construction workers both in formal & informal sector.
Carpenters, Helpers, Technical officers, Engineers.
- Employees of Asbestos cement manufacturing plants.
- Maintenance workers, machines and fitters attached to industries who are involving repairing of machines.
- Automobile technicians, Vehicle service station personals.
- Employees attached to the cleaning services.
- Employees involving solid waste disposal.

Unsafe Transportation of Asbestos sheets



Routes of Exposure

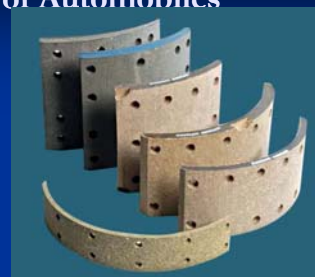
1. Manufacturing of Asbestos Roofing Sheets in Factories
2. Demolishing of Buildings & Structures containing Asbestos in construction Industry
3. Asbestos Fibre released from Brake & Clutch parts of Automobiles



Manufacturing of Asbestos Roofing Sheets in Factories



Asbestos Fibre released from Brake & Clutch parts of Automobiles



Demolished Asbestos debris



Demolished Asbestos



Asbestos Sheets Storage at Sales outlets



Asbestos Sheets Storage at Sales outlets



Asbestos Sheets Storage at Sales outlets



Present Status of the control of Asbestos use

- Technical Advisory Committee for the Management of Industrial Chemicals [TACMIC] decided to prepare a National Policy decisions in the use of all type of Asbestos in Sri Lanka in order to eliminate the Asbestos related diseases in Sri Lanka.
- In order to support the decision , the committee decided to carry out a study on the use of Asbestos in Sri Lanka and a situation Report and a policy Recommendation Report was prepared

Recommendations made in the Report

1. Establish a national Hazardous Chemicals Life cycle Management program
2. Develop Analytical and Measurement capacity- human resources, instrumentation and protocols
3. Develop a multidisciplinary team from industry , customs, environment, occupational hygiene and medical as a standing Task Force (STF)
4. Establish and gazette symbols for specific hazardous chemicals identified
5. Establish environmental quality guidelines for ambient and industry specific for limiting hazardous chemical exposure-national legislative framework for asbestos
6. Establish mandatory reporting requirements and documentation covering occupational health and waste disposal
7. Establish mechanisms to phase out and develop alternatives with equal or superior qualities with acceptable price performance ratios

8. State should adopt Green Procurement procedures to support the growth of a more sustainable economy
9. Be in line with international conventions related to asbestos

Decisions to be implemented in order to control the asbestos related diseases

1. To prepare National Policy including Short term and long term Solutions and determining suitable phase out plan
2. Preparation of guidelines for safe handling of Asbestos related products
3. Issue a circular by the Ministry of Environment requesting not to use Asbestos as a roofing material for new government buildings such as Schools, Hospitals and other buildings.

4. To find out possibility of granting tax concessions for health and environment friendly non Asbestos products
5. Make public more aware on the health impacts of asbestos products and also on the available non asbestos products including ceiling sheets
6. As an interim solution restrict the approvals for new Asbestos related industries and expansions for such existing industries

Thank You

Thailand



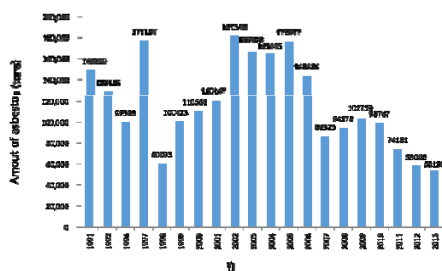
Status of Thailand on Asbestos use and Its related diseases

Chuleekorn Tanathitikorn M.D.
Board of Occupational medicine
Bureau of Occupational and Environmental Diseases
Department of Disease Control, Ministry of Public Health

The Situation of Asbestos in Thailand

- No asbestos mine in the country
- Thailand is top 5 in terms of importer and user of asbestos in Asia.
- Raw material is used in several manufactures
 - 90% in cement roof tile, & cement pipe manufactures
 - 7% in production of brake & clutch
 - 3% in production of vinyl floor tile, gasket and heat insulating materials
- Only chrysotile is used (crocidolite was banned in 1995 & amosite was banned in 2001, the other 3 amphiboles were banned in 2009)

Amount of Imported Asbestos in Thailand during 1991 – 2013



Source: Thai Customs Department: Import & Export Statistics

No. of asbestos factories (by type) in Thailand in 2014

Type	Still use asbestos In 2014
Brake & clutch	3
Roof Tile product	8
Pipe product	3
Others	6
Total	20

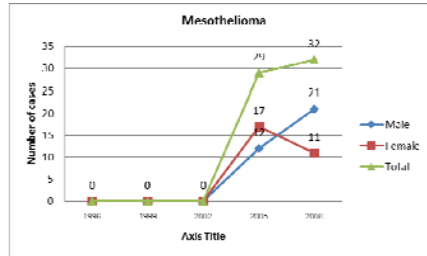


Asbestos-Related Diseases in Thailand

Unpublished report of Mesothelioma cases in Thailand

- Data from Thailand national cancer registry
32 cases of Mesothelioma were recorded.
- 12 cases that still have hospital history.
- All 12 cases in a university hospital in Bangkok but never reported to the DDC or the workmen compensation fund

Data from National cancer registry



Occupational Mesothelioma in Thailand

No	Yr. of Dx	gender	Age	Occupational	Symptoms	Exposure history	status
1	2007	Male	75	engineer	dyspnea	> 24 yrs	dead
2	2008	male	51	Cement fiber factory	dyspnea	> 23 Yrs	dead
3	2009	male	53	engineer	Dyspnea& fatigue	> 25 yrs	improve
4	2010	male	50	Cement tile factory	Dyspnea& fatigue	>20 yrs	-
5	2012	male	56	constructor	Dyspnea& fatigue	> 20yrs	On therapy

Organizations and Legislation on asbestos in Thailand



Organizations and Legislation

- **Ministry of Industry:**
Control of import, use, and storage
Hazardous Substance Act 1992
- **Ministry of Labour:**
- Regulation of an occupational exposure limit
Labour Protection Act 1998
- *Occupational safety and Health Act. AD 2011*
- **Ministry of Public Health:**
Provision of Occupational health and safety guidelines and services

The National Strategic plan after BKK Declaration in 2006

- Protection of workers and the public
- Control, and Ban of Asbestos use in the industries
- Increasing the awareness of asbestos-related health risks to the public
- Improvement of diagnosis and surveillance of asbestos-related diseases
- Collaboration among relevant organization at all levels

National Health Assembly

Settle by National Health Assembly Organizing Committee ;
(Chairman : Prime Minister)
settle by National Health Act

Third National Health Assembly ; On 13-15 Dec. 2010

Agenda item 2.5

: Measures to make Thai society free from asbestos



Ministry of Public Health

13

Some current activities (1)

1. Activity toward the control and ban of asbestos use:

- In the past, asbestos ban activities have been run by the government and academia only. However, recently, the NGOs have been involved in activities toward the banning of asbestos
- In April 2011 The government enjoined Ministry of Public Health to set the National committee meeting for study about health effects from Chrysotile
- Ministry of Public health held the first meeting on December 2012.

- The meeting was finished in January 2014 with conclusion as lists below

- Ministry of Public health will stand on the same position as World Health Organization following strategic directions:

- by recognizing that the most efficient way to eliminate asbestos-related diseases is to stop the use of all types of asbestos.
- by providing information about solutions for replacing asbestos with safer substitutes and developing economic and technological mechanisms to stimulate its replacement.
- by taking measures to prevent exposure to asbestos in place and during asbestos removal .
- by improving early diagnosis, treatment, social and medical rehabilitation of asbestos - related disease and by establishing registries of people with past and/or current exposure to asbestos

Some current activities (2)

2. Increasing of the awareness in industries and the public and strengthening capacity building:

- Releasing of information to medias
- Supporting the labeling of warning sign on asbestos containing products
- Setting up of training courses for workers and safety officer
- Setting up guidelines for the handling of asbestos materials and removal of asbestos materials in buildings

Some current activities (3)

3. Proposed Policy and Strategic Plan for reduction of asbestos use and promotion of substitution:

- The Office of Consumer Protection Board:
 - Enforce the enactment of the legislation on the labeling policy require the company to label a warning sign on asbestos-containing products
 - not allowed to use asbestos in some product such as flooring - tile

A warn sign logo used for labeling small asbestos-containing products



May Cause Lung cancer and Diseases



Some current activities (4)

4. Improvement of diagnosis of asbestos-related diseases:

- Training for Chest X-ray reading on pneumoconiosis according to the ILO classification
- AIR Pneumo Project
- Guideline for Asbestos related disease diagnosis for the Physicians co-operated with Nopparat Hospital and Chest Disease Institute

Some current activities (5)

5. Surveillance of asbestos-related diseases:

- Mesothelioma surveillance in hospitals for passive surveillance.
- Set the project for active surveillance by survey and examine the health status of asbestos- exposure workers in asbestos- containing manufactures.

Ministry of Labour

Ms. Suwadee Thaweek
Occupational Safety and Health Bureau ,
Department of Labour Protection and Welfare,
Ministry of Labour, Thailand

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Current activities under Ministry of Labour

- Report to the National safety committee
- Co-operate with MOPH to provide information to the Consumer Protection Agency
- Provision of information to relevant factories
- Inspection of asbestos-used factories
- reduce exposure standard: from 5 fibers/cc. to 0.1 fibers/cc

Occupational safety and Health Act. AD 2011

12 OSH Ministerial Regulations

- | | |
|----------------------------|----------------------|
| • OSHE Managementa | • Health Examination |
| • Harmful Chemical | • Ionizing Radiation |
| • Heat, Light, Noise | • Prevention of Fire |
| • Machinery, Crane, Boiler | • Confined Space |
| • Electricity | • Diving |
| | • Construction |

Occupational safety and Health Act. AD 2011

1. Ministerial Regulation on Health Check Up of Employees
 - employees who work with risk factors (Asbestos), the employer shall provide health check up to be conducted by a licensed medical practitioner who is specialized in occupational medicine **within thirty days from the first day the employee is employed and subsequently, conducted at least once a year**

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Occupational safety and Health Act. AD 2011

2. Ministerial Regulation on OSH- hazardous Chemical
 - The employer shall send MSDS of hazardous Chemical
 - Make improvement to reduce the asbestos density in the atmosphere which exceed **0.1 fiber/ 1 cc.** of air,
 - The employee shall have to wear PPE.
3. Ministerial Regulation on OSH – Construction
 - Spraying of water or using any proper method to prevent or eliminate dust throughout the working period

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Asbestos Voluntary Phase Out Program

1. Launching campaign on
“Free Asbestos Enhancement” Project
2. Asbestos voluntary phase out program
among local manufacturing industry

Launching Campaign on “Free Asbestos Enhancement” Project

- ❖ Exhibition : Asbestos hazard prevention
: Hazard of asbestos in your home
- ❖ Medical Exam. : Chest X-ray , Lung Function Test (LFT), Physical Examination
- ❖ Other Activities: Posting information on www.oshthai.org
: Publications dissemination
- ❖ 2009
National Safety Week
Regional Safety Week 4 Regions

“Free Asbestos Enhancement” Project National Safety Week



Provide training for asbestos workers



Asbestos Workers Health Surveillances Program 2009

Working Environment Surveillance



Asbestos Workers Health Surveillances Program

Employees Health Surveillance



Asbestos Workers Health Surveillances Program

Obstacles

- Ministry of Public Health and Ministry of labour is not the main responsible authority for legislation on banned asbestos.
- No systematic health data to convince policy makers and public
- Continuous interruption of the process by pro-asbestos agencies especially right now

Conclusion

- Thailand will face asbestos-related health problems in the near future
- The concern becomes national public health issues
- The national work plan and strategy has already developed
- The improvement of asbestos-related diseases is urgently needed
- Ministry of Public Health and Ministry of Labour together with other concerned agencies agreed in principle to explore ways and means in gradually reduce the uses of asbestos ,then stop completely.

Thank you

Thailand

Awareness - raising on the SAICM asbestos projects in Thailand

Chuleekom Tanathitikorn M.D.
Bureau of Occupational and Environmental Diseases
Department of Disease control, Ministry of Public health
AAI - 7 , 29 Sep - 1 Oct 2014
Jakarta , Indonesia.

Background

- Becoming newly industrialized country, Thailand imports an astonishing number of chemicals each year.
- World Health Organization and the Strategic Approach to International Chemical Management (SAICM) was supporting the budget for the Bureau of Occupational and Environmental Diseases to conduct a project

'Strengthen National Capacities for Sound Management of Priority Industrial Carcinogen in Thailand'

Objectives

The objectives of this study project are:

1. To set the priorities for sound management of industrial carcinogens.
 2. To develop the lists of preventive interventions and political recommendations for sound management of priority industrial carcinogens.
- Asbestos was chosen to be a case study for investigating appropriate control and preventive measures and making policy recommendations for sound management.

What are we doing in SAICM project

- Supporting data for priority chemical carcinogen: Asbestos
- Estimates of burden of asbestos-related diseases (Lung cancer and Mesothelioma) in Thailand.
- A review of policy and preventive measures related to Asbestos issues.
- Cost benefit analysis of possible preventive interventions.
- The proposed policy guidelines for protecting people from asbestos exposure.

THE NUMBER OF ASBESTOS FACTORIES (BY TYPE)
AND NUMBER OF WORKERS REGISTERED TO THE
DEPARTMENT OF INDUSTRIAL WORKS IN 2010

Factory type	No. of factories	No. of workers
1. Brakes and Clutches	12	495
2. Tiles	9	1,930
3. Cement pipe	2	25
4. Other asbestos used factories	1	15
5. Brake compression services (in Bangkok)	38	280
Total	62	2,865

NO. OF ASBESTOS FACTORIES
(BY TYPE) IN THAILAND IN 2014

Type	Still use asbestos In 2014
Brake & clutch	3
Roof Tile product	8
Pipe product	3
Others	6
Total	20

→ 1,208 workers

Amount of Imported Asbestos in Thailand during 1991 – 2013



Source: Thai Customs Department Import & Export Statistics

A REVIEW OF POLICY AND PREVENTIVE MEASURES RELATED TO ASBESTOS ISSUES

- Thailand does not have an integrated legislative structure for the control and management of hazardous substances and waste of Asbestos.
- Legislation is fragmented and the jurisdiction and authority to implement these laws is spread out in several ministries.
- No law and regulations on asbestos abatement and removal in Thailand.

MINISTRY OF INDUSTRY

- Toxic and hazardous substances control Act 1992
 - According to this act, asbestos is classified as type 3 hazardous substance which is that the production, import, export, or having in possession must obtain a permit.
 - The authority directly concerned with industrial hazardous waste is the Hazardous Waste Disposal Subdivision of the Office of Industrial Services and Waste Management in the Ministry of Industry.

MINISTRY OF LABOUR

- Occupational safety and Health Act. AD 2011
 - employees who work with risk factors (Asbestos), the employer shall provide health check up to be conducted by a licensed medical practitioner who is specialized in occupational medicine within thirty days from the first day the employee is employed and subsequently, conducted at least once a year

Ministerial Regulation on OSH- hazardous Chemical

- The employer shall send MSDS of hazardous Chemical Make improvement to reduce the asbestos density in the atmosphere which exceed 0.1 fiber/ 1 cc. of air,
- The employee shall have to wear PPE.

Ministerial Regulation on OSH - Construction

- Spraying of water or using any proper method to prevent or eliminate dust throughout the working period

MINISTRY OF PUBLIC HEALTH

- Public Health Act of 1992
 - The law provides for a control of health-hazardous enterprises.
 - Asbestos-related activities that need to be controlled are listed in three groups:
 - 1) brake lining and clutch facing
 - 2) manufacturing of products with asbestos as ingredient or mixture, e.g. brake linings, clutch facings, roofing tiles, rubber tiles, fiber ceiling board, and water pipes
 - 3) construction
 - The control usually comes in the form of general ministerial regulations. Most provisions are based on the Labour Protection Act

- Consumer Protect Act of 1979

- The law provides for the Committee on Labels to have the power to declare goods that may be harmful to physical and mental health as label-controlled goods.



Label of ACM by consumer protection office, Secretariat of cabinet

ANALYZING THE BARRIERS, GAPS, AND PROBLEM OF EXISTING LAWS AND MEASURES

- There are no direct or indirect provisions that deal with the control on the spreading of asbestos into the environment.
- There are no legal provisions governing the dismantling, repair and extension of old buildings with asbestos-containing material, as well as the use of asbestos products in new buildings.
- The law that sets tax and tariff rates put asbestos in the same group as several other chemicals, thus making it very difficult to change, since the change will affect other chemicals as well.

RECOMMENDATIONS OF MEASURES THAT MAY CONTRIBUTE TO REDUCING HEALTH RISK OF ASBESTOS TO THE PUBLIC

- Adjust laws already in existence on the control, export, import, and procession of asbestos raw material to be used strictly and as needed (i.e. if the substitutes for such good are not available)
- Consider to increase import tariff of asbestos as the same rate as tobacco or alcohol beverages and to reduce import tariff for alternative substances. This could be done by setting a special condition without prejudice to other products in the same code

- Encourage the setting of industrial standard for products that use asbestos substitutes.
- Develop the measures and specific laws to control the razing, repairing, and extension of buildings that involve with the use of asbestos, including control of the use of ACMs.
- Develop system of work permit and control of registration for those engaged in the overseeing and control asbestos-involving tasks and also develop a monitoring system of such works.
- Specify higher safety standard of asbestos in the workplace, this to include developing the standard or reference values used to monitor the amount of asbestos dust in the general environment.

- Set principles and standards of compensation for damages incurred, and provide the necessary welfare for those affected by asbestos.
- Consider the guideline to set up a welfare fund to help those affected by asbestos.
- There should be a set of regulations in the Prime Minister's office on the purchase of building materials and hiring of contractors for the construction of government buildings and building of organizations under supervision of the government. The regulations would specify that no materials containing asbestos be used in the construction, extension, and repair of building.

- Specify principles and criteria used in health screening, health surveillance and risk assessment, standards used in diagnosis and verification, film reading as well as the development and registration of pneumoconiosis specialists.
- Develop the monitoring and inspection system of imported and exported ACMs.

COST BENEFIT ANALYSIS OF POSSIBLE PREVENTIVE INTERVENTIONS

- Cost of protective measures used in the tire industry

Measures	Cost per worker per year (baht)
1. Annual health check-up	200
2. Dust strainer masks (including two filters)	1,430

→ 1,630

- Cost of protective measures used in the brake lining industry

Measures	Cost per worker per year (baht)
1. Annual health checkup	300-400
2. Dust strainer masks	890
3. Mask filters	1,740
4. Clothing	14,560
5. Physical examination before starting work.	290

→ 17,780

- Cost of protective measures used in the cement pipe industry.

Measures	Cost per worker per year (baht)
1. Annual health checkup	300-400
2. Dust strainer masks including 2 filters	32,200
3. Clothing	300
4. Physical examination before starting work.	290

→ 31,190

Treatment of lung cancer	Cost per person per year
The cost of the X-ray	200 baht
Computer X-ray	8,000 - 10,000 baht
Bronchoscope	3,000 - 5,000 baht
Biopsy	500 baht
Pathology	2,000 - 3,000 baht
Pre-operative evaluation (blood test)	2,000 baht
Additional tests (to see if cancer has spread further)	5,000 - 10,000 baht
Treatment of Stage 1-2 (room, surgery, medicine, treatment for 7 days)	70,000 baht
Treatment of Stage 3 chemotherapy (4 sets, 40,000 baht/set)	160,000 baht
Treatment of Stage 4 chemotherapy (4-6 sets, 40,000 baht/set)	160,000 - 240,000 baht
Treatment of Stage 4 chemotherapy and medicine (70,000-80,000 baht/month)	840,000 - 960,000 baht

PROCEDURES AND COST OF EACH LUNG CANCER TREATMENT PROCEDURE

- If the patient is at stage 1:
 - the cost per person is 90,700-100,700 baht.
- If the patient is at stage 2:
 - the cost per person is 90,700-100,700 baht.
- If the patient is at stage 3:
 - the cost per person is 180,700-190,700 baht.
- If the patient is at stage 4:
 - the cost per person is 1,020,700-1,220,700 baht.

THE PROPOSED POLICY GUIDELINES FOR PROTECTING PEOPLE FROM ASBESTOS EXPOSURE

- Ministry of Public Health should develop the recommendations to control of asbestos in construction work and present to the Public Health Committee which can further place into the local administration to announce as a local regulation, thus could prevent both workers and general public from asbestos dust dispersion.
- relevant governmental agencies involved in asbestos import, both as raw and asbestos-containing materials, should work in a joint intellectual effort to control asbestos.
 - if the Ministry of Industry decides to put in place the new law to classify chrysotile as type 4 hazardous substances, the Ministry of Commerce should also prohibit asbestos-containing materials to be imported or exported in the kingdom accordingly. Ministry of Finance should work in line with others by lowering import taxes on substitutes.

- the government should support and invest in research and development for relevant agencies toward the ban of asbestos.

- supporting the Ministry of Science and Technology as well as academic partners to study and search for the proper substitute of each asbestos containing product
- supporting the Ministry of Public Health to develop asbestos-related diseases and exposure surveillance system, diagnostic criteria, as well as strengthening and increasing the quantity of medical specialists

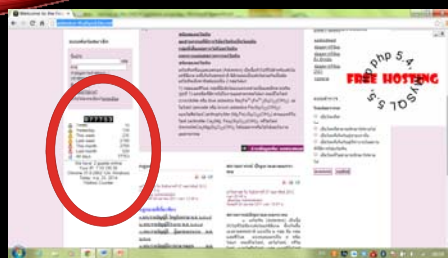
What are we doing after done SAICM project

- A National Multi-stakeholder Seminar

"Sound Management of Industrial Carcinogen in Thailand: case study on asbestos"

May 24, 2012 at Grand China Princess Hotel, Bangkok

- <http://asbestos-thailand.6te.net/>



National Health Assembly Organizing Committee (Chairman : Prime Minister) settle by National Health Act

Third National Health Assembly ; On 13-15 Dec. 2010

Agenda item 2.5

: Thai society free from asbestos

WHAT ARE WE DOING NEXT?

- Improvement of diagnosis of asbestos-related diseases:
 - Training for Chest X-ray reading on pneumoconiosis according to the ILO classification
 - AIR Pneumo Project
 - Guideline for Asbestos related disease diagnosis for the Physicians co-operated with Nopparat Hospital and Chest Disease Institute.

- Mesothelioma surveillance in hospitals for passive surveillance.
- Set the project for active surveillance by survey and examine the health status of asbestos- exposure workers in asbestos- containing manufactures.
- Registration system for asbestos workers.
- Hold the meeting of National Occupational health Committee in 2015.



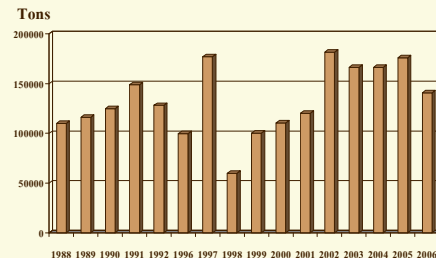
Thailand



Mesothelioma in Khon Kaen University Hospital, Thailand

Kittisak Sawanyawisuth, MD, MAS, PhD, MHPE
 Department of Medicine
 Faculty of Medicine
 Khon Kaen University, Khon Kaen
 Thailand

Amount of imported asbestos in Thailand (1988-2006)



Dr. Somkiat Siriruttanapruk

Asbestos related issues in Thailand

1. High consumption rate but low reported cases of mesothelioma
2. Asbestos ban project: ongoing

Introduction

- Thailand has been imported asbestos > 30 yrs
- 4th world largest consumer
- Thai Asbestos Occupational Exposure Limit (OEL) of 5 f/cc*
- Very few cases of asbestosis or asbestos-related diseases

*Takahashi K, Karjalainen A.
 Int J Occup Environ Health. 2003 Jul-Sep;9(3):244-8.

AAI-5, Busan, Korea

- Two cases of mesothelioma were presented
 - Road construction
 - Car wheel construction
- These two cases were published
 - Aim to increase physician awareness of asbestosis
- Cases of mesothelioma may be under reported

Makarawate P, et al. Case Rep Oncol Med. 2013;2013:356901.

Methods

- Mesothelioma was searched in KKU hospital database
- ICD-10 code of C45
- 1993-2012
- Charts were reviewed
 - Clinical
 - Exposure to asbestos

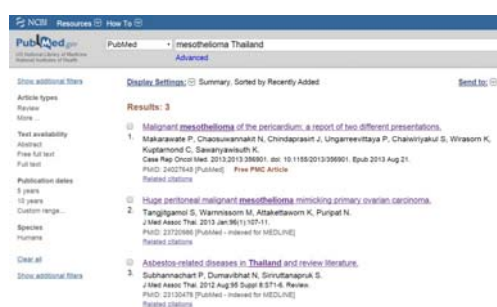
Results

- C45: 60 cases
- 12 cases of mesothelioma
- 1 excluded: British patient
- Total of 11 mesothelioma patients
- Only 2 patients: exposure history were recorded by physicians

Clinical features

- Median age of 48 years (range 24-71)
- 9 were male, 2 were female
- Median duration of symptom 2 months
- Sites of mesothelioma
 - Pleural 5
 - Lung and chest wall 2
 - Pericardial 2
 - Peritoneal 1
 - Pelvic 1

Discussion



Cases of asbestosis in Thailand

- May be under reported
- Medical record system is not quite valid despite using ICD
 - Chart review of each patient is needed (12/65)
- History of asbestos exposure is needed to emphasize in medical education system in Thailand
 - Only two patients were recorded possible hazard exposure history

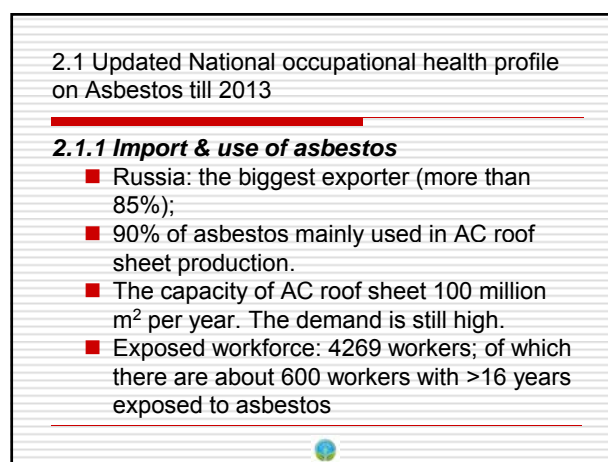
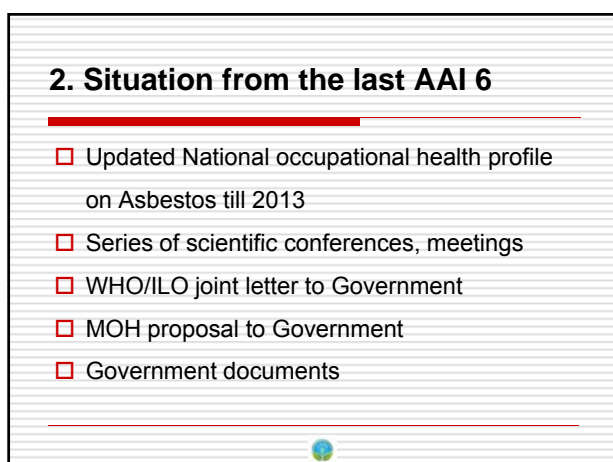
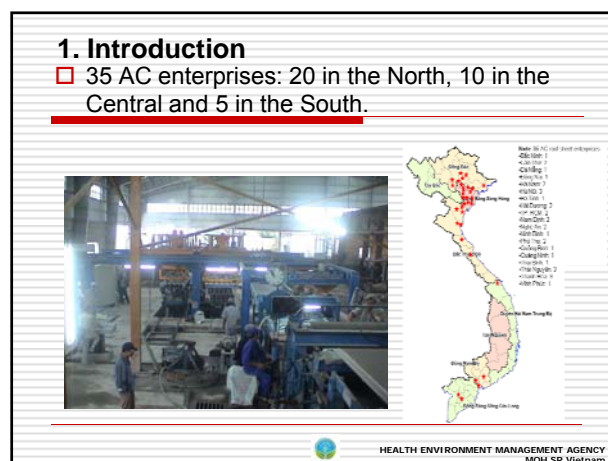
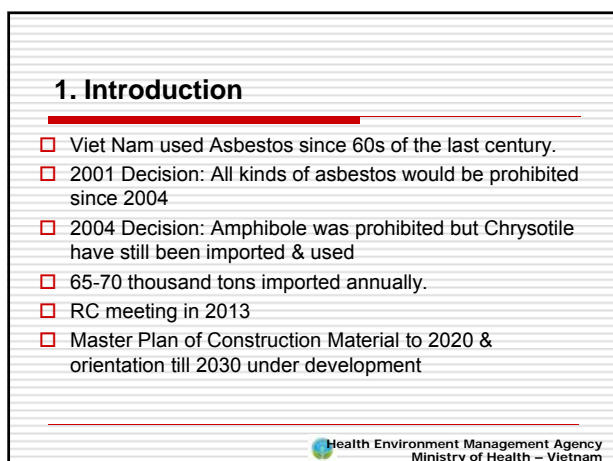
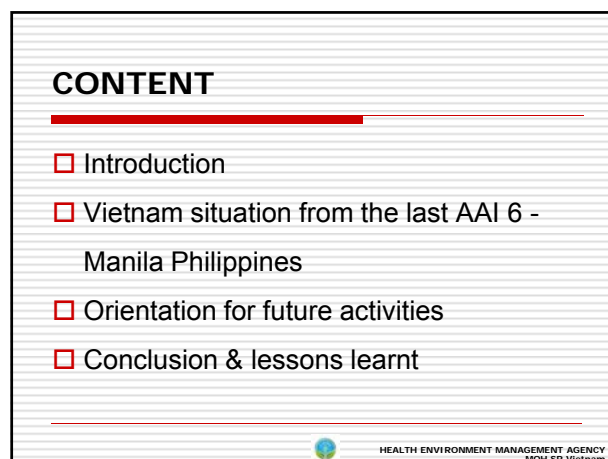
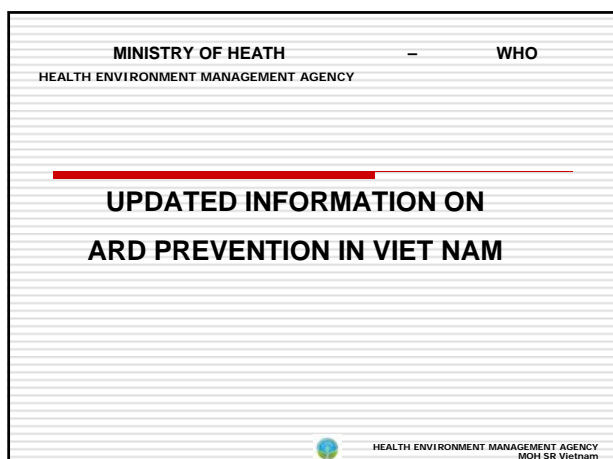
Limitations

- Hospital based
- Not a location for asbestos-used factories
- Asbestos exposure is limited, except 2 reported cases



Conclusions

- Asbestosis and asbestos-related diseases in Thailand may be under reported
- Patient identification and report: national level
- Medical education on occupational health is needed to be emphasized
- Future trend of ARDs may be higher



2.1 Updated the profile on Asbestos till 2013

2.1.2 Reviewing the substitutes in roof sheet production

- Ready (with global standard), but still not popular in the market. Price: 15-20% higher
- It is necessary to have state management on encouraging, promoting and changing to free Asbestos production line and product as soon as possible.



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MOH SR Vietnam

2.1 Updated the profile on Asbestos till 2013

2.1.3 Current inappropriate legal documents

- **Under Chemical law:** Chrysotile is in the list of providing basic information not yet in the list of chemical have conditions for trade
- **Under Environmental Law:**
 - Asbestos is a possible hazardous wastes
 - Wastes of product & material of AC is not hazardous wastes

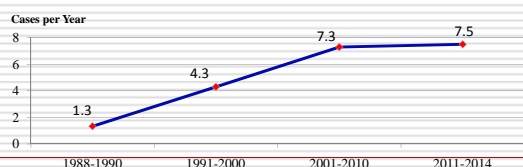


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2.1 Updated the profile on Asbestos till 2013

2.1.4 Mesothelioma cases recorded in 9 cancer registry centers

Period	Years	No of Patient	Cases per year
1988-1990	3	4	1.3
1991-2000	10	43	4.3
2001-2010	10	73	7.3
2011-2014	4	30	7.5
Total		150	



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2.2 Series of scientific conferences, meetings

a) 25-26 February 2014 MOH-WHO workshop

- Chaired by Vice Minister of Health.
- Participants from WHO, ILO, Ministries/ branches, scientists and localities...
- **Conclusions**
 - All kind of Asbestos are carcinogen agents includes chrysotile
 - Lack of database for monitoring ARDs and underestimate of ARDs cases
 - No TLV for Asbestos therefore should be BAN
 - IEC plays very important role for community awareness
 - Asbestos should be put in Annex 3 of RC next year
 - MoH will submit a proposal to Government



HEALTH ENVIRONMENT MANAGEMENT AGENCY
MOH SR Vietnam

2.2 Series of scientific conferences, meetings

b) 17 July 2014 MOH- MOST-WHO workshop

- Chaired by Vice Minister of MOH- MOST
- Participants from National Assembly members, Ministries/Branches, Institutes, Cancer Hospitals, VUSTA and Mass media agency,...
- **Conclusion**
 - No need further study on hazardous effects of Asbestos in Vietnam
 - More using Asbestos - more cancer and burden diseases
 - Environment cost and treatment cost relating Asbestos is higher than its value
 - IEC activities are still limited, low awareness
 - WHO and ILO had a uniquely views on Asbestos



HEALTH ENVIRONMENT MANAGEMENT AGENCY
MOH SR Vietnam

2.2 Series of scientific conferences, meetings

c) Participate & present in many related workshops/meetings conducted by MOH & other ministries/organization

- April, 2014 Meeting chaired by MOIT
- June, 2014 02 workshops of MOC & VUSTA
- July, 2014 Regular meeting with mass media of MOH
- August, 2014 Meeting with mass media of MOIC



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2.3 WHO/ILO joint letter to Government dated August 5, 2014

- Vietnam is one of 10 largest Asbestos using countries in the world
- Public health argument: **Heavy burden ARDs**
Vietnam had recorded mesothelioma cases and “**no safe use of Asbestos**”
- Economic argument: **Low cost** of using Asbestos for the poor vs. **high cost** of ARDs burden diseases and environmental treatment
- Social security: **Failed in public health protection** when continue using of Asbestos
- Vietnam should **BAN** all kind of Asbestos include Chrysotile

2.4 MOH proposal to PM on August 28 2014

- No longer use of Asbestos in Viet Nam
- Assign tasks for Ministries and Branches such as
 - MOC: Guide and change to the free Asbestos production roof sheet lines before 2020
 - MOIT: No objection to including Asbestos in to Annex 3 of Rotterdam Convention
 - MOST & MOE: Study resolution for Asbestos waste treatment
 - MoLISA: Enhance inspection at current AC enterprises
 - MOIC: Raise awareness on Asbestos's harmfulness

2.5 Government documents

2.5.1 Decision dated 22 August 2014

- Approval Master Plan for Construction Material up to 2030.
- Till 2020: not invest or extend production of AC roof sheet; gradually change to use the substitutes
- Till 2030: Develop road map for stop using of Asbestos in the roof sheet production

2.5 Government documents

2.5.2 Document of DPM dated 19 September 2014:

- A plan of **NO OBJECTION to include** Asbestos in to Annex 3 of RC before November 30 2014
- Detail roadmap to **stop using white asbestos in roof sheet production by 2020** & revise the Master plan accordingly.
- Develop National Action Plan for Elimination of ARDs;
- Evaluate magnitude of long term effect of Asbestos on health and to identify solution for reduction of Asbestos effects on environment and health in Vietnam

Activities by time

Time	Activities
Feb 2014	<ul style="list-style-type: none">• MOH_WHO workshop• Updated profile
April 2014	MOIT meeting
June 2014	<ul style="list-style-type: none">• MOC workshop• VUSTA workshop
July 2014	<ul style="list-style-type: none">• MOH-MOST_WHO workshop• MOH meeting with mass media
August 2014	<ul style="list-style-type: none">• MOIC meeting with mass media• WHO/ILO letter• MOH proposal• Master plan of construction material to 2020 & orientation till 2030
Sep 2014	Government office direction



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3. Orientation for future activities

- ☐ Implement DPM directions
- ☐ Raise awareness of the community focus on vulnerable groups



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Conclusion

- ☐ In 2014, MOH with support from WHO-ILO, MOLISA, Trade Union, MOE, related associations and National Assembly delegate have made a great efforts on Asbestos issue
- ☐ Government have been reported the updated information on Asbestos and Community health
- ☐ Clearer view for stop using of asbestos
- ☐ The National Action for Elimination of Asbestos Related Diseases up to 2030 will be developed and implemented.



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Lessons learnt

- ☐ Working groups and Smeetings to have appropriate direction by time (Master Plan, RC, Law)
- ☐ Collaboration & support of intel' Organization (WHO, ILO, Apheda) & Intel experts with updated information provided at workshops/meetings.
- ☐ Orientation for mass media not support to material containing asbestos
- ☐ Support comments of related ministries, professional associations, consumer association
- ☐ But, the lesson from 2001 should be noted, the effort have to continue and not ending



HEALTH ENVIRONMENT MANAGEMENT AGENCY
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Thank you for your attention




HEALTH ENVIRONMENT MANAGEMENT AGENCY
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International Labour Organization
Promoting fair globalization and decent work for all

Inter-Agency Workshop on the Sound Management of Industrial Chemicals, with Special Emphasis on Asbestos, for the Asian-Pacific Region (29 September to 1 October, 2014, Jakarta, Indonesia)

ILO POLICY and ACTION TOWARDS THE ELIMINAT ASBESTOS-RELATED DISEASES



Igor FEDOTOV, M.D., Ph.D.
Senior Specialist on Occupational and Environmental Health,
Labour Inspection, Labour Administration and Occupational
Safety and Health Branch, ILO Geneva

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The ILO policy on asbestos

The ILO policy on asbestos is governed by the international instruments (relevant Conventions and Recommendations, and International Labour Conference resolutions) adopted by the Organization, as well as ILO codes of practice. These international instruments provide solid legal bases as well as practical guidance for comprehensive preventive measures at the national and enterprise levels in order to protect workers and prevent asbestos-related diseases.

http://www.ilo.org/safework/WCMS_144446/lang-en/index.htm

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ILO Policy on Asbestos

Resolution on Asbestos was adopted by ILC, 2006

Considering that all forms of asbestos, including chrysotile, are classified as human carcinogens by the International Agency for Research on Cancer (IARC), and expressing its concern that workers continue to face serious risks from asbestos exposure, particularly in asbestos removal, demolition, building maintenance, ship breaking and waste handling activities, it calls for:

"The elimination of the future use of asbestos and the identification and proper management of asbestos currently in place as the most effective means to protect workers from asbestos exposure and to prevent future asbestos-related diseases and deaths."

"The Resolution also underlines that the ILO Convention on Safety in the Use of Asbestos No.162 should not be used to provide a justification for, or endorsement of, the continued use of asbestos."

http://www.ilo.org/public/english/protection/safework/health/resolution_on_asbestos.pdf

International Labour Organization
Promoting fair globalization and decent work for all

ILO activities on asbestos

- Identification of priority areas for action
- Provision of policy guidance and strengthening legal frameworks for prevention of ARD
- Building inter-agency cooperation for consolidated action by multiple partners
- Sharing knowledge and experience
- Assisting countries through technical cooperation



International Labour Organization
Promoting fair globalization and decent work for all


ILO International Instruments

Legal frameworks for action:

	Ratifications
Labour Inspection C.81	145
Occupational Cancer C.139	39
Working Environment C.148	45
Occupational Safety and Health C.155	62
Occupational Health Services C.161	31
Asbestos Convention 162	35

➢ 35 Codes of Practice

➢ A formidable compilations of principles, obligations, rights and duties, and technical standards on how to deal with asbestos hazards




International Labour Organization
Promoting fair globalization and decent work for all

ILO Occupational Cancer Convention 139

Key provisions of Convention 139 concern:


- periodically determine the carcinogenic substances and agents to which occupational exposure shall be prohibited or made subject to authorization or control;
- make every effort to have carcinogenic substances and agents to which workers may be exposed in the course of their work replaced by non-carcinogenic substances or agents or by less harmful substances or agents;
- reduce the number of workers exposed to carcinogenic substances or agents and the duration and degree of such exposure to the minimum

 **International Labour Organization**
Promoting fair globalization and decent work for all

ILO Convention on Safety in the Use of Asbestos 162

Key provisions of Convention 162 concern:

- prohibits the use of crocidolite and spraying of all forms of asbestos;
- replacement of asbestos or of certain types of asbestos or products containing asbestos by other materials or products evaluated as harmless or less harmful;
- total or partial prohibition of the use of asbestos or of certain types of asbestos or products containing asbestos in certain work processes;
- measures to prevent or control the release of asbestos dust into the air and to ensure that the exposure limits or other exposure criteria are complied with and also to reduce exposure to as low a level as is reasonably practicable

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Difficulties in recognition and prevention of ARD

Asbestos remains the primary carcinogenic substance in the workplace


ARD are amongst the most serious and costly occupational illnesses


Long latency periods of ARD, exposure to asbestos is difficult to control

Lifetime risks of 5/1,000 for lung cancer; 2/1,000 for asbestosis at 0.1 f/cc OEL

Residual health risks remain after cessation of exposure causing incurable diseases and premature deaths

Lack of trained specialists, poor health surveillance, low level of diagnosis of ARD


 **International Labour Office**

 **World Health Organization**

PROGRAMME ON SAFETY AND HEALTH AT WORK AND THE ENVIRONMENT DEPARTMENT FOR PUBLIC HEALTH AND ENVIRONMENT

Outline for the Development of National Programmes for Elimination of Asbestos-Related Diseases


http://www.ilo.org/safework/info/publications/WCMS_108555/lang-en/index.htm
http://whqlibdoc.who.int/hq/2007/WHO_SDE_PHE_07.02_eng.pdf

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Roles and action towards the elimination of ARD

Governments

1. Promote public awareness, establish and implement NPEAD linking them to labour and health policies
2. Introduce substitutes for asbestos, safer technologies and economic stimuli for their use
3. Strengthen legal frameworks and enforcement through labour inspection, control of exposures and compliance with OELs
4. Certify companies for demolition and maintenance works
5. Respond to business needs by sharing experience on good practices
6. Strengthen cooperation between labour, health and environment sectors

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Roles and action towards the elimination of ARD

Trade Unions/Workers


- raise awareness of health risks from exposure to asbestos
- promote the establishment of NPEAD
- participate in NPEAD implementation, training and risk management programmes
- cooperate with OSH professionals on application of protective and preventive measures
- cooperate on the introduction of safer technologies and substitutes

Enterprises/Employers

Introduce substitutes for asbestos:

- no liability in future for causing ARD
- better reputation and companies' images for customers & society
- new business opportunities with asbestos-free products



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ILO technical cooperation to eliminate ARD

Promotion of the ratification of Asbestos Convention 162 and implementation of ILO Asbestos Resolution

Technical assistance to countries in establishing NPEADs jointly with WHO

Inter-agency cooperation (ILO, WHO, SRC-SBC-UNEP, ISSA, ICOH) for global action to eliminate ARD

- Inter-agency awareness-raising workshop on sound management of industrial carcinogens, with special emphasis on asbestos, for the Asia-Pacific Region, Bangkok, 2010; Jakarta, 2014

Strengthening national systems of health surveillance for ARD, training physicians to use the ILO Classification of Radiographs of Pneumoconioses (Brazil, Chile, India, Indonesia, Malaysia, Peru, Thailand, Turkey, Vietnam)

Development of national certification schemes for chest x-ray reading with AIR Pneumo Project, Japan

Sharing knowledge on prevention of ARD, asbestos substitutes and transfer of safe technologies

Global action and support of regional initiatives to eliminate ARD such as Asian Asbestos Initiative (AAI)

 **ILO**
International Labour Organization
Promoting fair globalization and decent work for all

ILO technical cooperation - shipbreaking

Up to 3000 ships need to be scrapped annually (Bangladesh, China, India, Pakistan, Turkey)


Average-size ship contains 5-7 tons of asbestos which is collected and "re-used"

ILO-IMO-BC(UNEP) cooperation – guidelines produced by all three agencies

Technical cooperation and training activities

The IMO Convention on Environmentally Sound Ship Recycling adopted in 2009 with ILO contribution: guidelines are currently being developed to support the implementation of the Convention



 **Conclusions**


- The use of asbestos in the developing world is still high; it even continues to grow in some countries
- In many developing countries preventive capacities, legal systems and compensation mechanisms are inadequate to respond effectively to the forthcoming peak of ARD
- The continuous use of asbestos represents serious health risks to individuals and is damaging to the economies and societies

The elimination of conditions inevitably leading to ARD does not mean only the elimination of exposure conditions, but also requires the changes of the

economic, commercial, legal, social and political conditions

that permit persistence of the working conditions leading to these diseases


UN specialized agencies, workers' organizations, non-governmental organizations and civil society should persevere in their efforts to eliminate ARD globally

 **ILO**
International Labour Organization
Promoting fair globalization and decent work for all

Inter-Agency Workshop on the Sound Management of Industrial Chemicals, with Special Emphasis on Asbestos, for the Asian-Pacific Region (29 September to 1 October, 2014, Jakarta, Indonesia)

Thank You!

Igor FEDOTOV, M.D., Ph.D.
Senior Specialist on Occupational and Environmental Health,
Labour Inspection, Labour Administration and Occupational
Safety and Health Branch, ILO Geneva



(The 7th International Seminar on AAI-7, Jakarta, 2014/9/30)

Support of Accurate Diagnosis on Asbestos-related Disease (ARD) by Digital Pathology Network

Koukilmnai, M.D., Ph.D.

Emeritus Professor (Pathology), Hiroshima University

Pathological Diagnostic Center, Inc.
Institute of Support Center of Remote Medicine

Change of Medicine in Japan

In the former time :Completion within one hospital or medical institute



The present : Co-operation with other hospitals or medical institutes in the area

[Background]

1. Differences of the level in medicine among areas and necessity of uniformity
2. Lack of specialists (radiologist, pathologist, oncologist et al)
3. Increase of aged-patients with long-term medical treatment
4. Sharing of roles in medicine between hospitals and institutes.

Necessity of Common Information about Patients

- [Information]
- Previous medical history
 - Previous medication
 - Data of examination (serum or urine)
 - Radiological findings (X-P, CT, MRI)
 - **Pathological findings**

[Method]



Regional Network for Generalized Medicine
World-wide Network in Specialized Domain

The Remote Digital Pathology

Request of pathological diagnosis

Making of glass slide of tissue examined

Scanning of total glass slide (digitalization)

Transmission of the digital data of glass slide and patient's information **by the special network**

Making a diagnosis

Transmission of the diagnosis with microphotograph **by the special network**

Establishment of Pathological Diagnostic Center Inc.

Date: April 1, 2012 (Hiroshima City, Japan)

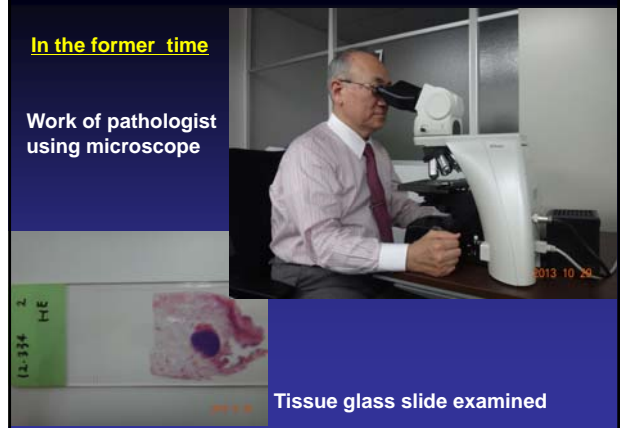
Staff: Pathologist 4 (Full-time 1)
(Part-time 3)
Clerk 1

Task: Pathological diagnosis as a consultant
Routine diagnosis for biopsied or operative material
Intraoperative quick pathology

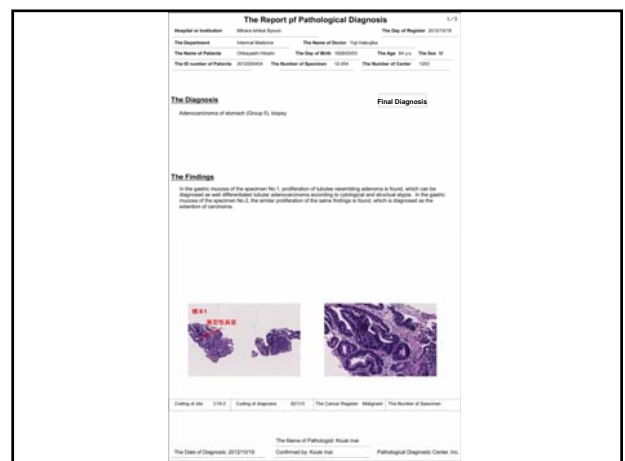
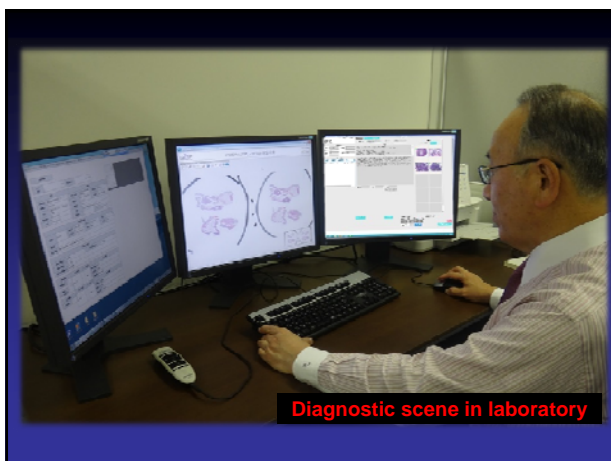
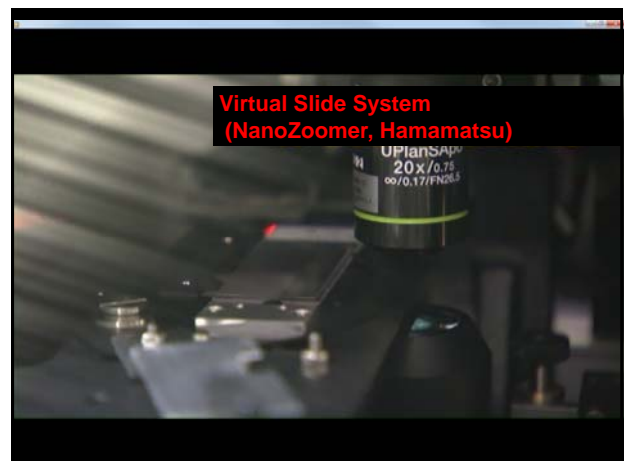
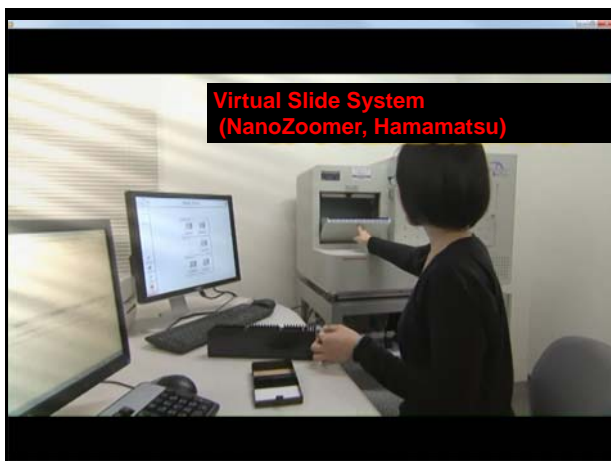
System: Network by digital-scanning-system and optical fiber

In the former time

Work of pathologist using microscope

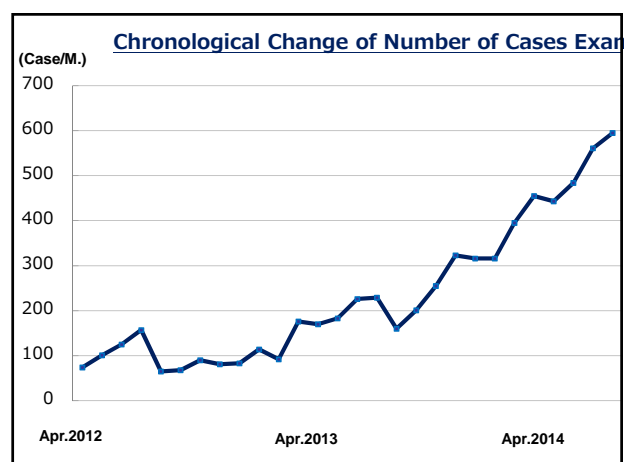


Tissue glass slide examined



Our Aim of Digital-Pathology-Network

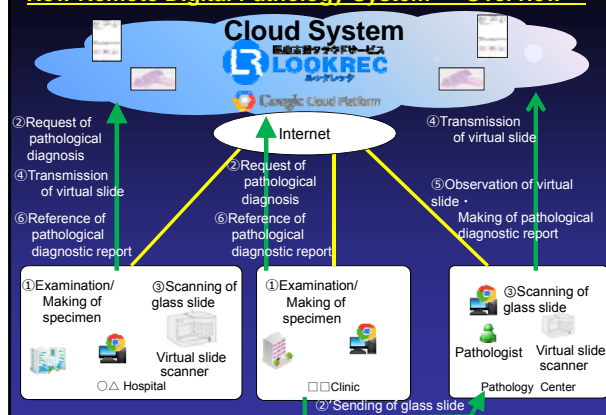
1. Necessity of pathological-diagnostic-service in the area, where pathologists are absent
2. Improvement of quality in pathological diagnosis by making consultation system to the specialist on difficult cases (not only within Japan, but also throughout the world)
3. Application to the relief or compensation system of ARD based on accurate diagnosis



Progress to New Remote Digital Pathology System

- | | |
|------------------------|--|
| 1. Scanning equipment: | 50,000 USD
(in the former; 150,000 USD) |
| 2. Soft on diagnosis: | LOOKREC service
(originally developed) |
| 3. Communication: | Internet using SSL-code |
| 4. Storage of data: | Cloud system by Google |

New Remote Digital Pathology System ~ Overview ~



Cooperation of pathological diagnosis and image diagnosis



Advantages of New System

1. Expansion of network by internet (compared to optical fiber)
2. Lower cost of establishment in each of institutes
3. No special application (only use Google Chrome Browser)
4. Lower cost of storage
5. Complete backup of data (Google cloud data center)

The Network of Remote Pathological Diagnosis in the World (Future Plan)



Okayama Rosai Hospital

Utility of Low dose CT for the regular
checkup for asbestos exposed
workers

Takumi Kishimoto, MD, PhD
Okayama Rosai Hospital ,
Okayama, Japan

NLST (National Lung Screening Trial)

For more than 55 years with
heavy smoker, regular checkup by
using Low dense chest CT induced
significantly better prognosis of
lung cancer than chest x-ray
screening.

(N Engl J Med. 2011 Aug 4;365(5):395-409)

Purpose

- The utility for the low dose spiral CT(LDCT) to detect lung cancer and mesothelioma of asbestos exposed workers is examined.
- The comparison between chest x-ray and LDCT is evaluated.

Material and methods

- 2132 cases of asbestos exposed workers were examined using LDCT
- Gender
 - Male 2,050 (97.4%)
 - Female 82 (2.6%)
- Age
 - 51 ~101 years old
 - (mean 76.1 ±6.7years, Median75 years)

Picture conditions for LDCT

- Posture
 - Abdominal posture
- dose
 - Less than 30mAs
- Radiological data
 - 5 mm thick, 5 mm interval, lung and mediastinal conditions
 - 2 mm thick, 5 mm interval, thin-section CT (TSCT)

Evaluation criteria for LDCT

- Pleural plaques and grades
- Interstitial changes and grades
- SCLS/DOTS
- Ground glass opacities
- Traction bronchiectasia
- Honeycombing
- Pleural effusion
- Parenchymal band
- Diffuse pleural thickening
- Rounded atelectasis
- Emphysema/pulmonary cyst

Control group (chest x-ray)

- 1,478 cases with occupational asbestos exposure were checked by chest x-ray.
- Gender
 - Male 1,397 (94.5%)
 - Female 81 (5.5%)
- Age
 - 50 ~91 years old
 - (mean 73.1 ± 5.8 years, Median 73 years)

Results

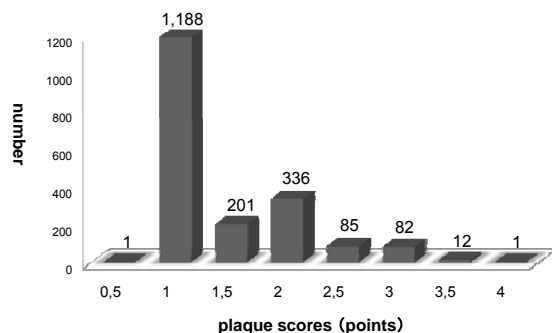
Findings of CT/TSCT (for 2,132 cases)

• Pleural plaques	1,906 (89.4 %)
• Interstitial changes	563 (26.4 %)
• SCLS/DOTS	297 (13.9 %)
• Ground glass opacities	482 (22.6 %)
• Traction bronchiectasia	186 (8.7 %)
• Honeycombing	42 (2.0 %)
• Pleural effusion	52 (2.4 %)
• Parenchymal band	287 (13.5 %)
• Diffuse pleural thickening	292 (13.7 %)
• Rounded atelectasis	70 (3.3 %)
• Emphysema/pulmonary cyst	980 (46.0 %)

Plaque scores (width of plaque)

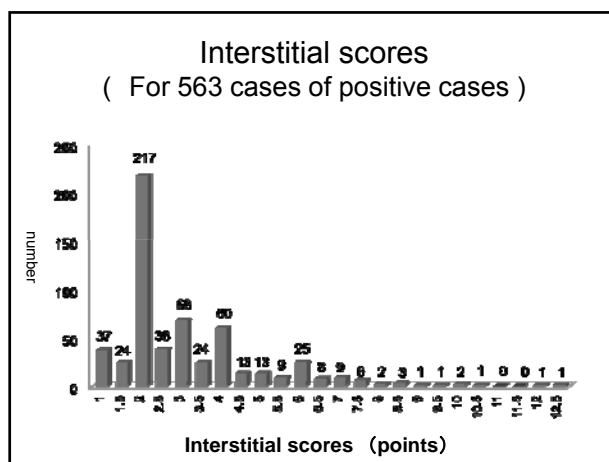
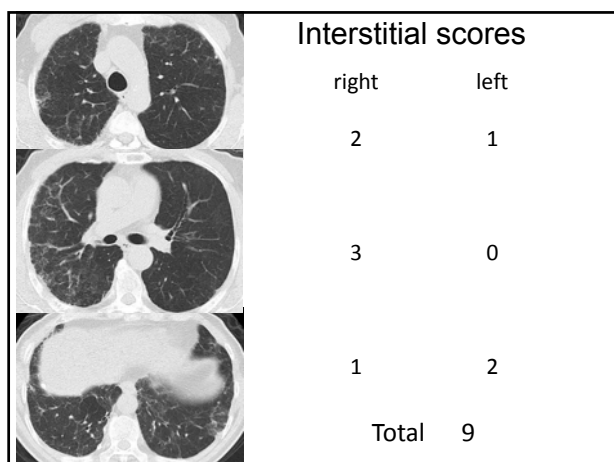
• Counts at most typical plaques	points
– No plaques	0
– Less than 1/4	1
– 1/4 ~ 1/2	2
– 1/2 ~ 3/4	3
– More than 3/4	4

Plaque scores
(for 1,906 plaque positive cases)



Interstitial scores (Width of fibrosis)

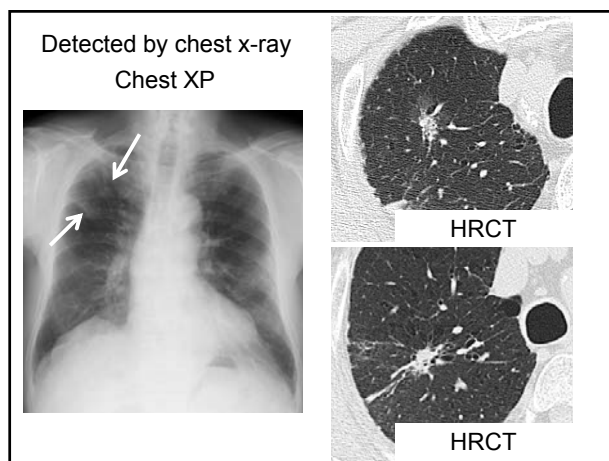
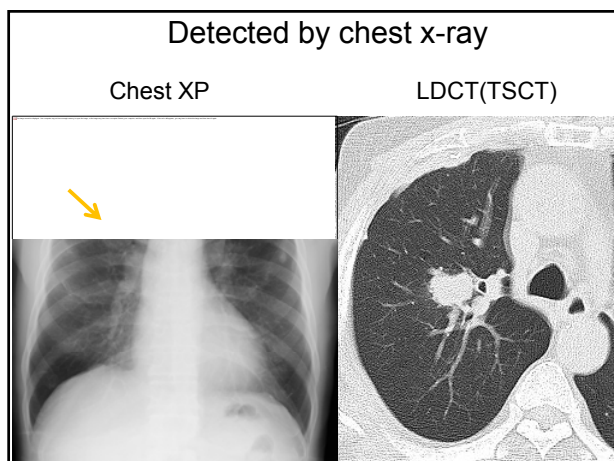
Each unilateral sides,	
• Point counts	
– ~Tracheal level	total 6 areas
– ~Inferior vena cava	
– ~below IVC	
• Most severe area counts (0~18 points)	
– No interstitial shadows	0
– ~1/4	1
– 1/4 ~ 1/2	2
– 1/2 ~	3



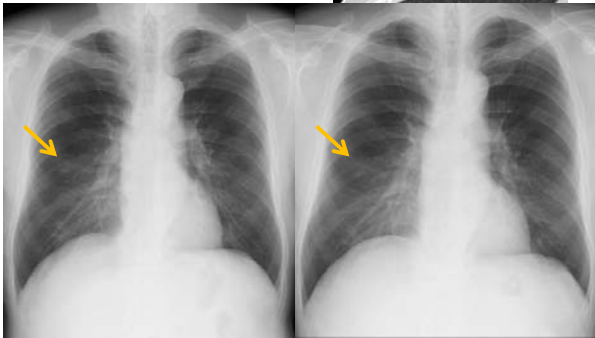
Lung cancer cases

- Total cases 45 cases
- Age 60~87 years (mean 73.4 years)
- Gender: male 44 cases, female 1 case
- Histology:
 - adenocarcinoma: 31, squamous cell: 10,
 - small cell: 3, large cell: 1

Case presentation



75 M construction worker for 34 years

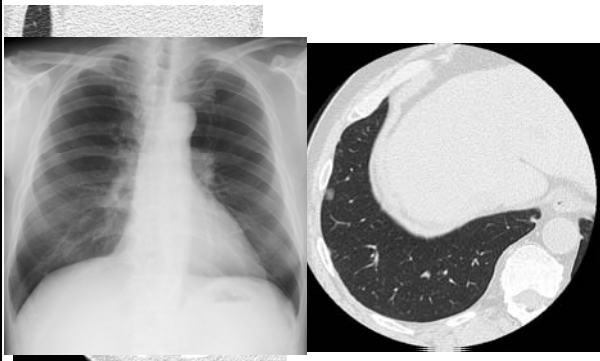
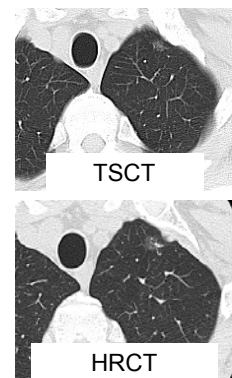


Relatively difficult to detect

Chest XP

LDCT(TSCT)

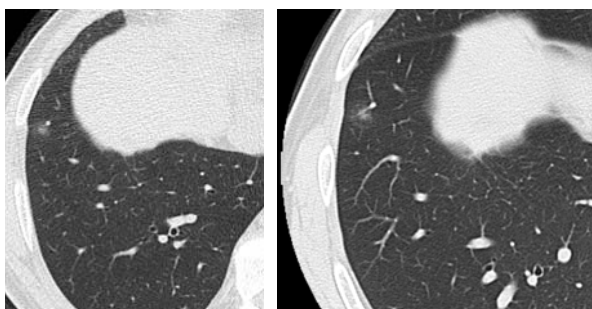
HRCT

66 years male
Ironworking for 50 yearsNo detection by chest x-ray
Chest XP

No detection by chest x-ray

LDCT

HRCT

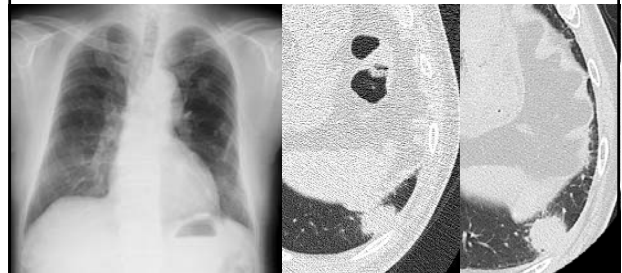


No detection by chest x-ray

Chest XP

TSCT

HRCT



Chest x-ray VS Low dense CT

- 45 cases with lung cancer
 - Pointed out by chest x-ray 12 (26.9%)
 - No checking by chest x-ray 10 (22.0%)
 - No pointed out without CT 23 (51.1%)

※ Thirty three cases (73%) out of 45 cases could not be found out by chest x-ray

Smoking histories

	Control group	Lung cancer
• Positive	1653 (78.8%)	42 (93.3%)
• Negative	44 (21.2%)	3 (6.7%)
	(p=0.016)	

CT/HRCT

Total (2,132) Lung cancer(45)

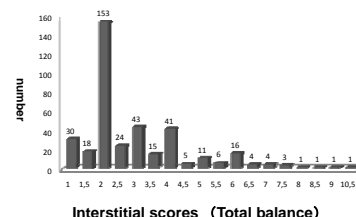
• Pleural plaque	1,906 (89.4 %)	40 (88.8 %)
• Interstitial changes	563 (26.4 %)	17 (37.8%)
• SCLS/DOTS	297 (13.9 %)	8 (17.8 %)
• Ground glass opacities	482 (22.6 %)	13 (28.9 %)
• Traction bronchiectasia	186 (8.7 %)	4 (8.9 %)
• Honeycombing	42 (2.0 %)	2 (4.4 %)
• Pleural effusion	52 (2.4 %)	7 (15.6%)
• parenchymal band	287 (13.5 %)	5 (11.1 %)
• Diffuse pleural thickening	292 (13.7 %)	5 (11.1%)
• Rounded atelectasis	70 (3.3 %)	0 (0 %)
• emphysema/pulmonary cysts	980 (46.0 %)	27 (60.0 %)

Interstitial changes for 45 cases of lung cancer

- Interstitial changes positive 17 negative 28

- Interstitial scores

~ 1.5points	2
~ 2points	4
~ 2.5points	3
~ 3points	2
~ 4points	6

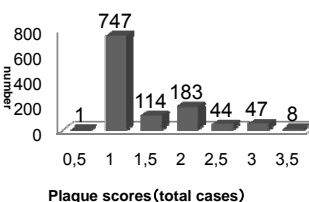


Pleural plaques for 45 cases of lung cancer

- Positive 40 cases with 28 calcification
- Less than 5mm 13 cases
- more than 5mm 27 cases

- Plaque scores

0.5~ 1 point	23 cases
1.5~ 2 points	5 cases
2.5~ points	2 cases



LDCT vs chest x-ray

	CT	chest x-ray
No. of lung cancer	45	11
Age (median)	73	79
Range	60~87	67~87
Gender: male	44 (98%)	11 (100%)
female	1 (2%)	0 (0%)
Histology:		
adenocarcinoma	31 (68%)	5 (45%)
squamous cell	10 (22%)	3 (27%)
small cell	3 (7%)	1 (9%)
large cell	1 (2%)	2 (18%)
Operation	30 (73%)	4 (36%)

Mesothelioma cases

- Total cases 7 cases
- Age 70~84 years (mean 75 years)
- Gender: male 7 cases
- Primary sites: pleura 6, peritoneum 1
- Histology:
epithelioid: 4, biphasic: 2, sarcomatoid: 1
- Smoker 6, non-smoker 1
- Pleural plaques: 7, asbestosis 0

Pleural plaques

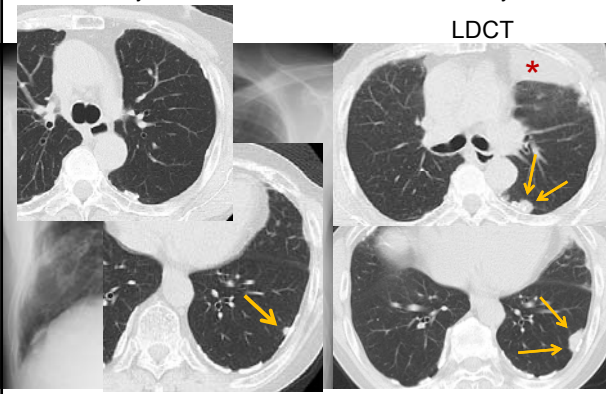
- Calcification: calcified 6, non-calcified 1
- Thickness of plaques No.

~4 mm	1
5 mm	3
6 mm	2
7 mm	0
8 mm~	1

A case of mesothelioma

74 years Male construction of boiler for 14 years

LDCT



Summary 1

- Low dense CT was performed for 2132 cases with histories of occupational asbestos exposure.
- The positive findings of pleural plaques were 89.4%.
- The interstitial changes of lung were detected for 24.8% and SCLS/Dots which were specific for asbestosis were also detected for 14.6%. But most of these cases of the interstitial scores were low.
- The positivity of high grade lung fibrosis such as traction bronchiectasia and honeycombing were low such as 6.9% of traction bronchiectasia were and 1.3% of honeycombing

Summary 2

- The detection of lung cancer is 1.44%. This value is higher than 0.3%~0.85% of screening of normal people.
- Scores of pleural plaques or interstitial changes for lung cancer were almost same as non cancer cases.
- Almost all cases of lung cancer could not detect by chest x-ray because of mainly pleural plaques. Therefore, LDCT is useful for the early detection of lung cancer.
- Seven cases of mesothelioma were detected in this screening. All cases had pleural plaques and the thickness of pleural plaques are more than 3mm.
- LDCT is useful for the early detection for mesothelioma and lung cancer will be benefit for the survival like NLST.

Japan Occupational Safety and Health Resource Centre and UOEH, Japan

Utilization of Job Exposure Matrix

Sugio Furuya¹, Ken Takahashi²,

¹ Japan Occupational Safety and Health Resource Center

² University of Occupational and Environmental Health, Japan

Outlook

We propose the Job-Exposure Matrix as follows:

- 1- Find and list all possible jobs/industries potentially exposed to asbestos in Japan using website, papers, book, etc.
- 2- Find the codes and then classify all jobs and industries based on the International Standard Classification of Occupations (ISCO) and the International Standard Industrial Classification of All Economic (ISIC).
- 3- List all of the ISCO jobs and ISIC industries exposed to asbestos in Japan and count the number of them.
- 4- Later the same process could be applied to other countries to find the situation and compare the results among the countries.

29 Sept - 1 Oct, 2014

Asian Asbestos Initiative (AAI) 7th

2

Detail process by steps

- **Step 1.** We found a document (in Japanese) which listed with details, the jobs potentially exposed to asbestos from Japan, Ministry of Health, Labour and welfare. Based on this document, we added new jobs that we found from other sources such as website, papers, book, etc.
- **Step 2.** The jobs were translated from Japanese into English.
- **Step 3.** The International Standard Classification of Occupations (ISCO) and the International Standard Industrial Classification of All Economic (ISIC) were used to classify the jobs or industries.
- **Step 4.** To find the code(s) of ISCO or ISIC for each job "Unit" of ISCO and "Class" of ISIC (smallest sublevel) were used.
- **Step 5.** The layout was changed based on the classification codes of ISCO or ISIC.
- **Step 6.** All of the ISCO and ISIC jobs and industries exposed to asbestos were listed and counted.

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3



List of Works exposed to Asbestos (MHLW)
http://www.jaish.gr.jp/information/mhlw/sekimen/h18_tebiki.html

4

Step 1. Find and list jobs/industries exposed to asbestos in Japan

Step 2. Translation into English

作業名	職業	備考	Job [Major group]	Job [Sub-major group]	Comment
(1) 石綿鉱山・石綿製品 の製造に関わる作業	(1.1) 石綿鉱山の坑夫		(1) Work related to asbestos mine and asbestos products	(1.1) Asbestos mining	
	(1.2) 石綿鉱山の採掘			(1.2) Asbestos quarrying	
⋮	⋮		⋮	⋮	
(34)タルク等石綿含有 物を使用する作業	(34.9) 研磨		(34) Work with asbestos- containing material (for example, talc)	(34.9) Polishing process	

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Step 3-1. International Standard Classification of Occupations (ISCO)

Download from:

http://www.ilo.org/wcmsp5/groups/public/-dgreports/-dcomm/-publ/documents/publication/wcms_172572.pdf

MAJOR GROUPS

1. Managers
2. Professionals
3. Technicians and Associate Professionals
4. Clerical Support Workers
5. Services and Sales Workers
6. Skilled Agricultural, Forestry and Fishery Workers
7. Craft and Related Trades Workers
8. Plant and Machine Operators and Assemblers
9. Elementary Occupations
10. Armed Forces Occupations



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Step 3-2. ISCO contents

Major	Sub-major	Minor	Unit
1	11 Chief Executives, Senior Officials and Legislators	111	1111 Legislators
			1112 Senior Government Officials
			1113 Traditional Chiefs and Heads of Villages
			1114 Senior Officials of Special-interest Organizations
	12 Administrative and Commercial Managers	112 Managing Directors and Chief Executives	:
		121	1211 Finance Managers
			1212 Human Resource Managers
			1213 Policy and Planning Managers
	122		1219 Business Services and Administration Managers Not Elsewhere Classified
			:
	13	:	:
		:	:
	14	:	:
		:	:

Total: 10 (Major) 43 (Sub-major) 130 (Minor) 436 (Unit) 7

Step 3-3. International Standard Industrial Classification of All Economic (ISIC)

Download from
http://unstats.un.org/unsd/publication/seriesM/seriesM_4rev4e.pdf

SECTIONS

- A. Agriculture, forestry and fishing
- B. Mining and quarrying
- C. Manufacturing
- D. Electricity, gas, steam and conditioning supply
- E. Water supply; sewerage, waste management and remediation activities
- F. Construction
- G. Wholesale and retail trade; repair of motor vehicles and motorcycles
- H. Transportation and storage
- I. Accommodation and food service activities
- J. Information and communication
- K. Financial and insurance activities
- L. Real estate activities
- M. Professional, scientific and technical activities
- N. Administrative and support service activities
- O. Public administration and defence; compulsory social security
- P. Education
- Q. Human health and social work activities
- R. Arts, entertainment and recreation
- S. Other service activities
- T. Activities of households as employers; undifferentiated goods- and service-producing activities of households for own use
- U. Activities of extraterritorial organizations and bodies



8

Step 3-4. ISIC contents

Section	Division	Group	Class
A Agriculture, forestry and fishing	01 Crop and animal production, hunting and related service activities	011 Growing of non-perennial crops	0111 Growing of cereals (except rice), leguminous crops and oil seeds
			0112 Growing of rice
			:
			0116 Growing of fibre crops
			0119 Growing of other non-perennial crops
		012 Growing of perennial crops	0121 Growing of grapes
			:
			0129 Growing of other perennial crops
		:	:
		017	:
B Mining and quarrying	05	:	:
		:	:
		:	:
		:	:
U Activities of extraterritorial organizations and bodies	:	:	:
		:	:

Total: 21 (Section) 88 (Division) 238 (Group) 419 (Class)

Step 4-1. ISCO - Find the smallest sublevel 4 digits codes

Job	ISCO	ISIC	Comment
Example (1.1) Asbestos mining [Work related to asbestos mine and asbestos products]	8111 8112 8113 8114 9311		

ISCO

Major	Sub-Major	Minor	Unit
8 Plant and Machine Operators and Assemblers	81 Stationary Plant and Machine Operators	811 Mining and Mineral Processing Plant Operators	:
			8113 Well Drillers and Borers and Related Workers
		:	:
		:	:
9 Elementary Occupations	93 Labourers in Mining, Construction, Manufacturing and Transport	931 Mining and Quarrying Labourers	9311 Mining and Quarrying Labourers
		:	:

10

Step 4-2. ISIC - Find the smallest sublevel "Class" (code)

Job	ISCO	ISIC	Comment
Example (1.1) Asbestos mining [Work related to asbestos mine and asbestos products]	8111	0899 0990	

Section	Division	Group	Class
B Other mining and quarrying	08	081 Quarrying of stone, sand and clay	0810 Quarrying of stone, sand and clay
			0891 Mining of chemical and fertilizer minerals
			0892 Extraction of peat
			0893 Extraction of salt
		089 Mining and quarrying n.e.c.	0899 Other mining and quarrying n.e.c.
			:
	09 Mining support service activities	091 Support activities for petroleum and natural gas extraction	0910 Support activities for petroleum and natural gas extraction
			:
		099 Support activities for other mining and quarrying	0990 Support activities for other mining and quarrying
			:

11

Step 4-3. Input appropriate code(s) for each job

Job	ISCO	ISIC	Comment
(1.1) Asbestos mining [Work related to asbestos mine and asbestos products]	8111 8112 8113 8114 9311	0899 0990	
(1.2) Mining [Work related to asbestos mine and asbestos products]	8111 8112 8113 8114 9311	0899 0990	
:	:	:	
(34.9) Polishing process [Work with asbestos- containing material (for example, talc)]	7549	2396	

12

Step 5-1. Changing the layout based on the classification codes (4digits – “Unit”) (ISCO)

ISCO		Job2	Job2
0110	Yes	Central government, its local branch office and former soldier [Other work related to asbestos]	—
⋮		⋮	⋮
9613	Yes	Asbestos removal operation [Demolition work]	Power generating installation [Work in electricity generating plants, electric power substations, and other electric(al) facilities]
9629	Yes	Waste processing facility [collection garbage, conveyance, waste processing and garbage disposal in waste incineration plant or discard plant]	—

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Step5-2. Changing the layout based on the classification codes (4digits – “Class”) (ISIC)

ISIC		Job1	Job2
0111	Yes	Farming [Work with agrichemicals or vermiculite]	—
0112	Yes	Farming [Work with agrichemicals or vermiculite]	—
⋮		⋮	⋮
9601	Yes	Dry cleaning work [Work related to laundry, (dry) cleaning]	Linen supply service [Work related to laundry, (dry) cleaning]

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Step 6-1. List and count all of the ISCO job categories exposed to asbestos

ISCO	Unit	
1111	Legislators	No
⋮	⋮	⋮
1321	Manufacturing Managers	Yes
1322	Mining Managers	Yes
1323	Construction Managers	Yes
⋮	⋮	⋮
2141	Industrial and Production Engineers	Yes
2142	Civil Engineers	Yes
⋮	⋮	⋮
0130	Armed Forces Occupations, Other Ranks	Yes
Total number of “Yes”		165

Among total 436 categories, 165 / 436 = 37.8%

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Step 6-2. List and count all of the ISIC industry categories exposed to asbestos

ISIC	Class	
0111	Growing of cereals (except rice), leguminous crops and oil seeds	Yes
0112	Growing of rice	Yes
0113	Growing of vegetables and melons, roots and tubers	Yes
0114	Growing of sugar cane	Yes
0115	Growing of tobacco	Yes
0116	Growing of fibre crops	Yes
0119	Growing of other non-perennial crops	Yes
0121	Growing of grapes	Yes
⋮	⋮	⋮
9900	Activities of extraterritorial organizations and bodies	No
Total number of “Yes”		213

Among total 419 categories, 213 / 419 = 50.8%

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Results. Number of ISCO job categories and ISIC industry categories exposed to asbestos in Japan

Digit Numbers	ISCO	Yes	No	Total	%
1 digit	Major	10	0	10	100.0%
2 digits	Sub-major	27	16	43	62.8%
3 digits	Minor	66	64	130	50.8%
4 digits	Unit	165	271	436	37.8%

Digit Numbers	ISIC	Yes	No	Total	%
1 digit	Section	17	4	21	81.0%
2 digits	Division	53	35	88	60.2%
3 digits	Group	118	120	238	49.6%
4 digits	Class	213	206	419	50.8%

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Comparison of Japan and Korea ISCO

1 digit	Japan	Korea	Total	
Both	8	8	8	80.0%
Japan only	2		2	20.0%
Korea only				0.0%
Neither				0.0%
Total	10	8	10	
	100.0%	80.0%	K/J	80.0%

2 digits	Japan	Korea	Total	
Both	14	14	14	32.6%
Japan only	13		13	30.2%
Korea only		3	3	3.0%
Neither			13	30.2%
Total	27	17	43	
	62.8%	39.5%	K/J	63.0%

3 digits	Japan	Korea	Total	
Both	34	34	34	26.2%
Japan only	32		32	24.6%
Korea only		8	8	6.2%
Neither			56	43.1%
Total	66	42	108	
	50.8%	32.3%	K/J	63.6%

4 digits	Japan	Korea	Total	
Both	76	76	76	17.4%
Japan only	89		89	20.4%
Korea only		13	13	3.0%
Neither			258	59.2%
Total	165	89	254	
	37.8%	20.4%	K/J	53.9%

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Comparison of Japan and Korea ISIC

1 digit	Japan	Korea	Total	
Both	10	10	10	47.6%
Japan only	7		7	33.3%
Korea only			0	0.0%
Neither			4	19.0%
Total	17	10	21	
	81.0%	47.6%	K/J	58.8%

2 digits	Japan	Korea	Total	
Both	30	30	30	34.1%
Japan only	23		23	26.1%
Korea only		5	5	5.7%
Neither			30	34.1%
Total	53	35	88	
	60.2%	39.8%	K/J	66.0%

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Faserjahre (BK-Report 1/2013), Germany IFA/DGUV

dguv.de/ifa/Publikationen/Reports-Download/Reports-2013/BK-Report-1-2013/



Asbestos Textile Industry (ISIC = 13) (90 percentile)								
	Carding		Spinning		Weaving		Sewing	
ISCO	8151		8151		8152		8153	
Period	Konz.	VK	Konz.	VK	Konz.	VK	Konz.	VK
1975-79	5.8	2	4.0	2	3.0	2	3.9	2
1980-83	3.6	2	4.0	2	3.1	1	2.7	2
1984-87	3.0	3	4.0	3	4.5	3	1.3	1

Cross-Industry (90 percentile)										
	Turning		Pressing		Sawing		Punching/Cutting		Winding	
Period	Konz.	VK	Konz.	VK	Konz.	VK	Konz.	VK	Konz.	VK
1980-82	0.6	1	1.3	1	9.8	1	2.0	1	1.1	3
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1988-90	0.2	2	0.2	2	0.6	2	0.7	2	0.02	3

Konz.: Concentration, in F/cm³ VK: Validity category

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Compensated number of ARDs – Top 10 industries: Workers Compensation (2008-2013), Japan

ISIC	Total	
4100	Building work except, equipment installation work for existing building	2,504
3011-3012	Shipbuilding including repairing	827
4321-4329	Equipment installation work for existing building	708
2910-2930, 3020-3099	Manufacturing of transportation equipments, except shipbuilding	315
2392, 2393, 2396, 2399	Manufacturing of ceramic, stone or clay products	302
2811-2829	Manufacturing of general machinery	267
2011-2100	Manufacturing of chemical and allied products	265
2511-2592, 2599	Manufacturing of fabricated metal products or metal working	161
2410	Smelting of metals, except smelting of non-ferrous metals	139
4510, etc	Wholesale and retail trade, restaurant or accommodations	130

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Compensated number of ARDs by industry -1 : Workers Compensation (2008-2013), Japan; ISIC 1 digit

Industry	Population %	Compensated ARDs		
		Case	%	REFS
B Mining and quarrying	0.0%	9	0.1%	2.7
C Manufacturing	16.8%	2,868	41.5%	2.5
D Electricity, gas, steam and air conditioning supply	0.5%	37	0.5%	1.0
E Water supply; sewerage, waste management and remediation activities				
F Construction	8.0%	3,463	50.1%	6.3
H Transportation and storage	5.6%	177	2.6%	0.5
Others	69.1%	362	5.2%	0.1
Total	100.0%	6,916	100.0%	1.0

REFS: Ratio to Expected Frequency Score

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Compensated number of ARDs by industry -2 : Workers Compensation (2008-2013), Japan; ISIC 2 digits

Industry (C: Manufacturing)	Population %	Compensated ARDs		
		Case	%	REFS
10 Food products	2.2%	16	0.2%	0.1
13-14 Textiles and wearing apparel	0.9%	119	1.7%	2.0
16 Wood products etc.	0.2%	40	0.6%	2.4
17 Paper products	0.4%	31	0.4%	1.0
18 Printing	0.8%	2	0.0%	0.0
20-21 Chemical products etc.	0.9%	265	3.8%	4.1
23 Non-metallic mineral products	0.5%	428	6.2%	11.7
24 Basic metals	0.7%	215	3.1%	4.7
25 Fabricated metal products	1.6%	167	2.4%	1.5
27 Electrical equipments	1.0%	87	1.3%	1.2
28 Machinery equipments	2.2%	267	3.9%	1.7
29-30 Transport equipments	1.6%	1,142	16.5%	10.3
Other manufacturing	3.7%	89	1.3%	0.3

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Compensated number of ARDs by industry -3 : Relief for not covered by WC (2006-2012), Japan; ISIC 1 digit

Industry	Population %	Compensated ARDs		
		Case	%	REFS
A Agriculture, forestry and fishing	4.0%	380	4.0%	1.0
B Mining and quarrying	0.0%	79	0.8%	17.5
C Manufacturing	16.7%	3,448	36.5%	2.2
D Electricity, gas, steam and air conditioning supply	0.5%	89	0.9%	1.7
E Water supply; sewerage, waste management and remediation activities				
F Construction	8.0%	1,789	19.0%	2.4
G Wholesale and retail trade; repair of motor vehicles and motorcycles	16.9%	815	8.6%	0.5
H Transportation and storage	5.6%	592	6.3%	1.1
I Accommodation and food service activities	6.2%	248	2.6%	0.4
J Information and communication	3.1%	108	1.1%	0.4

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Compensated number of ARDs by industry -4 : Relief for not covered by WC (2008-2012), Japan; **ISIC 1 digit**

Industry	Population		Compensated ARDs	
	%	Case	%	REFS
K Financial and insurance activities	2.6%	243	2.6%	1.0
L Real estate activities	1.8%	62	0.7%	0.4
O Public administration and defence; compulsory social security	3.5%	370	3.9%	1.1
P Education	4.6%	236	2.5%	0.5
Q Human health and social work activities	10.4%	147	1.6%	0.1
N Administrative and support service activities	8.0%	722	7.7%	1.0
S Other service activities	8.0%	109	1.2%	0.1
Others (M, R, T and U)				
Total	100.0%	9,437	100.0%	1.0

Multiple answers allowed, N=5,209

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Compensated number of ARDs by occupation: Relief for not covered by WC (2006-2012), Japan; **ISCO 1 digit**

Occupation	Population		Compensated ARDs	
	%	Case	%	REFS
1 Managers	2.6%	171	1.9%	0.7
2 Professionals	15.8%	580	6.5%	0.4
3 Technicians and Associate Professionals				
4 Clerical Support Workers	20.5%	1,310	14.6%	0.7
5 Services and Sales Workers	26.7%	1,406	15.7%	0.6
0 Armed Forces Occupations				
6 Skilled Agricultural, Forestry and Fishery Workers	3.9%	353	3.9%	1.0
7 Craft and Related Trades Workers	30.5%	5,134	57.3%	1.9
8 Plant and Machine Operators and Assemblers				
9 Elementary Occupations				
Total	100.0%	8,954	100.0%	1.0

Multiple answers allowed, N=5,170

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Discussion


- This kind of JEM will be useful to assist detection and diagnosis of ARDs, to identify the extent of problems for the elimination of ARDs.
- Will be useful for the purpose of comparison between deferent countries – hope to expand collaboration.
- Could be combined to data on the number of ARDs victims and/or the past situation of asbestos exposure.
- Creating website regarding jobs/industries exposed to asbestos in different countries (Job-Exposure Matrix) to spread the information and receive feedback from the readers, update or upload new results.

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Asian Asbestos Initiative (AAI) 7th



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Korea




**Asbestos Management Policies
in Korea**
(about Environmental Asbestos)

30 September, 2014

CONTENTS

- 1 History of Asbestos Regulations in Korea
- 2 Vision & Strategy
- 3 Asbestos Safety Managements
- 4 Asbestos Health Damage Relief



- 1 History of Asbestos Regulations in Korea
- 2 Vision & Strategy
- 3 Asbestos Safety Managements
- 4 Asbestos Health Damage Relief



1. History of Asbestos Regulations in Korea


1990 : Ban use without permit
- Occupational Safety and Health Act

1997 : Ban Crocidolite & Amosite

2007 : Interagency Comprehensive measures



2007 : Ban Asbestos-containing Cement & Braking Pad

2009 : Complete Ban on Asbestos
- Occupational Safety and Health Act
- temporal exception for special use gasket

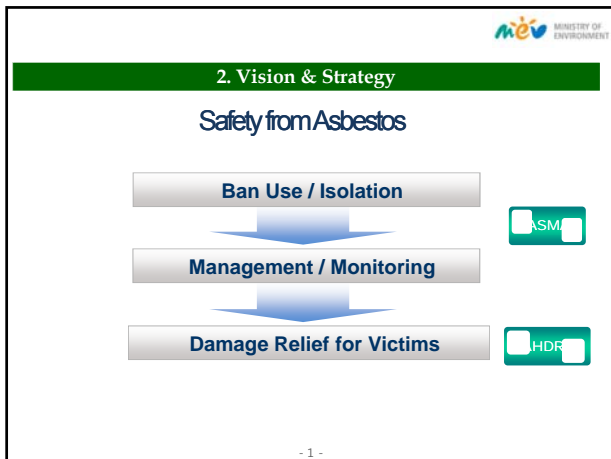


2010 : Asbestos Health Damage Relief Act
- Relief benefits to victims of environmental exposure
- Establishment of Asbestos Damage Relief Fund

2011 : Asbestos Safety Management Act
- Life-cycle Management of Asbestos in Buildings
- Monitoring Possibly Asbestos-Containing Minerals (PACM) & Naturally Occurring Asbestos(NOA)


- 1 History of Asbestos Regulations in Korea
- 2 Vision & Strategy
- 3 Asbestos Safety Managements
- 4 Asbestos Health Damage Relief



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CONTENTS



- 1 History of Asbestos Regulations in Korea
- 2 Vision & Strategy
- 3 Asbestos Safety Managements**
- 4 Asbestos Health Damage Relief

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3. Asbestos Safety Managements

Asbestos in Buildings

- Survey** : above 500 m² (Kindergarten 430 m²)
 - Government buildings, Public use facilities
 - Schools, Kindergarten, etc...
 - due on Apr. 2014 (1st. Survey), Apr. 2015(2nd. Survey)
- Asbestos Mapping & Information System**

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- Maintenance**
 - Appoint asbestos manager
 - Periodic check (every 6 month)
 - Provide asbestos map before maintenance
- Warning sign on asbestos-containing materials**

CAUTION

CONTAINS ASBESTOS

DO NOT DISTURB WITHOUT PROPER TRAINING AND EQUIPMENT

AUTHORIZED PERSONNEL ONLY



- Establishment Safety Management Guideline & Standard Manual**

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Current Achievement of Survey Buildings

(as of Aug.1, 2014)

	Total			Achievement		
	Total	By Apr. 2014	By Apr. 2015	Total	By Apr. 2014	By Apr. 2015
Total	53,528	44,549	8,979			
Survey Completed	46,945	42,839	4,106			
Asbestos Detected	22,263	21,240	1,023	87.7%	96.2%	45.7%
Not surveyed	5,761	1,032	4,729			
Exception Applied	822	678	144			


* Kindergarten and Schools are not included

Asbestos Management Consulting

- buildings for the old and children with weak finance
- up to 300 sites in 2014

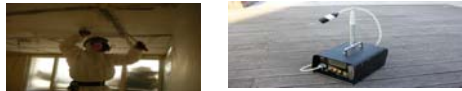
Support to Small kindergarten

- below Act Standard(430 m² acm)
- up to 800 sites in 2014




Monitoring Asbestos Removal Site

- Disclosure of removal operations information**
 - Promote public awareness, watch
 - Inform name, location, working period, etc...
- Self-monitoring of asbestos level in the air**
 - Less than 0.01f/cc in the air during operation
 - Site with more than 500 m² acm
- Appoint Supervisor (Monitor)**
 - Site with more than 800 m² acm



Asbestos Removal Sites in 2013

	Sites	Below 500 m ²	500 m ² ~800 m ²	800 m ² ~5,000 m ²	above 5,000 m ²
Sites	16,039	14,251	1,788	1,734	240
Exposure Limit observance	16,039	O	O	O	O
Measurement Asbestos conc.	3,762	-	O	O	O
Appoint Monitor	1,974	-	-	O	O
Management by Local Government	240+@	-	-	-	O



Possibly Asbestos-Containing Minerals

- Designated PACM**


Talc Serpentine Vermiculite Sepiolite
- Import or Mining** : less than 1%
- Transforming** : less than 0.01f/cc in the air
- Distribution**: 1%(raw material), 0 or 0.1%(final products)

Naturally Occurring Asbestos

- Natural Component of soils or rocks**
 - Health Risk when distributed airborne
 - Possible with basic/ultrabasic/metamorphic sedimentary rock
- Management Flow Chart**

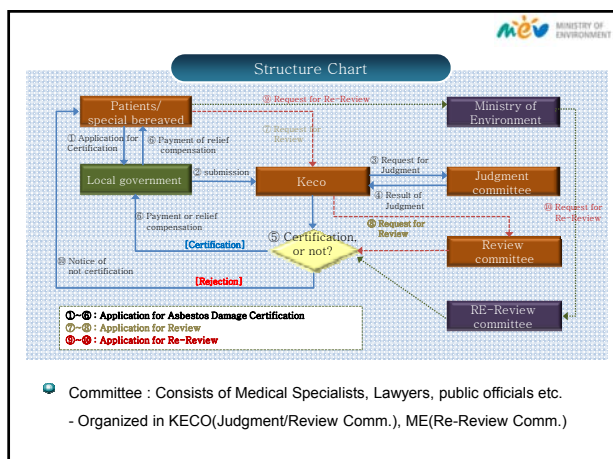
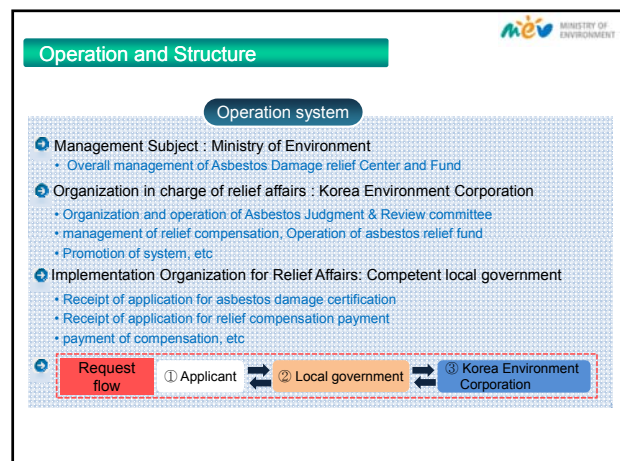
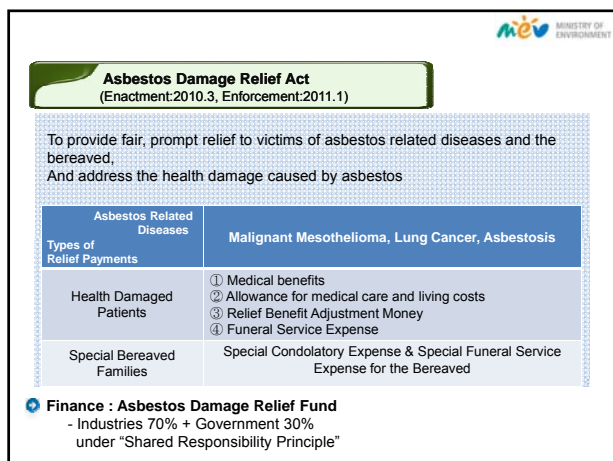
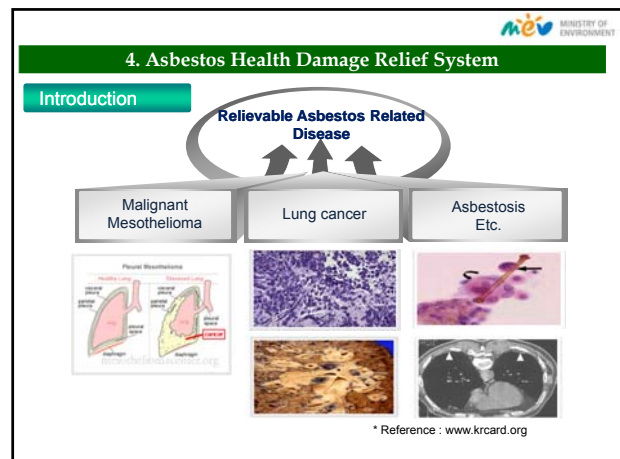
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graph TD
    A[Geological Survey : NOA areas shown in a map  
* Minister of environment] --> B[Asbestos level and human health risk assessment  
* Minister of environment / Provincial Governor]
    B --> C[Designation of management area  
* Minister of environment]
    B --> D[Other area]
    C --> E[Management plan  
* Provincial Governor]
    C --> F[Measures for reducing exposure  
* Developer]
    
```

Removal Slate Roofs

- 2011 : Establish Slate Management Plan**
 - plan to remove 190,000 Slate Roofs by 2021
- Record of Removal Slates**
 - about 28,000 Slates in 2011~2013
 - planned 20,000 in 2014
- Project duty : Local Government**
 - Support 70% from Central Government Finance
 - cooperation with KECO(Korea Environment Corp)





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Relief Payments

Disease	Allowance for Medical care and living costs	Funeral Service Expense / Special Funeral Service Expense	Special Condolatory Expense
Malignant Mesothelioma / Lung Cancer	KRW 1,232,900 (per month)		KRW 34,983,450
Diffuse Pleural thickening	KRW 887,680 (per month)	KRW 2,332,230	KRW 17,491,720
Asbestosis	Class1		
	Class2		KRW 11,661,150
	Class3		KRW 5,830,570

* USD 1 = KRW 1,056 (30 Sep. 2014)

- Medical Benefits : costs for medical care (up to KRW 4 million annually)
- Relief Benefit Adjustment Money : paid when Patient died early
 { Special Condolatory Expense – payments paid before }

Current Achievement									
Application of judgment (receipt)									
[as of Dec. 2013]									
Year	Total	Patients				Special bereaved			
		Sub total	Malignant mesothelioma	Protopathic lung cancer	Asbestos	Sub total	Malignant mesothelioma	Protopathic lung cancer	Asbestos
2011 (%)	782 (100)	412 (52.7)	100 (12.8)	37 (4.7)	275 (35.2)	370 (47.3)	320 (40.9)	41 (5.2)	9 (1.1)
2012 (%)	536 (100)	305 (56.9)	91 (17.0)	27 (5.0)	187 (34.9)	231 (43.1)	201 (37.5)	30 (5.6)	-
2013 (%)	529 (100)	408 (77.1)	58 (11.0)	100 (18.9)	250 (47.3)	121 (22.9)	67 (12.7)	51 (9.6)	3 (0.6)
Tot. (%)	1,847 (100)	1,125 (60.9)	249 (13.5)	164 (8.9)	712 (38.5)	722 (39.1)	588 (31.8)	122 (6.6)	12 (0.6)

Subject of judgment (result)												
[as of Dec. 2013]												
Year	Total	Patients							Special bereaved			
		Sub total	Malignant mesothelioma	Protopathic lung cancer	Asbestosis				Sub total	Malignant mesothelioma	Protopathic lung cancer	Asbestosis
					Sub total	1th degree	2nd degree	3rd degree				
2011 (%)	459 (100)	249 (54.2)	82 (17.9)	12 (2.6)	155 (33.7)	27 (5.9)	54 (11.7)	74 (16.1)	210 (45.8)	197 (42.9)	10 (2.2)	3 (0.7)
2012 (%)	456 (100)	230 (50.4)	72 (15.8)	15 (3.3)	143 (31.3)	15 (3.3)	66 (14.4)	62 (13.6)	226 (49.6)	206 (45.2)	20 (4.4)	-
2013 (%)	346 (100)	287 (82.9)	44 (12.7)	34 (9.8)	209 (60.4)	27 (7.8)	81 (23.4)	101 (29.2)	59 (17.1)	41 (11.8)	16 (4.6)	2 (0.6)
Tot. (%)	1,261 (100)	766 (60.7)	198 (15.7)	61 (4.8)	507 (40.2)	69 (5.5)	201 (15.9)	237 (18.8)	495 (39.3)	444 (35.2)	46 (3.6)	5 (0.4)

Payment to Victims												
[million KRW, as of Dec. 2013]												
Year	Total	Patients							Special bereaved			
		Sub total	Malignant mesothelioma	Protopathic lung cancer	Asbestosis				Sub total	Malignant mesothelioma	Protopathic lung cancer	Asbestos
					Sub total	1th degree	2nd degree	3rd degree				
2011	2,172	1,326	841	52	433	122	173	139	846	761	69	16
2012	7,246	2,962	1,785	270	906	254	405	247	4,285	3,984	285	16
2013	8,593	3,664	1,728	619	1,317	317	650	350	4,929	4,441	461	27
Tot.	18,011	7,951	4,355	941	2,656	693	1,228	736	10,060	9,186	815	59

Step-by-step find service for asbestos victims

- 432 Victims are founded by Service (2011~2013)

Changes in 2014												
<ul style="list-style-type: none"> Asbestos related diseases means : malignant mesothelioma, protopathic lung cancer, asbestosis and <u>diffuse pleural thickening</u> Medical benefits for <u>asbestosis victims</u> Allowance for medical care and living costs(20% up) Special bereaved families (<u>asbestosis 2nd, 3rd degree</u>) 												

Change in 2015 (Planned)												
<ul style="list-style-type: none"> Allowance for medical care and living costs(not decided) <ul style="list-style-type: none"> For heavy asbestosis and diffuse pleural thickening, Payment period extended to same as malignant mesothelioma and lung cancer Standardized diagnosis methods establishment <ul style="list-style-type: none"> for malignant mesothelioma and asbestosis, (and research for lung cancer starts) 												

International Cooperation

International cooperation in Seoul Initiative

- Ministry of environment Korea, KECO and UNESCAP
- with ministry of public health Thailand(2013~2014)
 - Technical workshop, policy analysis & research for asbestos management



- with ministry of health Indonesia (2014~2015 planned)

Challenges

- Monitoring illegal actions : Use, Import, Removal
- Gap between administration and public concerns
 - Controlled risk vs. complete removal & isolation
- Existing Asbestos Management
 - Building, Vehicle, NOA area, Asbestos Waste
- Debate on Dolomite : Need to include PACM?
- Finding Hidden Victims and Providing Health Care

Implication

The more benefit in past, the more cost in future

- Korea removed 40,000 Slate roofs until now,
 - and will remove 150,000 more by 2021
 - But, about 1.2 million slates remains.
 - expected all cost is more than billion dollar.
- Past & today's benefit from asbestos converts to cost in someday.

THANK YOU

Deputy Director Lee, KyungBin(E-mail: lunarabbit@korea.kr)

Environmental Health Management Division
Ministry of Environment, Korea

Korea Occupational Safety and Health Agency (KOSHA)

KOSHA

Activities to protect workers' health in Korea &
international collaboration activities of KOSHA

Sep 30, 2014
Seung-Hyun Park, PhD

KOSHA

Activities to protect workers' health
in Korea

KOSHA

Use of asbestos by industry in Korea

(Unit: %)

Year	Construction	Friction	Textile	Others
1976	96.1	2.0	1.5	0.4
1981	89.3	7.3	2.6	0.8
1985	86.0	8.2	4.7	1.1
1990	82.3	10.5	5.5	1.7
1993	82.3	10.5	5.1	2.1

- Construction: asbestos slate, board, corrugated sheet
- Friction: break pad, lining
- Textile: asbestos rope, yarn, tape, cloth
- others: gasket, etc.

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Ratification of Asbestos convention

- ILO Asbestos convention 162, 1986
 - Date of entry into force: 16 Jun 1989
 - Ratification countries: 35 as of 2014. 9
 - Major contents
 - National laws or regulations shall prescribe the measures to be taken for the prevention and control of, and protection of workers against, health hazards due to occupational exposure to asbestos.

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History of asbestos ban in Korea

- History of asbestos ban
 - 1990. 7 : Permission of use
 - Shall obtain in advance permission from MEL
 - Maintain proper working condition to protect workers' health
 - 1997. 5 : Prohibition of amosite, crocidolite
 - 2003. 7 : Prohibition of amphibole asbestos
 - 2007. 1 : Prohibition of some of ACMs
 - Asbestos cement, friction material for automobile
 - 2009. 1 : Prohibition of all types of ACMs

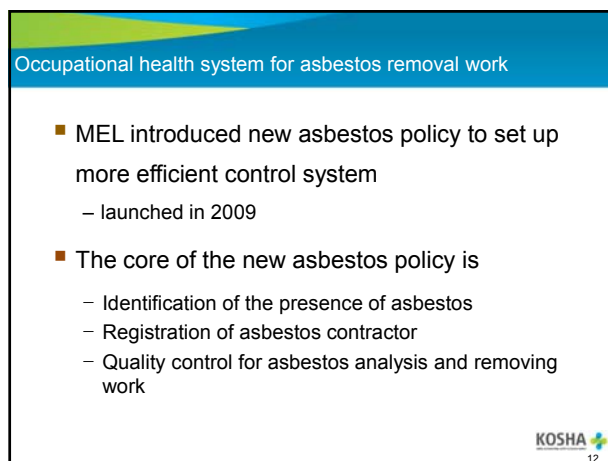
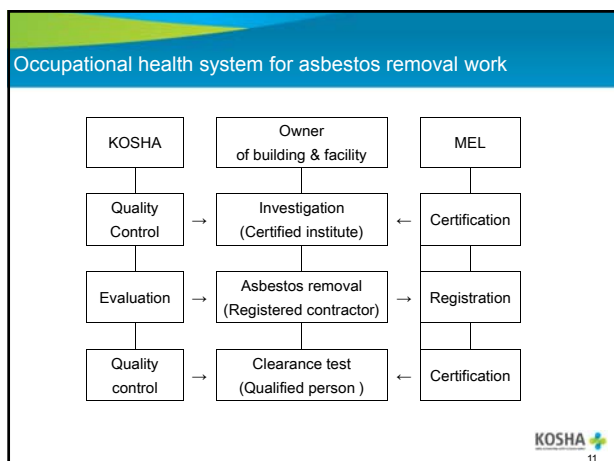
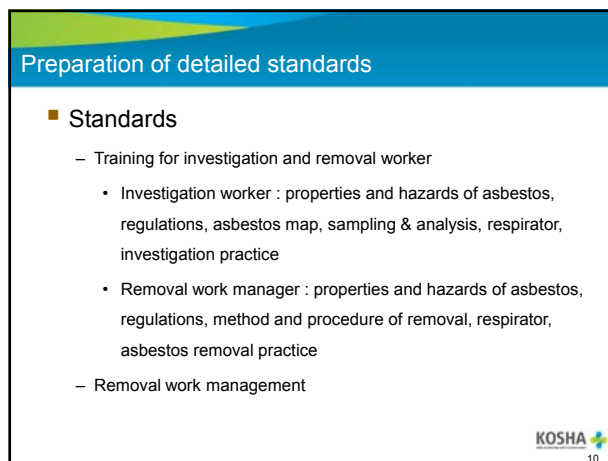
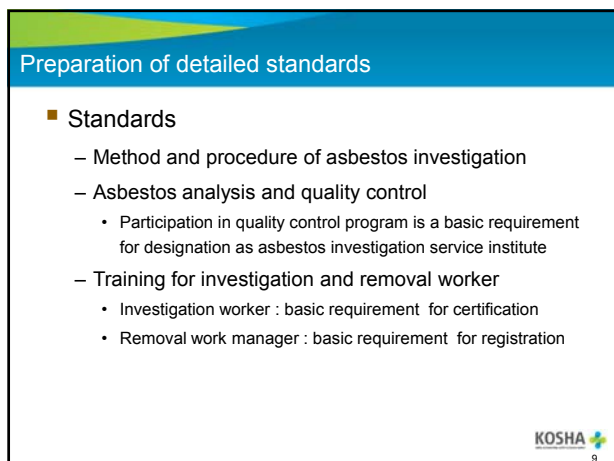
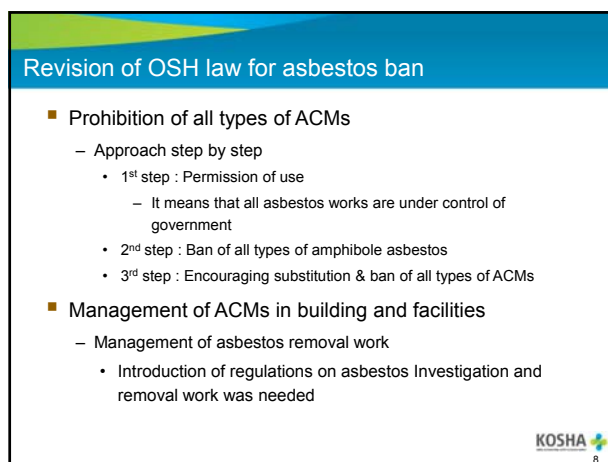
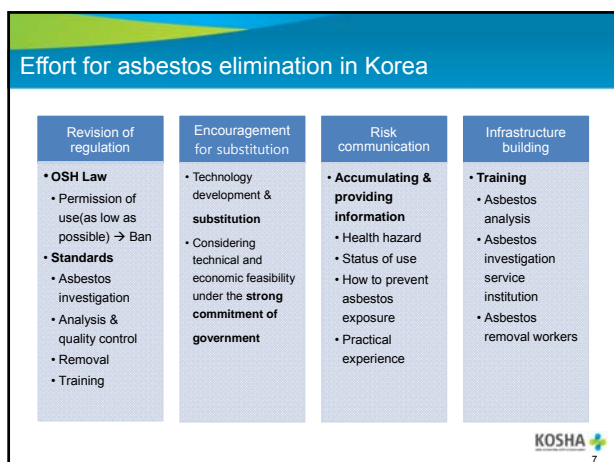
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Activities for asbestos elimination

Source: <http://www.hse.gov.uk>

Activities for asbestos elimination began in Korea

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Encouraging for substitution

- Technology development & substitution
 - Encouraging use of non asbestos materials
 - Substitutes for asbestos have been constantly developed.
 - Substitutes include fibers made of carbon, steel, cellulose, ceramics, glass, and wollastonite and organic fibers made from aramid, polyethylene, polypropylene, and polytetrafluoroethylene
- Strong commitment & considering feasibility
 - Considering technical and economic feasibility under the strong commitment of government

Classification of fiber

Synthetic fibers			Natural fibers	
Organic	Inorganic		Organic	Inorganic
	Vitreous	Crystalline		
Polyamides (nylon, aramid)	Glass filament Glass wool	Alumina(saffil) Potassium octatitanate	Cotton Hemp	Attapulgit Erionite(zeolite)
Polyolefins	Refractory ceramic fibers	Silicon carbide		Nemalite (fibrous brucite)
Polyester	Rock wool	Silicon nitride		Sepiolite
Polyurethane (elastane)	Slag wool fibers			Wollastonite
Polyvinyls(PVC)				

*Source: Inhalation Toxicology, 17:497-537, 2005

Patents on asbestos-free building materials

Year	Type	Major composition
1975	Drywall joint compound	Attapulgit, limestone, mica, polyvinylacetate latex binder, polyacrylamide resin
1981	Building boards & sheets	Portland cement, cotton, mineral fiber, bentonite, polypropylene
1983	Fiber reinforced cement	Glass fiber, cement, water
1983	Drywall joint compound	Sepiolite clay, limestone, mica, polyvinylacetate latex binder, polyacrylamide resin
1987	Inorganic sheet component	Silica fume pulp, polyvinyl alcohol fiber, slag wool, flocculant, portland cement
1994	Joint compound	Calcium carbonate filler, talc, latex emulsion binder, hydroxypropyl methylcellulose
1996	Fiber reinforced product	Portland cement, sepiolite, mica, polyvinyl alcohol fiber, cellulose pulp
2005	Insulating material	Portland cement, blast furnace slag cement, organic fiber, siliceous component, wollastonite

* Source: J Korean Soc Occup Environ Hyg 2013;23:184-195

Patents on asbestos-free friction materials

Year	Type	Major composition
1980	Clutch facing	Metal fiber, glass fiber, mineral wools, silica fiber, ceramic fiber, wood pulp, cotton
1983	Brake lining clutch lining	Attapulgit, phenolic resin, steel wool, graphite, baryte(barium sulfate) filler
1983	Brake lining, clutch surface	Rubber, phenolic resin, cashew granules, glass fiber, aromatic polyamide fiber
1986	Friction materials	Aramid, phenolic resin, ceramic fiber, metal fiber, carbon fiber
2002	Press pad	Woven fabric(heat-resistant yarn), aromatic polyamide, metal fiber
2002	Brake shoe, brake pad	Unsaturated polyester, polyphenylene sulfide, glass epoxy, phenolic polymer

* Source: J Korean Soc Occup Environ Hyg 2013;23:184-195

Patents on asbestos-free gasket & joint sheet materials


Year	Type	Major composition
1982	Gasket	Phenolic fiber, aromatic polyamide fiber, nylon fiber, ceramic fiber, synthetic rubber latex, filler, aluminum sulfate, ammonia water
1983	Gasket	Aramid fiber, diatomaceous earth, phenolic resin, polyacrylic latex, antioxidants, pigment
1985	Gasket	China clay, mica(or chlorite), graphite, cellulose fiber, vitreous fiber, synthetic organic polymer binder
1985	Gasket	Ball clay, calcium silicate of high specific surface area, cellulose fiber, organic polymer binder, fibrillated poly(aromatic amide) fiber
1995	Gasket	Styrene-butadiene rubber, aromatic polyamide fiber, oil-absorbent agent, barium sulfate, clay, talc, sulfur
1995	Joint sheet	Expanded graphite, acrylonitrile-butadiene rubber(binder), aramid fiber
2006	Joint sheet	Graphite(filler), acrylonitrile-butadiene rubber, aromatic polyamide fiber(base fiber)

* Source: J Korean Soc Occup Environ Hyg 2013;23:184-195

Risk communication

- Providing information
 - Properties & health hazards, asbestos related diseases, status of use, types of ACMs, how to prevent asbestos exposure, appropriate respirator, proper removal,
 - Asbestos information center
 - Providing information, practical experience
 - Anyone can visit the center and get information through various types of information materials
- Asbestos product DB
 - National survey
 - Conducted by asbestos experts through cooperating with asbestos manufacturer
 - Contents of survey: Manufacturer, period of manufacture, type of ACMs, composition of ACMs, contents of asbestos, commercial name of products, major usage, product figure

ACMs in building



Roofing

Ceiling

Partition

Outer wall


Floor tile

Insulation

KOSHA 19

Roofing material

- Cement Corrugated Sheet
 - Constituents: asbestos, cement, pulp
 - Content of asbestos : 10~20%




* Source: KOSHA Homepage-Asbestos control

KOSHA 20

Partition board

- Asbestos cement flat board
 - Constituents: asbestos, cement, pulp
 - Content of asbestos : 15~20%



* Source: KOSHA Homepage-Asbestos control

KOSHA 21

Ceiling finish material

- Asbestos cement gypsum board
 - Constituents: asbestos, cement, gypsum, pulp
 - Content of asbestos : 5~15%




* Source: KOSHA Homepage-Asbestos control

KOSHA 22

Building finish material

- Autoclaved asbestos cement extrusion panel
 - Constituents: asbestos, cement, sand
 - Content of asbestos : 15~20%

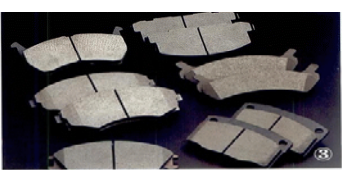


* Source: KOSHA Homepage-Asbestos control

KOSHA 23

Friction material

- Brake pad
 - Constituents: asbestos, synthetic resin, metal
 - Content of asbestos : 10~20%



* Source: KOSHA Homepage-Asbestos control

KOSHA 24

Friction material

- Clutch lining
 - Constituents: asbestos, synthetic resin, metal
 - Content of asbestos : 10~20%



* Source: KOSHA Homepage-Asbestos control



25

Asbestos cloth

- Asbestos cloth
 - Constituents: asbestos
 - Content of asbestos : 90~99%



* Source: KOSHA Homepage-Asbestos control



26

Sealing or packing material

- Asbestos gasket
 - Constituents: asbestos, synthetic resin, fiber
 - Content of asbestos : 30~40%



* Source: KOSHA Homepage-Asbestos control



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Asbestos on ship



Engine exhaust line (Chrysotile 50%)



28

Asbestos on ship



Exhaust cover of generator (Chrysotile 20%)



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Infrastructure building



- Training
 - Professional development to enforce new asbestos management system for asbestos removal and management was urgent
 - The new system was needed asbestos investigation service institutions & asbestos removal contractors
 - Asbestos analysis training by KOSHA
 - Asbestos removal training by KOSHA and asbestos training institute
 - Intensive training for two years (2007~2008)



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International collaboration activities of KOSHA



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KOSHA-WHO training program on asbestos analysis

- Since 2011, KOSHA-WPRO cooperative training program on asbestos analysis has been held annually at the asbestos laboratory of KOSHA
 - For 4 years, 20 participants from Asian countries such as Philippines, Cambodia, Thailand and et al. had completed an intensive course of instruction
 - ❖ All expenses including airfare, accommodation and meals of participants were covered by KOSHA



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KOSHA-WHO training program on asbestos analysis

- Training course
 - Fiber counting using phase contrast microscopy (PCM)
 - Bulk asbestos analysis using polarized light microscopy (PLM)
- Level
 - Lectures on the basic knowledge and hand-on training using microscopes were provided so that participants could carry out the asbestos analysis in their laboratories



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KOSHA-WHO training program on asbestos analysis



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On-site consulting for setting up an asbestos laboratory

- Purpose
 - To support for setting up laboratory equipment and facilities for asbestos analysis
 - To provide training for staffs on sampling and analysis of asbestos
- Period
 - August 5, 2013 ~ August 10, 2013
- Venue
 - National Center for Public Health in Mongolia



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On-site consulting for setting up an asbestos laboratory

- Instrumental setting up
 - Laboratory instrument and materials including microscopes were assembled and properly set up at the National Center for Public Health in the Ministry of Health in Mongolia
 - ❖ A KOSHA expert was dispatched to Mongolia
- Training workshop
 - Fiber counting using phase contrast microscopy (PCM)
 - Bulk asbestos analysis using polarized light microscopy (PLM)



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On-site consulting for setting up an asbestos laboratory



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Support of asbestos analysis for Asian countries

- KOSHA supported asbestos analysis for Asian countries
 - For recent 3 years, more than 50 samples from 4 Asian countries, Mongolia, Fiji, Palau and Cambodia, were requested to be analyzed microscopically for asbestos in KOSHA.

Sample Name	Air Volume (L)	Fibers	Fields	Fiber Density (f/uf)	Concentration (f/cc)
A.E.A.personal-03	37.5	21.5	100	27.4	0.281
A.E.A.personal-17	69.1	97.5	100	124.2	0.692
A.E.A.personal-26	76.6	100	36	353.9	1.779
A.E.A.personal-27	151.0	9.0	100	11.5	0.029

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Development of Asbestos Toolkit

- KOSHA participated in the project as a co-lead institution to develop the toolkit which had been led by the UOEH, Japan.
 - 4 authors contributed 4 sub-chapters of the toolkit:
 - Asbestos exposure assessment and control in occupational settings;
 - High risk occupation and industries in regards to ARDs;
 - Asbestos substitute
 - Case studies of asbestos-related national legislations.

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Development of the national asbestos profile in Cambodia

- In cooperation with WPRO, the Cambodia Asbestos Project has been initiated in May to support the development of the national asbestos profile
 - To build the NAP, 3 KOSHA experts visited Cambodia in May 1-5 and October 8-14, 2013.
- 1st visit in May
 - The first workshop on asbestos was held to raise awareness on asbestos and transfer knowledge on asbestos in Cambodia.
 - Workplaces suspected to be related to asbestos were investigated to identify the use of asbestos.

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40

Development of the national asbestos profile in Cambodia

- 2nd visit in October
 - The second workshop was held to discuss the progress of the NAP
 - Mesothelioma cases in Cambodia were surveyed
 - Airborne samples were collected to evaluate workers' exposure to asbestos at workplaces

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41

Thank you for your
attention

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Australia

Financial burden of Asbestos-related diseases: medical, compensation and environmental costs

Professor Nico van Zandwijk
Dr Matthew Soeberg

Asbestos Diseases Research Institute
University of Sydney

Inter-Agency Workshop on the Sound Management of Industrial Chemicals, with Special Emphasis on Asbestos, for the Asia-Pacific Region
in collaboration with the 7th International Seminar of the Asian Asbestos Initiative (AAI-7) 30-9-2014



Asbestos Exposure

- 125 million workers, occupationally exposed to asbestos (http://whqlibdoc.who.int/hq/2006/WHO_SDE_OEH_06_03_eng.pdf.)
- Asbestos use has increased in several parts of the world: Asia, South America and former Soviet Union
- All types of asbestos cause malignant mesothelioma, lung, laryngeal and ovarian cancer (Straif et al, Lancet Oncol, 2009, 10:453)



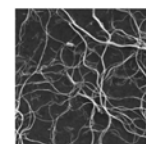
Asbestos/Chrysotile Cancer Risks

- Low chrysotile exposures dangerous
van der Bij, Cancer Causes Control (2013) 24:1-12
- A 37-year observation mortality in Chinese chrysotile asbestos workers
Wang et al, Thorax Online, October 2011
- Mesothelioma from Chrysotile, review (a world-wide ban is warranted)
Kawanek, Annals Epidemiol (2011) 21:688-697
- Asbestos levels encountered at the lower end of exposure distribution associated with increased risk of pleural mesothelioma, lung cancer and laryngeal cancer
Offenberg, JCEM (2014) 54:6-19
Hillerdal, Occup Environ Med (1999) 56: 505-513
- Chrysotile asbestos use is not safe and must be banned (in Response to Chrysotile Institute/Bernstein's lobby)
Archives of Environmental & Occupational Health (2013) 68: 243-249



The problem of chrysotile in Australia: late 1990s and early 2000s

- Chrysotile has a long history of use in Australia
- Many workers were (and potentially still are) at risk
- Huge costs associated with the use of chrysotile



PHASING OUT CHRYSOTILE IN AUSTRALIA

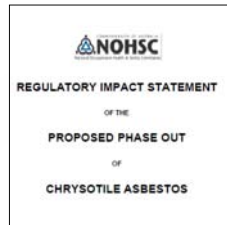
Proposed phase out of chrysotile in Australia (February 1999)

- 1999: The Australian National Industrial Chemical Notification and Assessments Scheme (NICNAS) assessed chrysotile asbestos.
- Recommendation that all use of chrysotile be phased out.



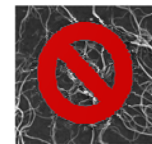
Proposed phase out of chrysotile in Australia (November 2001)

1. To reduce future death and illness from exposure to chrysotile fibres; and
2. In a cost-effective manner within an appropriate time frame.



Chrysotile prohibited in Australia (December 2001)

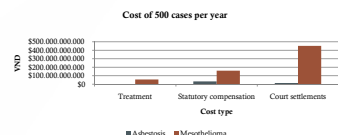
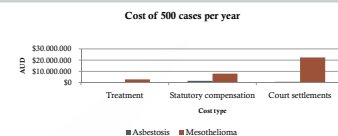
- By 31 December 2001, a prohibition on all uses of chrysotile asbestos was in place
- The prohibition was adopted across all states of Australia as well as by the Australia Customs (importation and exportation of chrysotile)



Focus of presentation

Medical costs
+
Compensation costs
+
Environmental costs
+
Research costs

Cost of Asbestos-related diseases in Australia converted into Vietnamese currency



Using June 2014 exchange rates

MEDICAL COSTS ASSOCIATED WITH ASBESTOS-RELATED DISEASES:

Data from European Countries

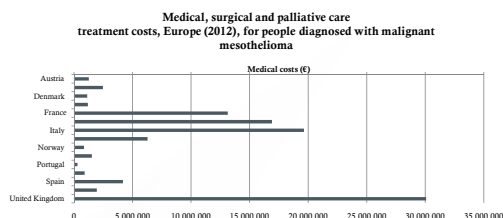
Cost of hospital care for patients with Malignant Mesothelioma, Scotland, 2000

- The total estimated cost of hospital care for 100 people who died from mesothelioma in Scotland, 2000, was £942,038.

	Number of days of treatment	Cost
Day cases	103	£35,073
Inpatients	3,285	£906,965
Total	3,388	£942,038

Source: A Watterson, T Gorman, C Malcolm, M Robinson & M Beck. (2006) The economic costs of health service treatments for asbestos-related mesothelioma deaths. Am. N.Y. Acad. Sci. 1076: 871-881

Estimated medical costs of care for patients with Malignant Mesothelioma in the European region



Source: WHO Regional Office for Europe. (2012) The Human and Financial Burden of Asbestos in the WHO European Region Meeting Report, 5-6 November 2012, Bonn, Germany

COMPENSATION FOR PEOPLE WITH ASBESTOS-RELATED DISEASES:

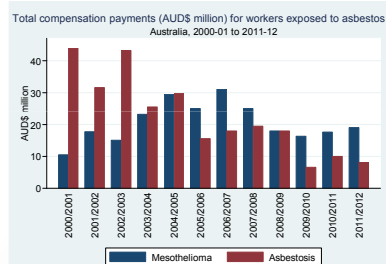
Data from Australia & European countries

Asbestos-Related Diseases (ARD) compensation Australia, 1970-2004

- 1970s: first ARD court cases in Australia
- 1980: Precedent for civil damages to be awarded to people with ARD
- 2001: The building materials manufacturer James Hardie Industries set up the Medical Research and Compensation Foundation (MRCF) to fund ARD compensation.
- 2004: NSW commission of inquiry ('the Jackson Inquiry') made critical remarks about James Hardie Industries' setup and management of the MRCF.

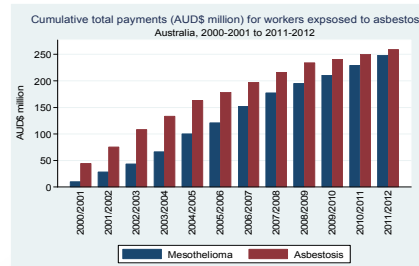


Total compensation payments for Malignant Mesothelioma and Asbestosis, Australia 2000-2011



Source: Australian National Data Set for Compensation-based Statistics (NDS)

Cumulative compensation payments for Malignant Mesothelioma and Asbestosis, Australia



Source: Australian National Data Set for Compensation-based Statistics (NDS)

Fear that the James Hardie Medical Research and Compensation Fund would fall short (2004)

News
bmj.com news roundup
Full versions of these stories are available at bmj.com/content/vol328/issue7442/medres. R010600P

Fund for patients with asbestos induced diseases may run out

Documents tabled at an inquiry into a compensation fund for people with diseases induced by asbestos have shown that only months after the fund was established by an asbestos manufacturer the fund's chairman feared that it had a massive shortfall.

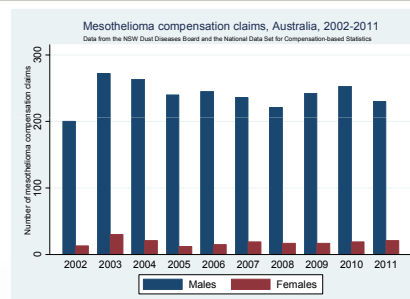
In February 2001 James Hardie Industries established a non-profit trust, the Medical Research and Compensation Foundation, with \$A250m

Bernie Banton: the fight for compensation from James Hardie Industries

- Bernie Banton led the fight to force building products company James Hardie (mainly chrysotile) to establish a \$4 billion fund to compensate thousands of asbestos victims.
- The 61-year-old died from Mesothelioma in November 2007.



Compensation claims for Malignant Mesothelioma in Australia



2014: Under-estimates of Mesothelioma compensation by James Hardie Industries (former asbestos company)

Asbestos exposures

- James Hardie announced \$US195.8 million in adjustments for asbestos liabilities in its annual accounts, up from \$US117.1 million last year
- The main reason for the rise, according to the report, is a continued increase in claims by asbestos (mesothelioma) victims
- 608 asbestos-related claims were received, a 12 per cent rise from 542 claims the previous year
- 604 claims were settled in 2014 with an average settlement of \$253,000, resulting in a total payout of \$140.4 million for the year
- Mesothelioma claims: average settlement \$308,000, Asbestosis or Lung Cancer: average settlement \$100,000

Source: <http://www.abc.net.au/news/2014-05-22/james-hardie-doubles-profit-amid-building-revival/5469920>

Company producing Asbestos-containing materials pays compensation to 42-year old male diseased by Asbestos waste

- AUD \$2 million in damages awarded to man who was exposed as a child to asbestos waste



Review of compensation for Asbestos-Related Disease in Western Australia (June 2014)

- Call for review of asbestos-related compensation laws in Western Australia (WA)
- Currently WA has a one-payment rule, not covering future asbestos-related diseases, e.g. mesothelioma or lung cancer.

WA Government orders review of asbestos compensation laws



Compensation for Asbestos-Related Diseases, England and Wales

Condition	Type of compensation possible	Notes
Pleural plaques	None	Existing legislation currently being reviewed ^a
Diffuse pleural thickening	IIDB and usually a lump sum under PWCA; civil claim for damages	For a civil claim, patients must have loss of respiratory reserve plus evidence of diffuse bilateral pleural thickening on computed tomography
Asbestos related lung cancer	IIDB and usually a lump sum under PWCA; civil claim for damages	For a civil claim, patients need to have asbestosis plus lung cancer, or a high enough degree of asbestos exposure to have doubled the risk of lung cancer
Asbestosis	IIDB and usually a lump sum under PWCA; civil claim for damages	For a civil claim, patients must have loss of respiratory reserve plus evidence of asbestosis on computed tomography
Mesothelioma with occupational asbestos exposure	IIDB and usually a lump sum under PWCA; civil claim for damages	
Mesothelioma with non-occupational asbestos exposure	Lump sum under the Mesothelioma Lump Sum Payments Regulations; no IIDB; possible civil claim for damages	Mesothelioma Lump Sum Payments Regulations (available from October 2008); civil claim may be possible with secondary asbestos history (for example, spouse, washing husband's overalls)

IIDB = Industrial Injuries Disablement Benefit; PWCA = Pneumoconiosis Workers' Compensation Act 1979.

Source: Currie et al. *BMJ* 2009;339:b3209

Compensation for Malignant Mesothelioma in England and Wales (2014)

- Mesothelioma patients can receive an average payment of £123,000 from July 2014, as part of a £380 million insurer-funded compensation package.

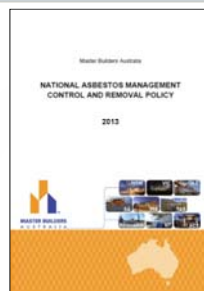


ENVIRONMENTAL COSTS OF REMOVING ASBESTOS FROM THE PHYSICAL AND BUILT ENVIRONMENT:

Data from Australia and Italy

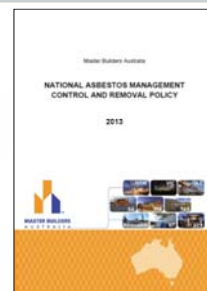
Removal of Asbestos from all Australian government and commercial buildings by 2030

- "Staged removal of all asbestos-containing materials from government and commercial buildings and structures by a target date of 2030"



Removal of Asbestos from all Australian government and commercial buildings by 2030

- "Creates a significant disposal issue as there are limited designated asbestos disposal sites, which would create a risk of illegal disposal, particularly when coupled with high fees and charges for disposal."



Removal of Asbestos from all Australian government and commercial buildings by 2030

- "The availability of asbestos disposal sites does not necessarily prevent illegal dumping."
- "The perpetrator of [an illegal asbestos dump in Victoria] was successfully prosecuted and was ordered to pay AUD \$18,539.20"



Asbestos insulation in Canberra homes (June 2014)

- More than 1,000 homes in the Australian Capital Territory contain loose-fill asbestos
- Demands for AUD\$5 million emergency assistance fund for families in affected houses

Mr Fluffy asbestos: ACT Opposition demands \$5m emergency assistance for households

by ACT Opposition spokesman, Mr. Fluffy

ACT Opposition spokesman, Mr. Fluffy, has today demanded the ACT Government provide a \$5 million emergency assistance fund for households in the ACT who are affected by asbestos insulation.

The ACT Opposition spokesman, Mr. Fluffy, has today demanded the ACT Government provide a \$5 million emergency assistance fund for households in the ACT who are affected by asbestos insulation.

More than 1,000 Canberra homes are thought to contain loose-fill asbestos, which is a health hazard. The ACT Government has a long-term plan to remove the asbestos from these homes.

Mr. Fluffy has today demanded the ACT Government provide a \$5 million emergency assistance fund for households in the ACT who are affected by asbestos insulation.

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Replacement of Australian Asbestos shed roofs (April 2014)

- Sugar mill factory spent AUD\$10 million on a project to replace asbestos-containing roof products

QSL replacing asbestos shed roofs at Larderia sugar terminal

QSL replacing asbestos shed roofs at Larderia sugar terminal
by GreenSource - 10/04/2014

Larderia Sugar Limited (LSL) will begin a \$10 million replacement project early next month to replace the asbestos-impregnated roofs of five of the three storage sheds in the Larderia Bulk Sugar Terminal.

The five-month project will involve the steel roof sheeting contained in the 1970s as a remediation measure, and also upgrade the structure to improve wind strength against future cyclones.

QSL operations general manager Thomas Doherty said the Larderia project is part of an overall \$500,000 project to replace the roofs of the five bulk sugar terminals managed by QSL across the state.

Mr Doherty said the 15-year-old sugar shed roofs are made of steel sheets which have been impregnated and covered with a thin layer of asbestos-impregnated material, referred to as a bonded asbestos, which was a major health concern between the 1970s and 1980s.

But he said the removal of the asbestos roofing would not pose a health issue for nearby residents or staff.

"When we remove these roof sheets, the asbestos is bonded, so it's not fibrous. It's not airborne, so we have the roofs removed by a specialist asbestos contractor, and the material is disposed of in special licensed asbestos landfills," he said.

Mr Doherty said the sheds had been very sturdy, built back in the 1970s, surviving not only Cyclone Ita last week, but also the bush fires ravaging Larderia Town in 2011.

He said Larderia is the second QSL site to be refurbished, with work already completed on their sugar storage sheds in Wilkesport last year, and further work scheduled at the other QSL sugar terminals over the next eight years.

The next project is to be Cairns or Mourmou, followed by Townsville and Bundaberg.



Cost of remediation of Asbestos (mainly chrysotile) sites in Italy

Site(s)	Cost (Euro)
Ferrandina	500,000
Broni	500,000
Canolo	1,000,000
Vita, Gibellina, Partanna, Montevago, S. Margh. de Belice, Menfi	1,000,000
Messina	1,000,000
Tuscany	500,000



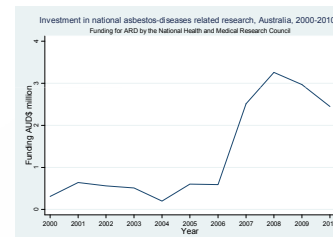
Source: F. Paglietti, S. Malinconico, V. di Moffetta & M. Gianfranco (2012) Guidelines for Asbestos Remediation at Italian Superfund Sites, Journal of Environmental Science and Health, Part C: Environmental Carcinogenesis and Ecotoxicology Reviews, 30:3, 253-286, DOI: 10.1080/10590501.2012.705161

INVESTMENT ON ASBESTOS-RELATED DISEASE RESEARCH:

Australian data

Research investment in Asbestos-Related Diseases, 2000-2010 (Australia)

- More than \$14.5 million invested by the National Health and Medical Research Council (NHMRC)



Summary

Asbestos-induced cancers have a poor prognosis and induce major expenses for medical care, costs of compensation, 'cleaning' of environment, and research.



Banning all forms of asbestos is cost-effective



Khoo Teck Puat Hospital, Singapore

7th International Seminar of the Asian Asbestos Initiative (AAI-7)

Asbestos Waste Management in Singapore

30 Sep 2014

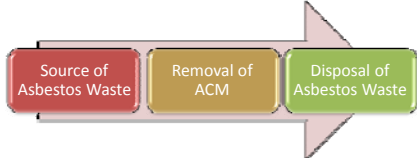
Dr. John Lim
Associate Consultant (Occupational Medicine), Khoo Teck Puat Hospital
Adjunct Assistant Professor, Saw Swee Hock School of Public Health, National University of Singapore

Prof. David Koh
Assistant Vice Chancellor and Vice-President (Research and Innovation)
Chair Professor, PAPRSB Institute of Health Sciences
Universiti Brunei Darussalam
Professor, Saw Swee Hock School of Public Health, National University of Singapore

Presentation Outline

1. Epidemiology of Asbestos-related diseases (ARDs) in Singapore
2. Asbestos-related legislations
3. Asbestos waste management:


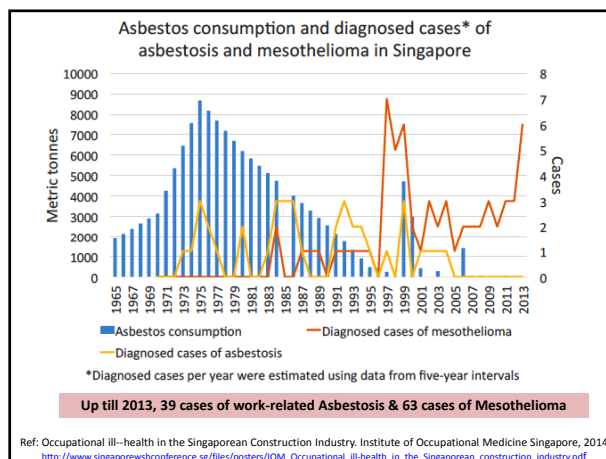


Epidemiology of ARDs in Singapore

Detection of asbestos-related cancers

Data base of asbestos exposed workers (Ministry of Manpower)

Data base of all cancers (Singapore Cancer Registry)





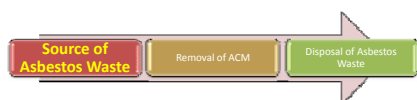
Asbestos-related Legislations

Ministry of Manpower	National Environment Agency
Factories (Asbestos) Regulations 1980	• Environmental Protection and Management Act 2002
↓	• Environment Public Health Act 2002
WSH (Asbestos) 2014	• Environment Public Health (Toxic Industrial Wastes) Regulations 2009
Effective date of operation : 1 May 2014	
• WSH (Medical Examinations) Regulations 2011	

Asbestos Use in Singapore

- No known users of raw asbestos since 2001
- Most occupational exposure took place between 1940 to 1984 in a large asbestos cement factory





Current Source of Asbestos Waste: Asbestos Removal Work

- Demolition / renovation of old buildings constructed before 1991 (in the form of corrugated roof sheets, ceiling boards, wall partitions, floor tiles or pipe insulation)
- Maintenance of old refinery installations
- Stripping of brake and clutch linings of heavy vehicles



Asbestos Removal- High Risk Work



Asbestos fibres can be released from broken ACM during demolition, renovation or removal and disposal work which is not properly carried out

Workers, bystanders, future occupants and public can be exposed

WSH (Asbestos) Regulations 2014

Key Changes:

- Asbestos Survey to be carried out by a competent person to ascertain the presence of asbestos
- Licensing of contractors carrying out asbestos removal work
- Written plan of work to ensure asbestos removal work is carried out safely
- Asbestos removal work to be supervised by a competent person
- General provisions for all works involving asbestos
- Removal of ACMs before demolition of building

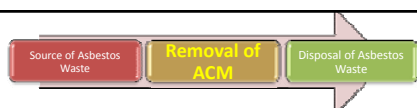
Enforcement

The maximum penalty is \$20,000 and/or 24 months' jail for violation of the WSH (Asbestos) Regulation 2014



	2013	2012	2011
No. of notifications on asbestos work	251	205	194
No. of composition fines	10	14	30

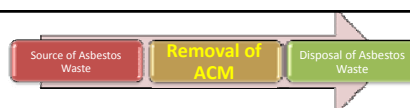
Source: Singapore Ministry of Manpower, Occupational Safety and Health Division
Annual Report: 2011, 2012, 2013



Ascertaining presence of asbestos: Survey of workplace

- (a) For any work, operation or process involving a material which is likely to contain asbestos:
- Thermal insulation of pipe, boiler
 - Sprayed insulation
 - Refractory lining
 - Gasket
 - Fire protection board, door
 - Cable penetration insulation
- (b) For demolition or renovation of any building built before 1 Jan 1991

To appoint a competent person to conduct a survey to ascertain the presence of asbestos in the material/ building before work



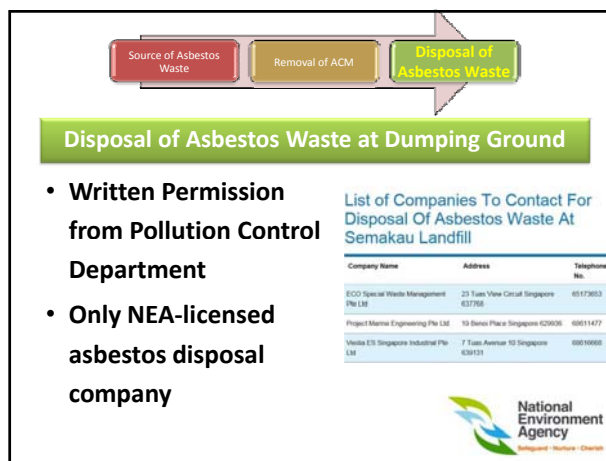
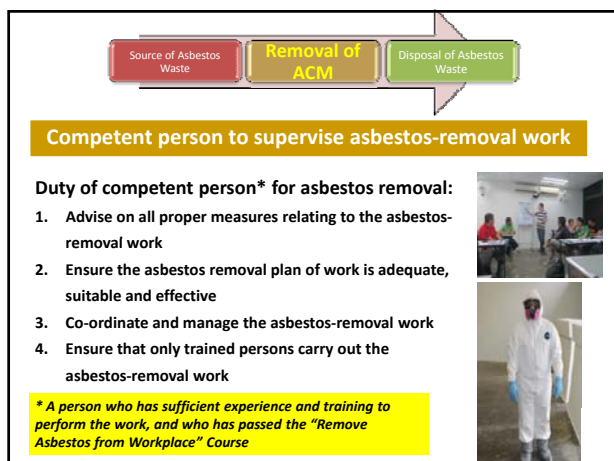
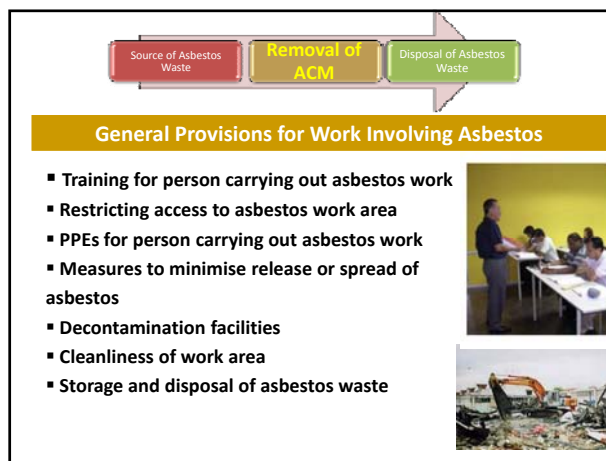
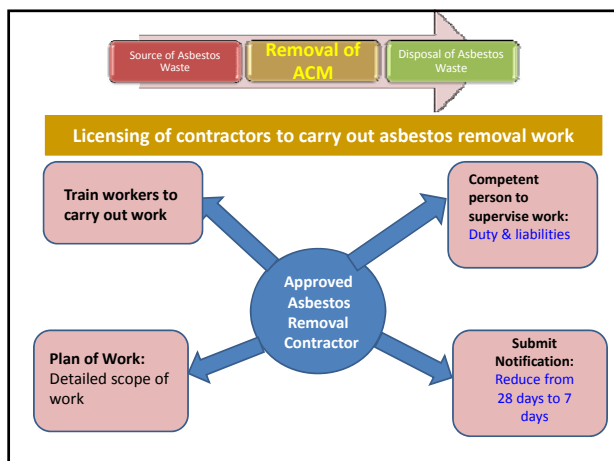
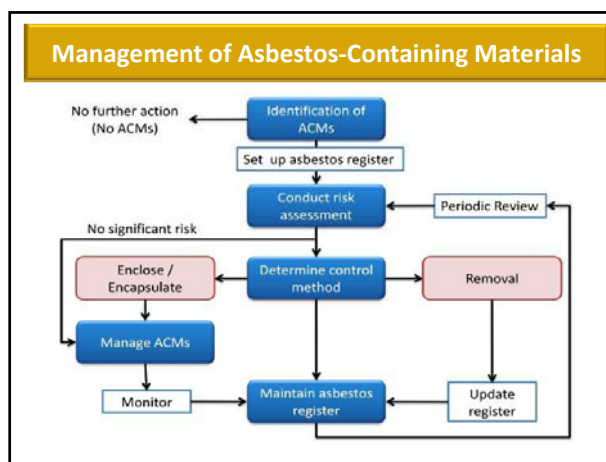
Ascertaining presence of asbestos: Conduct of Survey

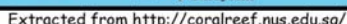
Duty of competent person* for asbestos survey:

- To exercise care and diligence in conducting asbestos survey
- To take samples for testing
- To ensure samples are analysed by accredited lab
- To prepare and submit the survey report* together with the analysis results

*Survey report to be kept for at least 2 years

*A person who has sufficient experience and training to perform the work, and who has passed the "Survey Asbestos and Other Fibres Risks at the Workplace" Course





-



Proper Work Practice
Disposal chute is properly covered and affixed with warning labels

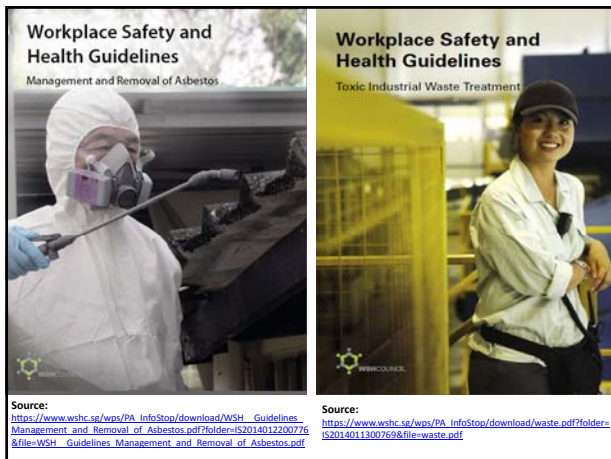


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- A photograph of a green and white Scania refuse truck, viewed from the front-left. The truck has a white cab with a black grille and a green body. It is parked on a paved surface with trees in the background.



- 





National University of Malaysia

INTERNATIONAL CENTRE FOR CASEMIX AND CLINICAL CODING (ITCC)

Economics of Asbestos Health v.s. Trade

Prof Dr. Syed Aljunid
MD (Mal); MScPH(Singapore); PhD (London); FAMM;
FPHMM

Professor of Health Economics &
Head
International Centre for Casemix and Clinical Coding
National University of Malaysia

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INTERNATIONAL CENTRE FOR CASEMIX AND CLINICAL CODING (ITCC)

Outline

- Introduction
- Use of Asbestos in Manufacturing and other Sectors
- Economic Contribution of Asbestos
- Health Impact of Asbestos
- Cost of Managing Asbestos Related Diseases
- Asbestos Production-Consumption Model
- Conclusion

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Introduction

- Asbestos is natural mineral with unique characteristics being used in manufacturing and industries
- Asbestos contribution to economic development is shown in many countries
- Health effect of asbestos especially long-term carcinogenic property is a major concerns
- Efforts being made to ban use of asbestos

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Economic Growth of Selected Asian Countries

Table 0.1. Real GDP growth of Southeast Asia, China and India
(annual percentage change)

	2012	2010	2014-10	2000-07
ASEAN-6 countries				
Brunei Darussalam	1.0	2.4	2.3	-
Indonesia	6.2	6.1	6.0	5.1
Malaysia	6.6	6.3	6.1	6.6
Philippines	6.8	5.9	5.8	4.9
Singapore	1.3	3.1	3.3	6.4
Thailand	6.5	5.3	4.9	5.1
CLMV countries				
Cambodia	7.2	7.1	6.8	9.8
Lao PDR	7.9	7.5	7.7	6.8
Myanmar	-	7.0	6.8	-
Viet Nam	5.2	6.0	5.4	7.6
Average of ASEAN 10	5.5(*)	5.6	5.4	5.5(**)
2 large economies in Emerging Asia				
China	7.7	7.5	7.7	10.5
India	3.7	6.1	5.9	7.1
Average of Emerging Asia	6.4	6.9	6.9	8.6

Source: Economic Outlook of Asia, China and India – Beyond Middle Income Trap- OECD Report 2014

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Towards High Income Economy

Country	Projected Year
Malaysia	2020
China	2026
Thailand	2031
Indonesia	2042
Philippines	2051
Viet Nam	2058
India	2059

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World Economy (2012)

	Total GDP (billion USD)	Economic Sectors			
		Agriculture	Industry	Manufacturing	Services
Low Income	527.0	27	23	12	49
Low Middle Income	5,031.4	17	31	16	52
Upper Middle Income	17,481.2	8	38	23	54
High Income	49,886.8	1	25	15	74
WORLD	72,905.3	3	27	16	70

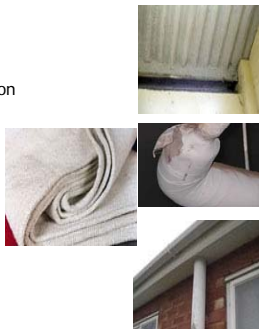
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Asbestos use

- Boilers and heating vessels
- Cement pipe
- Clutch, brake, and transmission components
- Conduits for electrical wire
- Pipe covering
- Roofing products
- Duct and home insulation
- Fire protection panels
- Furnace insulating pads
- Pipe or boiler insulation
- Sheet vinyl or floor tiles
- Underlay for sheet flooring.



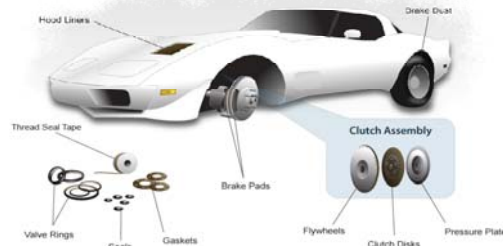
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Asbestos in Automobiles

© Asbestos.com

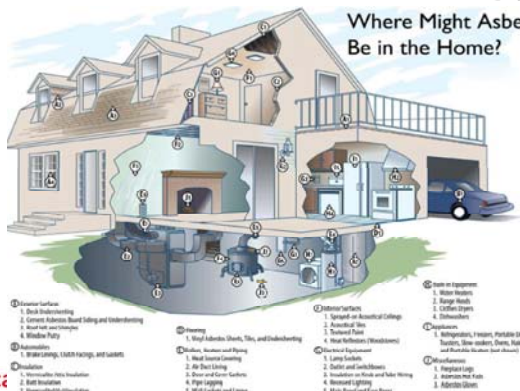


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Where Might Asbestos Be in the Home?



C



Issues in Asbestos Ban: Case of Brazil

- Defenders of Asbestos Use: The Industries
 - Cost of non-asbestos roof-tile and panels higher than asbestos fibre-cement tile (30-40% more expensive)
 - Need to import synthetic fibre which need USD 180 million per year additional spending (Estimate: **USD 14 million only**)
 - Jobs: 170,000 workers involved in asbestos contain product (Actual figure only: **16,983** workers)
 - Loss of tax revenue from Asbestos Mining Company
- **(Tax paid is low but royalties paid by government)**

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The Right Balance....



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Exposure to Asbestos

- Asbestosis
 - Lung Fibrosis
 - Pleural Fibrosis
 - Chronic bronchitis
- Lung Cancer
 - 10% of all male deaths in developed countries
 - Smokers has higher risk than non-smokers
- Mesothelioma
 - Less than 0.04% of all deaths in general population of USA
- Other Cancers
 - Laryngeal Cancer
 - Ovarian Cancer
 - Esophageal Cancer
 - Kidney Cancers
 - Lymphomas

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Burden of Diseases Linked to Asbestos

- Consumption of asbestos
 - 2.1 million metric tonnes per annum between 2003-2007
 - Likely to decrease but increase consumption seen in China, India and Uzbekistan
- 125 million people exposed to Asbestos at workplace
- 107,000 died every year due to lung cancer, mesothelioma and asbestosis from occupational exposure
- 1.5 million DALYs
- 50 countries ban use of asbestos in 2009

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Asbestos use in USA

- 1.5 million workers at risk now
- 100 deaths in 1968
- 1,500 deaths in 2002
- Rand Corporation:
 - Asbestos illness
 - 2.4 million claims up to 2002
 - USD 54 Billion pay-out in insurance claims
 - Business Financial Loss of USD 210 billion

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Global Burden of Diseases Occupational Risk Factors

	Annual Deaths	DALY Lost
Total	850,000	24 million
Occupational Injuries	312,000	10 million
Cancers (Lung cancer etc)	102,000	1 million
COPD	318,000	3.7 million
Asbestosis	7,000	376,000
Asthma	38,000	1.6 million

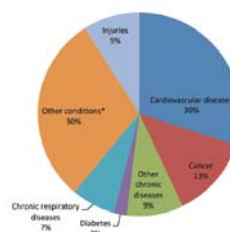
Fingerhut et al, SJWEH Suppl 2005;no 1:58-61

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Cancer and CNCDs



- 60% of Deaths due to CNCDs
- 13% due to Cancers
 - 7.6 million Deaths
- 13.3 million new cancer cases in 2010
- 56% of new cancer cases in developing countries

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Global Burden of Cancer

- Global Cost of New Cancer Cases
 - 13.3 million cases
 - USD 290 billion in 2010
 - Medical Cost = USD 154 billion (53%)
 - Non-Medical Cost = USD 67 billion (23%)
 - Loss of Income – USD 69 billion (24%)
- In 2030 will increase to:
 - USD 458 billion

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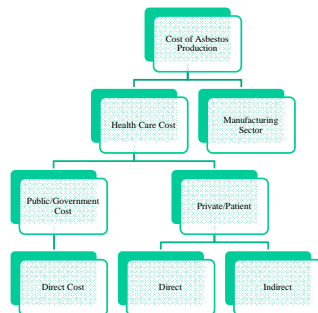
Study Objectives

- To estimate the global economic burden of Asbestos Related Diseases (ARDs)
- To develop the production-consumption model of Asbestos
- To obtain the direct and indirect cost of ARDs
- To recommend action to be taken on Asbestos use and production

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Economic Burden of Asbestos

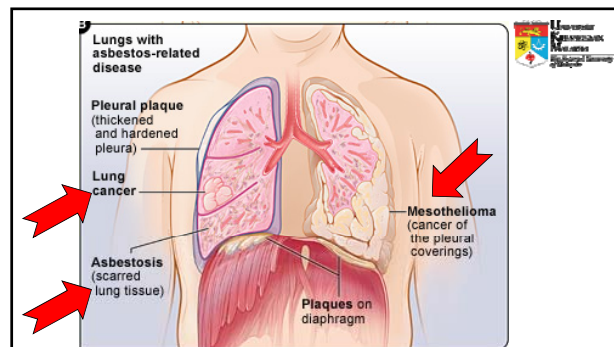


Government/Public Health Care Cost

- Direct
 - Out-patient Cost
 - In-patient Cost
 - Medicines
 - Procedures
 - Investigations

Private/Patient Healthcare Cost

- Direct
 - Out-of-Pocket Payment
 - Consultation Fees
 - Admission Fees
 - Travel Cost
- Indirect
 - Loss of productivity
 - Time cost of family members
 - Loss of Leisure



Major Cost Identified

- Cost of Shemotherapy treatment = Number of patients X Cost of chemotherapy per patient;
- Cost of legal claims due to health effects = Number of patients X Average claim per patient;
- Cost of stay in surgery ward = Number of days spent in hospital X Cost of admission per day;
- Cost of Pnuemonectomy = Number of Mesothelioma patients X Cost of surgery;
- Cost of Chronic Lung Fibrosis/ asbestosis = Number of asbestosis patients X Cost of treatment for asbestosis.

Mode of Treatment of Mesothelioma

- Surgery
 - 1 in 5 undergone surgery (those with metastatic pleural mesothelioma)
 - Two types:
 - Pleurectomy/decortication
 - High failure rate (50-80%)
 - Extrapleural pneumonectomy

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Modes of Treatment of Mesothelioma

- Chemotherapy
 - Before and after surgery
 - Mainly for palliative
 - Use combination of cytotoxic drugs
 - May include intraperitoneal administration

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Mode of Treatment of Mesothelioma

- Radiation
 - One of the option for treatment of mesothelioma
 - Challenges to provide high dose radiotherapy to shrink the tumour size but avoid heart and other lung tissues
 - New method: IMRT (Intensity-modulated Radiotherapy) to accurately target cancer cells

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Modes of Treatment of Mesothelioma

- Complimentary and Alternative Medicine
 - Additional services used by patients
 - Most common in less developed countries when access to conventional care is limited
 - Includes: Massage, acupuncture and herbal medicine

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Cost of Mesothelioma Related Deaths- Scotland and UK

- 120 asbestos-related diseases in Scotland in 2000
 - 100 cases are Mesothelioma
 - Direct Cost is £ 942,038
- 50,000 cases of Mesothelioma in UK by 2003
 - Direct Cost is £ 471 million

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Cost of Mesothelioma in US

- Estimated 3,000 Mesothelioma cases diagnosed every year
- Cost of treating lung cancer (Age 65 years and above) in 2010
 - First Year: USD 60,885
 - Last Year of Life: USD 95,318

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Cost of Mesothelioma in US (Common Procedures)

- Thoracentesis (removal of fluid from the chest):
 - \$495 to \$876
- Thoracoscopy with pleurodesis (biopsy and prevention of fluid buildup in the chest):
 - \$6,627
- Extrapleural pneumonectomy (removal of lung and chest cavity lining):
 - \$11,426

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**Cost of Pleurectomy
(Indonesia, 2012-RP)
(INA-CBG Code: J-4-14-i/ii/iii)**

Types of Cases	ALOS (Days)	Cost (,000)	% of Per capita GDP
Mild	6.0	5,670	13.3
Moderate	9.0	9,227	21.7
Complex	10.0	10,917	25.6

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**Cost of Pneumonectomy
(Indonesia, 2012-RP)
(INA-CBG Code: J-1-10-i/ii/iii)**

Types of Cases	ALOS (Days)	Cost (,000)	% of Per capita GDP
Mild	4.0	12,125	28.5
Moderate	12.0	19,874	46.6
Complex	13.8	28,151	66.1

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**Cost of Radiotherapy
Indonesia (2012) (RP)
(INA-CBG Code: C-4-12-i/ii/iii)**

Types of Cases	ALOS (Days)	Cost (,000)	% of Per capita GDP
Mild	4.0	3,787	8.9
Moderate	27.0	9,454	22.2
Complex	37.0	19,156	45.0

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INTERNATIONAL CENTRE FOR CASEMIX AND CLINICAL CODING (ITCC)

**Cost of Chemotherapy
(Indonesia, 2012- RP)
(INA-CBG Code: C-4-13-i/ii/iii)**

Types of Cases	ALOS (Days)	Cost (,000)	% of Per capita GDP
Mild	4.0	3,688	8.7
Moderate	8.0	6,940	16.3
Complex	8.3	9,583	22.5

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Table 5.2.3. Costs of acute medical treatment and pensions for mesothelioma deaths in an average year in 15 European countries

Country	No. of mesothelioma cases (underestimates)	Acute medical treatment costs (€) ^a	Average mesothelioma pension costs ^b
Austria	80	1 271 948	19 763 200
Belgium	156	2 480 298	38 538 240
Denmark	71	1 128 854	17 539 840
Finland	75	1 192 451	18 528 000
France	826	13 132 855	204 055 040
Germany	1063	16 900 999	262 603 520
Italy	1235	19 635 885	305 094 400
Netherlands	395	6 280 240	97 580 800
Norway	54	858 565	13 340 160
Poland	96	1 526 337	23 715 840
Portugal	19	302 088	4 693 760
Romania	58	922 162	14 328 320
Spain	263	4 181 527	64 971 520
Sweden	123	1 955 619	30 385 920
United Kingdom	1891	30 065 652	467 152 640

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Table 5.2.4. Total costs of mesothelioma cases in 15 European countries in one year

Country	No. of mesothelioma cases (underestimates)	Total costs ^a (€)
Austria	80	21 035 120
Belgium	156	41 018 484
Denmark	71	18 668 669
Finland	75	19 720 425
France	826	217 187 614
Germany	1 063	279 504 157
Italy	1 235	324 729 665
Netherlands	395	103 860 905
Norway	54	14 198 706
Poland	96	25 242 144
Portugal	19	4 895 841
Romania	58	15 250 462
Spain	263	69 152 957
Sweden	123	32 341 497
United Kingdom	1 891	497 217 649
Total		1 684 124 295

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Asbestos Production Model

- $\ln Q_i = a_0 + a_1 \ln X_{i1} + a_2 \ln X_{i2} + \mu_i$
- where:
 - Q_i = asbestos output for the i-th producer,
 - X_{ij} = level of jth asbestos input for the ith producer
 - a_{ij} = parameters of the production relationship relating j-th input to output for the i-th producer
 - μ_i = random error term.



Asbestos Production Model (Validation)

- Total asbestos production for the last 104 years since 1900 for all the countries is 1,736,658.5 Mt.
- Mean consumption is 266,417.196 Mt.
- Asbestos Equation:
 - Total production in metric tons = $1,051,713.8 + 2.309 \ln(\text{consumption tons})$.



Results: Annual Cost of Asbestos Consumption and Health Claims

Source	Description	Amount in USD
Virta [18; 46]	Value of 2.11 million MT of asbestos at 1,260.00 USD per ton consumed in 2003	2.93 billion
White [34]; WHO [47]	Annual compensation for 107,000 ARD cases at 40,000.00 USD per claim	4.28 billion
	Total	7.21 billion

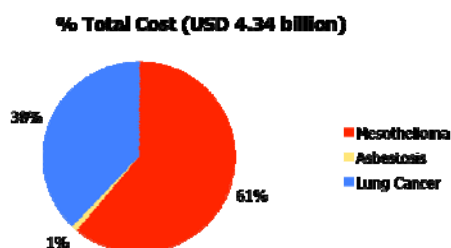


Cost of Treatment of ARDs

Source	Type of Disease	Treatment Modality	Cost Per Case in USD	Number of Patients	Annual Cost in USD
HUKM [34]; WHO [40]	Mesothelioma	Pneumonectomy/surgery	2,803.36	43,000	120.00 million
Ausai et al., [32]; WHO [40]		Chemotherapy medication	54,380.00	43,000	2.33 billion
HUKM [34]; WHO [40]		Radiotherapy	4,569.94	43,000	196.50 million
HUKM [34]	Asbestosis	Medical	1,584.62	26,650	42.23 million
HUKM [34]	Lung Cancer	Pneumonectomy/Surgery	2,803.36	26,650	74.70 million
Ausai et al., [31]		Chemotherapy/Medication	54,380.00	26,650	1.449 billion
HUKM [34]		Radiotherapy	4,569.94	26,650	121.78 million
	Total Cost				4.34 billion



Cost of Treatment of ARDs



ARDs: Loss of Earnings due to Hospital Visits and Admissions

Description	Type of Disease	Amount (USD)
Annual loss due to visits to primary care clinics in relationship to daily GNI per case	Lung Cancer	4,791
Annual loss due to visits to primary care clinics in relationship to daily GNI per case	COPD/Asbestosis	1,651
Annual loss of earnings due to visits to Primary Care Clinic by 26,650 patients in relationship to daily GNI	Cancer lung	127.68 million
Annual loss of earnings due to visits to Primary Care Clinic by 26,650 patients in relationship to daily GNI	Asbestosis	43.99 million
Annual loss of earnings due to hospital stay for 43,000 patients at a rate of USD 399.84 each	Mesothelioma	9.09 million
Annual loss of earnings due to hospital stay for 26,650 patients at a rate of USD 350.33 each	Asbestosis	4.94 million
Annual loss of earnings due to stay in medical ward for 26,650 patients at a rate of USD 384.60 each	Lung cancer	5.42 million
Annual loss of earnings due to stay in surgery ward for 26,650 patients at a rate of USD 399.84 each	Lung cancer	5.63 million
	Total	196.75 million

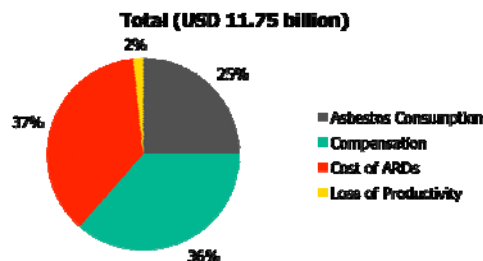
Global Burden of Asbestos Use and Asbestos Related Diseases

Source	Description	Amount (USD)
Virta [18; 46]	Value of 2.11 million Mt. of asbestos consumed in 2003	2.93 billion
White [34]; WHO [47]	Annual compensation for ARDs patients	4.28 billion
Asukai et al., [32]; HUKM [34]; WHO [47]	Annual cost of treatment for ARDs	4.34 billion
HUKM [34]; WHO [47]; World Bank [52]	Annual loss of earning due to hospital visits and admissions for ARDs	196.75 million
	Total Cost	11.75 billion

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Global Burden of Asbestos Use and Asbestos Related Diseases



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Summary

- Global economic Burden of Asbestos is USD 11.75 billion
 - USD 4.54 billion is to manage ARDs
 - USD 4.28 billion is for compensation
 - USD 2.93 billion of Asbestos consumption
- Every 1 USD spend on Asbestos consumption, USD 3 to pay for ARDs

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Study Limitations

- Conservative estimates
- Cost based on published literatures
- Medical cost based on Malaysian hospital data
- Other ARDs are not included
- Non Occupational exposure of asbestosis not included
- Under estimation on loss of productivity
- Long term productive loss not included

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Conclusions

- Evidence on cost of asbestos use emerging
- Industry and Manufacturing Sectors linked to consumption of asbestos
- Huge economic burden due to asbestos use
- Any economic gain on the use of asbestos is superseded by loss due to health impact
- Very strong case to ban asbestos now

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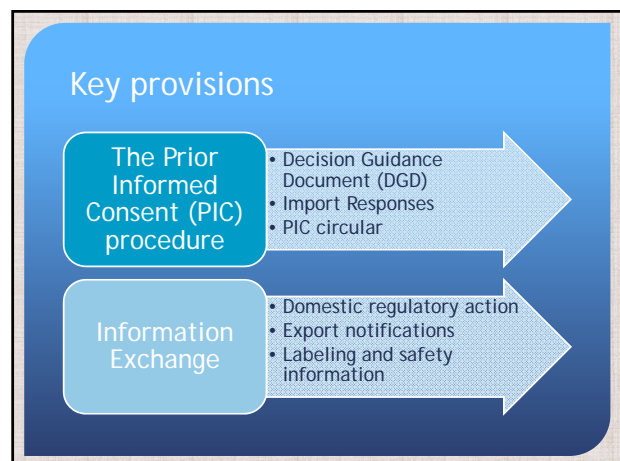
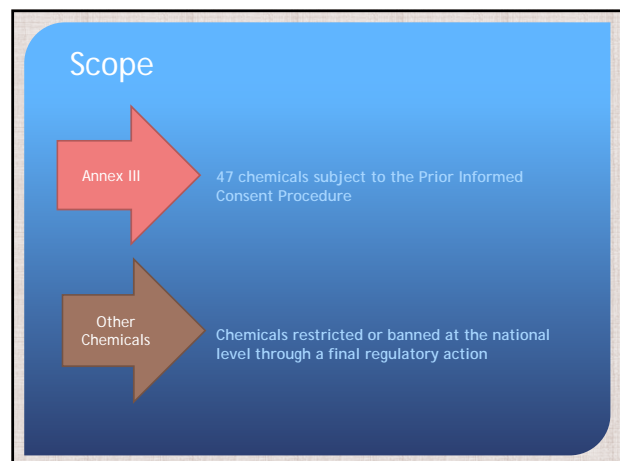
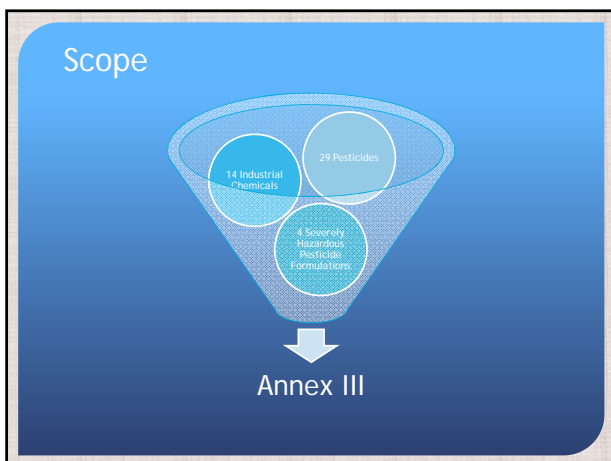
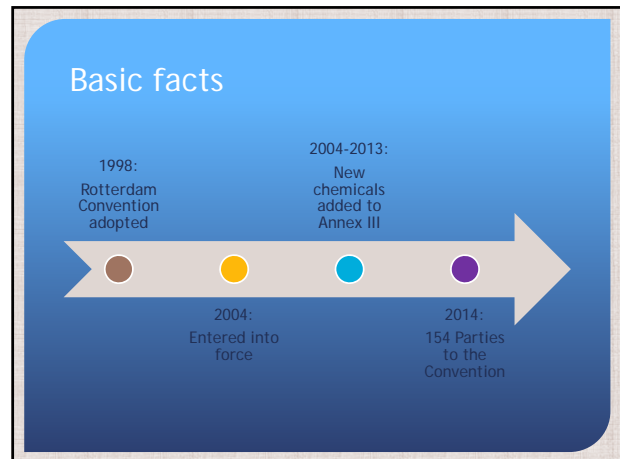
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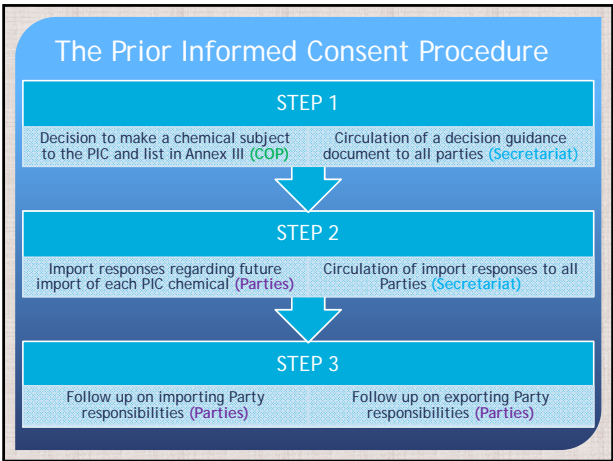
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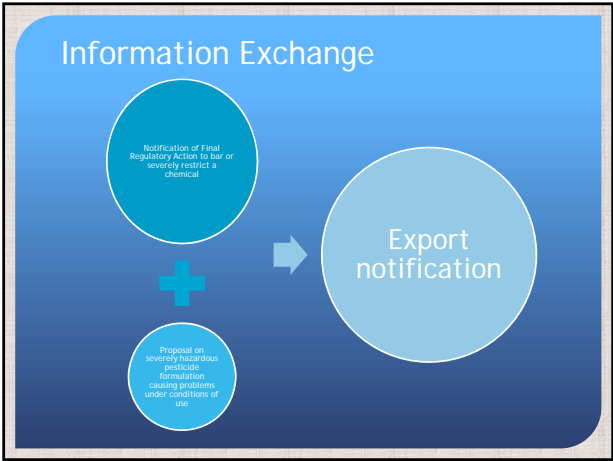
8

RC-4/4: Inclusion of chrysotile asbestos in Annex III of the Convention

The COP *Encouraged* Parties to:

- make use of all available information on chrysotile asbestos to assist others to make informed decisions regarding the import and management of chrysotile asbestos; and
- inform other Parties of those decisions using the information exchange provisions laid down in Article 14 (*information exchange*) of the Convention

	Chemical	CAS number (s)	Category
1	Actinolite	77536 - 66 - 4	Industrial
2	Anthophyllite	77536 - 67 - 5	Industrial
3	Amosite	12172 - 73 - 5	Industrial
4	Crocidolite	12001 - 28 - 4	Industrial
5	Tremolite	77536 - 68 - 6	Industrial



The Chinese University of Hong Kong

Research on Asbestos Related Diseases and Implications

Ignatius TS Yu

Chairman and Honorary President
Hong Kong Occupational and Environmental Health Academy

Hon. Clinical Professor,
School of Public Health and Primary Care,
The Chinese University of Hong Kong

Research by Hong Kong Researchers

- Asbestos consumption and mesothelioma
- Mortality of a cohort of workers with asbestosis
- Mortality of a cohort of workers in a factory processing chrysotile asbestos in South-west China
- Mortality of a cohort of chrysotile asbestos miners in western China

Asbestos consumption and mesothelioma

- 1976 – 2006
- 199 cases of mesothelioma from Cancer Registry
- 137 males and 62 females

Research

EHP 2010

Are Current or Future Mesothelioma Epidemics in Hong Kong the Tragic Legacy of Uncontrolled Use of Asbestos in the Past?

Lap Ah Tse,¹ Ignatius Tak-sun Yu,¹ William Goggins,¹ Mark Clements,² Xiao Rong Wang,¹ Joseph Siu-kie Au,³ and Kai Shing Yu¹

¹School of Public Health and Primary Care, Chinese University of Hong Kong, Hong Kong, China; ²National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australia; ³Department of Clinical Oncology, Queen Elizabeth Hospital, Kowloon, Hong Kong SAR, China

BACKGROUND: Because of the long latent period of asbestos-related mesothelioma, investigators suggest that the high incidence of this disease will continue in the coming decades.

OBJECTIVES: We describe the time trends of mesothelioma incidence and its relationship to historical consumption of asbestos in Hong Kong and project future trends of mesothelioma incidence.

METHODS: We obtained local annual consumption of total asbestos for 1960–2006 (converted to kilograms per person per year). Age-standardized incidence rates (ASIRs) of mesothelioma were computed and depicted on graphs using the centered moving average method. Indirectly standardized rates were regressed on a transformation of consumption data that assumed that the latency between asbestos exposure and mesothelioma diagnosis followed a normal distribution with a mean \pm SD of 42 ± 10.5 years.

RESULTS: ASIRs for males started to increase substantially in 1994 and were highest in 2004; for females, ASIRs climbed in the 1980s and in the early 1990s but have fluctuated without obvious trends in recent years. The highest asbestos consumption level in Hong Kong was in 1960–1963 and then decreased sharply afterward. Using past asbestos consumption patterns, we predict that the mesothelioma incidence rate for males will peak in 2009, with the number of cases peaking in 2014, and then slowly decline in the coming decades.

CONCLUSIONS: Hong Kong experienced an epidemic of mesothelioma from 2000 to 2006 that corresponded with the peak of local asbestos consumption in the early 1960s assuming an average latent period of 42 years. The incidence is anticipated to decline in the coming decades but may not decrease back to the background risk level (the risk unrelated to asbestos exposure).

KEY WORDS: asbestos, epidemic, incidence, mesothelioma, time trends. *Environ Health Perspect* 118:382–386 (2010). doi:10.1289/ehp.9900688 available via <http://dx.doi.org/> [Online 22 October 2009]

coverage (Tse et al. 2009), and the extracted data contained new primary malignant mesothelioma cases diagnosed during the period 1983–2006. Only three male cases of malignant mesothelioma were observed in the Hong Kong population before 1983 (1976, 1978 and 1982), and no cases were reported among females (Lam et al. 1983). All malignant mesothelioma cases during the study period were coded as C45 according to the *International Classification of Diseases, 10th Revision* [World Health Organization (WHO) 2004].

Population estimates during the corresponding period and population projections were obtained from the Hong Kong Census and Statistics Department (Census and Statistics Department 2009a). We used mid-year population data to calculate the incidence rate.

Local asbestos consumption. We obtained information on the annual import, export, and reexport of all types of asbestos from the *Hong Kong Census and Statistics*

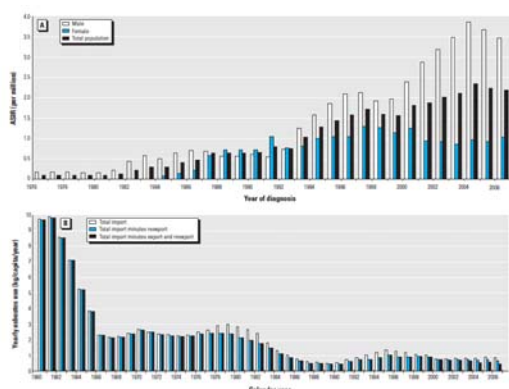


Figure 1. (A) ASIRs of mesothelioma among adults in the Hong Kong general population during 1976–2006, using centered moving average method by a 5-year interval. (B) Annual per capita asbestos use (kg/capita/year) in Hong Kong during 1960–2006 (total import, total import minus reexport, and total import minus export and reexport), using centered moving average method, by a 5-year interval.

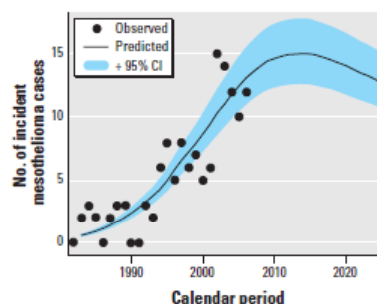


Figure 2. Projections for the predicted numbers of mesothelioma cases for males in the Hong Kong general population for 2002–2027, assuming a normally distributed latency period of 42 ± 10.5 years (mean \pm SD).

Mortality of a cohort of workers with asbestosis

- 124 male registered cases of asbestosis in Hong Kong during 1981–2008
- Forty-five patients (36.29%) had a history of PTB at the time of asbestosis diagnosis
- Followed up to December 31, 2008

Standardized Mortality Ratio

Cause of Death	No. of deaths	SMR	95% CI
All	86	6.06	4.90–7.51
All Cancers	36	7.53	5.38–10.25
Lung Cancer	14	7.91	4.32–13.29
Mesothelioma	17	6013.63	3505.95–9621.81
Colon Cancer	2	5.33	0.65–19.25

Positive association with net years of exposure to asbestos for mesothelioma and lung cancer

Lung Cancer 2012

Mesothelioma and lung cancer mortality: A historical cohort study among asbestosis workers in Hong Kong

Minghui Chen^a, Lap Ah Tse^{a,*}, Ronald K.F. Au^b, Ignatius T.S. Yu^a, Xiao-rong Wang^a, Xiang-qian Lao^c, Joseph Siu-kei Au^a

^a School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong Special Administrative Region, China
^b Pneumococcal Clinic, Department of Health, Hong Kong Special Administrative Region, China
^c Department of Clinical Oncology, Queen Elizabeth Hospital, Hong Kong Special Administrative Region, China

Public Health 2013

Pulmonary tuberculosis and lung cancer mortality in a historical cohort of workers with asbestosis

L.A. Tse^{a,*}, M.H. Chen^a, R.K.F. Au^b, F. Wang^a, X.R. Wang^a, I.T.S. Yu^a

^a JC School of Public Health and Primary Care, Chinese University of Hong Kong, 4/F School of Public Health, Prince of Wales Hospital, Shatin, N.T., Hong Kong SAR, China
^b Pneumococcal Clinic, Department of Health, Hong Kong SAR, China

Mortality of a cohort of workers in a chrysotile asbestos factory

- 37-year prospective cohort study
- 577 asbestos workers and 435 control workers
- Followed from 1972 to 2008
- Follow-up rate of 99% and 73%

Hazard Ratios

Cause of Death	No. of deaths	HR	95% CI
All	259	2.05	1.56 - 2.68
All Cancers	96	1.89	1.25 - 2.87
Lung Cancer	53	3.31	1.60 - 6.87
Mesothelioma	2		
Non-malignant respiratory diseases	81	3.23	1.68 - 6.22

- There was a clear exposure-response trend with asbestos exposure level and lung cancer mortality in both smokers and non-smokers.

Standardized Mortality Ratio

TABLE 2. SMR of Selected Causes Among Chrysotile Workers in China, 1972–2008

Cause of Death	Observed	Expected	SMR (95% CI)
All causes	259	197.3	1.31 (1.16, 1.48)
All cancers	96	46.0	2.09 (1.71, 2.55)
Lung cancer	53	13.0	4.08 (3.12, 5.33)
GI cancer ^a	29	22.1	1.31 (0.91, 1.89)
NMRD ^b	81	23.9	3.38 (2.72, 4.21)

Asbestos-exposure levels, and exposure years showed a clear trend of risk for lung cancer and respiratory diseases

A 37-year observation of mortality in Chinese chrysotile asbestos workers

Thorax 2012

Xiaorong Wang,¹ Eiji Yano,² Hong Qiu,¹ Ignatius Yu,¹ Midori N Courtice,¹ L A Tse,¹ Sihao Lin,¹ Mianzhen Wang³

Lung Cancer 2012

Cancer mortality among Chinese chrysotile asbestos textile workers

X.R. Wang^{4,*}, I.T.S. Yu⁴, H. Qiu⁴, M.Z. Wang⁵, Y.J. Lan⁶, L.Y. Tse⁴, E. Yano², D.C. Christiani⁴

¹ School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong
² Department of Occupational Health, School of Public Health, Sichuan University, Chengdu, China
³ Department of Hygiene and Public Health, Tokyo University School of Medicine, Tokyo, Japan
⁴ Department of Environmental Health, Harvard School of Public Health, Boston, USA

J Thorac Oncol. 2012

Cause-Specific Mortality in Relation to Chrysotile-Asbestos Exposure in a Chinese Cohort

Sihao Lin, PhD,* Xiaorong Wang, PhD,* Ignatius T.S. Yu, MD,* Eiji Yano, MD,† Midori Courtice, MSc,* Hong Qiu, MPH,* and Mianzhen Wang, MD‡

Mortality of a cohort of chrysotile asbestos miners in western China

- Largest chrysotile asbestos mine in China
- 1,539 male workers at cohort entry date - 1 January 1981
- Followed through 31 December 2006
- Exposed group – 1080 miners
- Control group (no direct exposure) - 459

Hazard Ratios

Cause of Death	No. of deaths	HR	95% CI
All	343	2.09	1.64 - 2.66
All Cancers	103	3.22	1.92 - 5.41
Lung Cancer	50	4.61	1.96 - 10.86
Mesothelioma	0		
GI cancer	45	2.96	1.39 - 6.31
Non-malignant respiratory diseases	81	3.34	1.76 - 6.33

Standardized Mortality Ratio

Cause of death	Miners (n = 1,080)		
	Obs ^a	SMR	95% CI ^b
All causes	343	2.10	1.89, 2.33
All cancers	103	3.08	2.54, 3.74
Lung cancer	50	4.71	3.57, 6.21
GI cancer	45	1.66	1.24, 2.22
NMRD ^c	67	3.53	2.78, 4.48

Asbestos-exposure levels, and exposure years showed a clear trend of risk for lung cancer and respiratory diseases, as well as GI cancer (in particular stomach cancer)

Mortality in a Chinese chrysotile miner cohort

Int Arch Occup Environ Health 2012

Xiaorong Wang · Sihao Lin · Eiji Yano · Hong Qiu · Ignatius T. S. Yu · Lapah Tse · Yajia Lan · Mianzhen Wang

Cancer Mortality in Chinese Chrysotile Asbestos Miners: Exposure-Response Relationships

PLoS ONE 2013

Xiaorong Wang^{1,*}, Eiji Yano^{2,*}, Sihao Lin³, Ignatius T. S. Yu¹, Yajia Lan⁴, Lap Ah Tse¹, Hong Qiu¹, David C. Christiani⁴

¹ Division of Occupational and Environmental Health, Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong, China.
² School of Public Health, Tokyo University School of Medicine, Tokyo, Japan; ³ Huan School of Public Health, Sichuan University, Chengdu, China; ⁴ Department of Environmental Health, Harvard School of Public Health, Boston, Massachusetts, United States of America

Exposure to chrysotile mining dust and digestive cancer mortality in a Chinese miner/miller cohort

OEM 2014

Sihao Lin,¹ Xiaorong Wang,¹ Eiji Yano,² Ignatius Yu,¹ Yajia Lan,³ Midori N Courtice,¹ David C Christiani⁴

Exposure-specific lung cancer risks in Chinese chrysotile textile workers and mining workers

Lung Cancer 2014

Xiaorong Wang^{4,*}, Sihao Lin⁴, Eiji Yano⁵, Ignatius T.S. Yu⁴, Midori Courtice⁴, Yajia Lan⁴, David C. Christiani⁴

¹ Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong, China

² School of Public Health, Tokyo University School of Medicine, Tokyo, Japan

³ Huan School of Public Health, Sichuan University, Chengdu, China

⁴ Department of Environmental Health, Harvard School of Public Health, Boston, USA

- ❑ A clear exposure–response relationship between lung cancer mortality and exposure levels was observed in both cohorts
- ❑ At low exposure levels (Q1 and Q2), textile workers displayed higher death risks of lung cancer than mining workers.
- ❑ Similarly considerably high risks were observed at higher exposure levels, with hazard ratios of over 8 and 11 at Q3 and Q4, respectively, for both textile and mining workers, after both age and smoking were adjusted

Implications

- Total ban of asbestos in Hong Kong in April 2014
- Carcinogenicity of chrysotile asbestos was confirmed
- All countries should seriously consider total ban of all forms of asbestos as soon as possible
- IARC (International Agency for Research on Cancer) should review the carcinogenicity of asbestos on gastrointestinal cancers



Inter-Agency WS and AAI-7
Jakarta, Indonesia
Sep-Oct, 2014

Asbestos and Asbestos-related Diseases Myths, Lies, and Half-Truths

Ken Takahashi, MD, PhD, MPH
Professor of Environmental Epidemiology
Director of the WHO-CC for Occupational Health
University of Occupational and Environmental
Health, Japan

I declare that I have no conflict of interest

Total Ban of Asbestos

Effective Sep.1 2006

アスベスト全面禁止

労働安全衛生法施行令が改正され、平成18年9月1日から施行されます。

石綿及び石綿をその重量の0.1%を超えて含有するすべての物の製造、輸入、譲渡、提供、使用が禁止されます。

ただし、裏面の表の物については、国民の安全上の観点等から実証試験等が必要であり、例外的に当分の間禁止が留保されます。



Prohibit manufacture, import, sales, provision and use of ASB and its products (0.1%+ weight ASB) of all types including CHR

● 蛇紋石系石綿
クリンタイル(白石綿)
● 角閃石系石綿
クロシタイル(黒石綿)
アモサイト(黒石綿)
アブソライト
トルモライト
アクチノライト

Total compensated ARD reached 10,954 cases in Japan!

Media
Report

In FY2013:

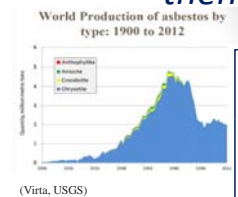
- 1,085 ARD cases (+2/FY2012) compensated by **IACA**
 - **Mesothelioma** 528, **LC** 383, DPT 53, BPE 44, Asbestosis 77
 - Construction 52.2%, manufacture 39.1%
- 23 ARD cases (-144/FY2012) compensated by **Relief Law** for “statute of limitation expired”
 - Cumulative N = 1,486 since FY2006

MOH, Japan: “We expect about 1,000 cases/yr compensation because heavy use of ASB continued around 1970-1990.”

Mainichi Newspaper July 1, 2014
Yomiuri Newspaper July 2, 2014

Myth!

If a country bans amphiboles, then the country is OK!?



(Virta, USGS)

- **AMPH** has been out of market for 2+ decades; no international trade of **AMPH** occurred in 21st century
- Statements recently issued by WHO/ILO pertain to **CHR**
- Asbestos ban should mean **CHR** ban

ILO supports safe use of ASB!?

Lie!

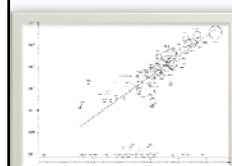
ILO Asbestos Convention (C.162, 1986)
“Safety in the Use of Asbestos”

- Deliberate misinterpretation and negligence by pro-chrysotile parties
 - **Replaces** safety with safe > “safe use” (there is no safe use)
 - **Neglects** Preamble of C.162
 - **Ignores** ILO Resolution on Asbestos (2006)
 - “All forms of asbestos, including **CHR**, are ... known human carcinogens”
 - “C.162 **should not be used** to provide a justification for, or endorsement of, the continued use of asbestos.”

“To eliminate ARDs, stop using all types of ASB” (WHO, 2006)

1. Human carcinogen (epidemiology & experiments)
2. National **burden** studies

National ARD burdens are **directly proportional** to national ASB consumption



Park, Takahashi et al. EHP 2011

- Per capita consumption predicts 70–80% of national burden (Lancet 2007, EHP 2011)
- Countries stopped using ASB starting to show level-off / decline (EHP 2008)

There is conflicting evidence re: potency/danger of CHR!?

Some research suggested no or low health risk of CHR [some negative papers]

- One should compare **absolute unanimity of positive papers** thoroughly reviewed by IARC: repeatedly and firmly maintaining its conclusion
 - 1973, 1977, 1986, 2012
- "[some negative papers] reflect a string of **industry-sponsored studies** designed only to cast doubt on the clear links between CHR and lung disease."*
 - Editorial: *Nature*, 2010. "All forms of asbestos, including CHR, are ... known human carcinogens"
 - "These are familiar tactics."
 - "Irresponsible policies could cause an epidemic of malignant lung disease."

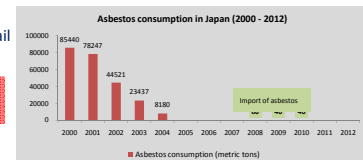
Even Japan prohibited CHR as recently as 2012!?

Japan removed the last item on "positive list" in 2012

- CHR was prohibited in principle in 2004**
 - Prohibited items included on "negative list"
- CHR was banned** in 2006 after 2005 Kubota Shock
 - Exempted items on "positive list"
 - Exempted items removed one by one
 - Last exempted item removed in 2012

In adopting ban, Japan *did* trail other developed countries

Half-truth!



What is Japan doing after ban?

- All ASB including CHR banned in Sep 2006 : exempted items designated by **positive list**
- Asbestos Relief Law** (Feb 2006): local residents and workers/former workers who were not covered under IACIA
- After Kubota shock, many "**asbestos clinics**" instigated + hospitals/clinics began asbestos-related health examinations
 - Standard questionnaire read by 70% of Nagao, Takahashi et al. *J Occup Health*, 2008
 - Complaints: lack of manpower + exposure

Compensation by Relief Law vs IACIA

	Non-Employee		Employee	
	Relief in lifetime	Relief after death	Relief for "statute of limitation expired"	Workers Compensation
Victim	medical expense + 1,039 USD per month	—	—	medical expense + 80% of the victim's average wage
Bereaved Family	1,990 USD of funeral expenditure	28,000 USD of condolence money + 1,990 USD of funeral expenditure	According to the number of eligible dependents and other factors, 24,000 USD (1 dependent) to 33,000 USD (4 dependents or more) of pension OR 120,000 USD of lump sum (0 dependent)	Pension - 153 days (1 dependent) to 245 days (4 dependents or more) of the victim's average daily wage + 30,000 USD OR 120,000 USD of lump sum (0 dependent)

1 USD = 100 YEN

Courtesy of Mr. Sugio Furuya, JOSHRC

Kubota's private compensation reaches 100 M USD

Paid out to 274 residents/ex-residents neighboring asbestos plant.

Mainichi Newspaper, July 6, 2014
(1 USD = 100 YEN)

Asbestos-related Legislations in Japan

Year	Event
1973	First ca. officially compensated
mid 1980s	Media reports on public fear (wide use in buildings, etc.); no strengthening of measures
1995	CRO & AMO prohibited
2004	CHR prohibited in principle [negative list]
2005	Ratified ILO C. (No.162, 1986)
2005	Kubota Shock
2006	CHR banned [positive list]

(- 2005) Ordinance on Prevention of Hazards Due to **Specified Chemical Substances**

regulations premised on manufacture and handling of ASB *lost relevance* + trend towards prohibition of use

Ordinance on Prevention of **Asbestos Hazards** (2005 -)

Lie! CHR substitutes not economic, not feasible!?

"Wide variety of less hazardous substitutes for various uses *available*"

- for **reasonable** or no additional cost
- IARC 2a, 2b or less; **better** technical & practical feasibility

I. Fiber Substitution (in asbestos-cement products)

- PVA (polyvinyl alcohol)
 - Cellulose
 - PP (polypropylene)
- ★ **non-inhalable** (above respirable limit, *diam.* > 10 micron)

II. Alternative Products

- [for AC roofing] - Above substitution
- [for AC pipes] - *high-pressure*: iron & ductile iron pipe
- *low-pressure*: steel-reinforced pipes

World Bank (2009) & WHO-Euro (2011)

Myth! Mesothelioma cases in developing countries have little asbestos exposure!?

Recent research suggested no/little asbestos exposure history among mesothelioma cases in countries X & Y

- Scientific consensus unequivocal that **at least 80%** of mesothelioma is attributable to past ASB exposure
 - Helsinki Criteria Update, 2014
- Possible reasons for **failure to identify**
 - Pinning down historical exposure (myriad of possible exposure situations) is extremely difficult; expertise required
 - Latency time not saturated (**30-50 years** required)

List of Banned Countries (N=55) (Laurie-Kazan Allen, Jan 2014)

Algeria	Czech Republic	Iceland	Malta	Serbia
Argentina	Denmark	Ireland	Mozambique	Seychelles
Australia	Egypt	Israel	Netherlands	Slovakia
Austria	Estonia	Italy	New Caledonia	Slovenia
Bahrain	Finland	Japan	Norway	South Africa
Belgium	France	Jordan	Oman	Spain
Brunei	Gabon	Korea (South)	Poland	Sweden
Bulgaria	Germany	Kuwait	Portugal	Switzerland
Chile	Greece	Latvia	Qatar	Turkey
Croatia	Honduras	Lithuania	Romania	United Kingdom
Cyprus	Hungary	Luxembourg	Saudi Arabia	Uruguay

WHO-WPRO Member States highlighted in **red**; I cannot find any WHO-SEARO Member States.

- All EU Countries banned; Although USA does not have ban, its use is <1,000 tons/year (*de facto* ban)
- Which country will be added next from SEAR/WPR?

Inter-Agency WS and AAI-7
Jakarta, Indonesia
Sep-Oct, 2014

Asbestos and Asbestos-related Diseases Myths, Lies, and Half-Truths

Ken Takahashi, MD, PhD, MPH

Professor of Environmental Epidemiology
Director of the WHO-CC for Occupational Health

University of Occupational and Environmental Health, Japan

Please do NOT print next slide

- Highly Controversial!!

WHO supports "differentiated" approach!?

WHO Global Plan of Action on Workers' Health

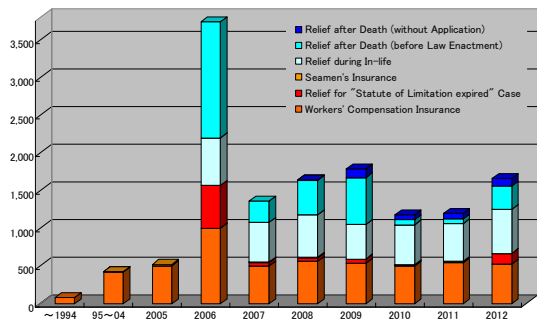
2007 World Health Assembly

"Its activities will include global campaigns for elimination of ARDs -- bearing in mind a differentiated approach to regulating its various forms"

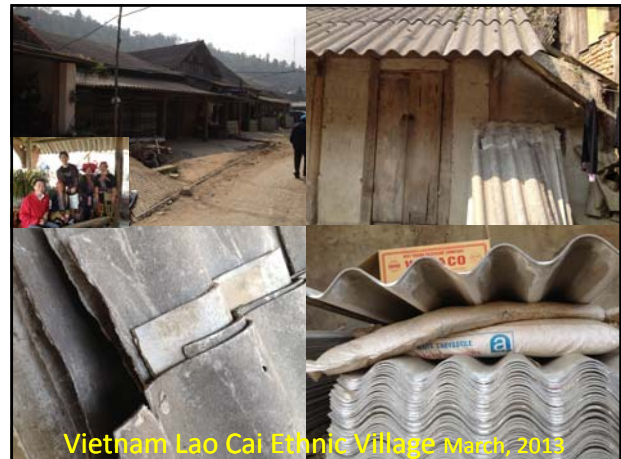
Half-truth!

- Used by CHR lobby as justification for continued use, and thus became highly **controversial**
- Except for this one sentence, there is **no ambiguity** in other WHO documents on CHR as a definite carcinogen and the need to "stop using all forms of asbestos" to "eliminate ARD"
- (**off-record**) statement was advanced last minute by an exporting country and reluctantly concurred to

Trend of Relief/Compensation in Japan (Graph for Mesothelioma only)



Courtesy of Mr. Sugio Furuya, JOSHR



Vietnam Lao Cai Ethnic Village March, 2013



Vietnam Corrugated Roof Factory Dec, 2006

Myth! Vietnam banned amphiboles, so Vietnam is OK!?

Vietnam banned AMPH in 2004

(Virta, USGS)

- **AMPH** has been out of market for 2+ decades; no international trade of **AMPH** occurred in 21st century
- All statements recently issued by WHO/ILO pertain to **CHR**
- Asbestos ban should mean

Vietnam's Position on ASB in World

- By *total* volume, **10th largest** ASB consumer in world (asbestos-cement roofing +++ ; also brakes, insulation in boilers, etc.)
- By *per capita* volume, **7th largest** ASB consumer in world.
- One of seven countries opposed to **inclusion of CHR** into Annex III of the Rotterdam Convention

Unique Advantages for Vietnam

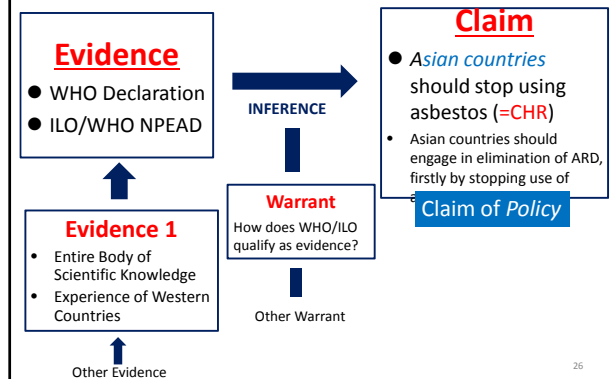
- ➔ OSH Project (Japan fund; support by WHO/ILO) with emphasis on ASB (CHR)
- ➔ Collaboration expanded from **UOEH**/WHO to **ADRI**+APHEDA/ILO
- ➔ Expertise rapidly being acquired for diagnosis / identification of **mesothelioma**
- ➔ Golden opportunity to take lead in ASEAN (Thailand still struggling)
- ➔ VNM well known for wise governance and being able to learn from mistakes rather than repeating

Caution about discussing theme

- I am cautious because
 - “**Distinguishing** chrysotile” is often motivated to **downplay** its potency, and justify continued use
 - When in fact
 - WHO (IARC) stance is “**all forms** of ASB are carcinogenic” AND “stop using all forms of ASB”
 - Historically **96%** of all ASB used is CHR and 100% since 1995 (2 M ton/yr x 20 yr)
 - “Relative potency” between fiber types
 - Qualifies as theme of **scientific** interest
 - But less relevant for **prevention** AND **compensation**
- Probably we are forced to deal with it, because of the

Completed by [redacted]

In Context of Argumentation



WHO Declaration on ARD Elimination (2006) How does it qualify as EVIDENCE?

Burden of ARD is substantial (①)

- Many workers are exposed to ASB (125 M) > many die every year from ARLC, meso and asbestosis (90,000 < 107,000)
- Other deaths occur and non-occupational exposure exist
- Such numbers are rising

CHR is carcinogenic But CHR is still widely used

- IARC: **All Types of ASB** are human carcinogen
- No threshold identified for carcinogenic risk of CHR (②)
 - ASB (=CHR) still widely used (2 M ton per year)
 - Substitutes exist in terms of other fiber materials and products

Bearing in mind ② (with ① implied),
The most efficient way to eliminate ARD is to stop using all types of ASB

Relative potency of CHR

- May be less potent than AMPH, but CHR is still a definite carcinogen
- Scientifically, there is the **caveat** (caution, warning) that, AMPH is comparatively highly potent, especially for mesothelioma
 - But not to denigrate (belittle, dwarf, **disapprove**) the potency of CHR per se, especially for lung cancer
- Practically (viewpoint of prevention, compensation), the scientific caveat becomes less relevant (not prudent; not in the public interest)

IARC Vol. 100C (2012)

- Earlier epi studies: **gravimetric** measures of dust
- Later epi studies: **fiber-counting** methods [by PCM]
- ◆ **Problem** is: **conversion factors** unreliable unless done side-by-side
- ◆ **Ideally**: Epi studies should distinguish fiber types and assess size distribution [by EM]

- IARC Position on **Amphybole Hypothesis** (Because AMPH is much more biopersistent, health risk of CHR is due to TREMO contamination): WG notes that lower biopersistence does not imply less potency
- IARC Position on Relative Potency: There is considerable evidence that CHR is less potent **for MESO**, citing Hodgson & Darton (2000) that CHR:AMO:CRO=1:100:500

Experimental Animals (IARC Vol 100C)

Sufficient Evidence for Carcinogenicity for **All** Forms of Asbestos

- **Rat** is the main test model for fibre-induced diseases; to a lesser extent **hamster** (baboons also)
- Carcinogenic **potency** of fibre increases with fibre length (*but* sufficient evidence for ALL)
- **Inhalation** > intraperitoneal admin > intratracheal
- WHO fibre definition
 - Aspect ratio ≥3: 1, length ≥5 micron, diam ≤3 micron
- Studies in **companion animals** (pet DOGS)
 - Dogs developed mesothelioma whose owners had asbestos-related jobs or hobby (OR=8.0); also CHR proven in lungs

Consensus vs. Dissenting Opinions

What is the Ultimate Goal?

Dissent = Difference of Opinion; Ex. Minority Dissent

- **Consensus**
 - Much more reliable because it is built on a **Body of Evidence**; it is hard-won
 - Individual biases average out, gaps in knowledge compensate for each other
 - Eventually consensus is built on **solid ground**; it is “Collective”
- **Dissent**
 - There is a role for dissenting opinions, because
 - There is never any guarantee of being correct; someone can set out to *challenge consensus*, to *disprove the prevailing theory*; But there should be Good Reason to Disagree
- **Ultimate Goal**
 - Is to **Maximize the Probability of Being Correct**.
 - While remaining open to New Evidence

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Interesting Observation by IARC on Pleura vs. Peritoneum MESO

In relation to ASB exposure,

- PER : increases with square of CUM exposure
- PLE : increases with less than linear with CUM exposure

Thus, PER will dramatically increase relative to PLE at high exposure levels.

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Bayesian View

Objectivist view: begin with probability = “state of knowledge” (*evidential probability*)

◆ allows to **extend logic**, to enable reasoning with **proposition** whose truth or falsity is uncertain

- start from prior probability
- but **update** in the light of **new data**

Subjectivist view: begin with probability = “personal belief”

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Country and fiber type

- World
 - CHR= **96%** of production + use from 1900-2003
 - CRO= 2.2%; AMO= 1.6%; ANTHO & TRE <1%
 - Since 1995, CHR= 100%
- USA
 - #1 cumulative mesothelioma deaths; #1 cumulative asbestos use
 - CHR=98% of import 1900-2003 (30 Mt); CRO=1%; AMO=1%
- **Australia** - Whitenoom: CRO
- **S. Africa** – “Major (most) World Supplier of CRO & AMO”
- Finland - ANTHO

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Asbestos Substitutes

- Two Ways: (1) fiber substitution (2) alternative products
- 1. Fiber Substitution

Man-made mineral fibers: **aramid** fiber, **cellulose/ceramic** fiber, **glass** fiber, **PVA/PVC** fiber. All of which are IARC classified as 2a, 2b or less (not 1 - definite carcinogen)
- 2. Alternative Products

Aluminum/vinyl/wood sidings; Ductile iron pipes; PVC pipes

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Treatment of Mesothelioma

Meso is aggressive, treatment-resistant tumor (median survival 1 yr)

- **Surgery**
 1. Diagnostic (video thoracoscopy + open pleural biopsy)
 2. Palliative surgery
 3. Curative surgery (**extrapleural pneumonectomy**)
- **Chemotherapy** (none proven curative, but good for palliation)

First line = **Pemetrexed** (antifolate) plus **Cisplatin** (platinum)
- **Radiotherapy** (disappointing; exception is for local postsurgical radiotherapy)

Others: Immunotherapy (local cytokine therapy with recombinant IL-2 or INT-gamma)
Gene therapy (administration of engineered viruses into...)

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India



GOVERNMENT OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
Directorate General Factory Advice Service and Labour Institutes
REGIONAL LABOUR INSTITUTE

NO.1, SARDAR PATEL ROAD,
TTTT POST, ADYAR, CHENNAI – 600 113
Phone No. : 044-22355690, 22350737, Fax No. 044- 22352457

DGFASLI web site : www.dgfasli.nic.in
E-Mail ID of RLI, Chennai : chennai.rli@gmail.com

Inter - Agency Workshop on the Sound Management of Industrial Chemicals with Special Emphasis on Asbestos for the Asia Pacific Region

7th International Seminar of the Asian Asbestos Initiative (AAI-7)

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DGFASLI , MOL& E,GOI

- ▶ Directorate General Factory Advice Service & Labour Institutes, Ministry of Labour and Employment, Government of India
- ▶ Mandate – Occupational Safety, Health and Environment at Workplace
- ❖ Central Labour Institute, Mumbai
- ❖ Regional Labour Institute, Chennai, Kanpur, Kolkata, Faridabad

The Constitution of India Directive Principles

- ▶ Securing the **health and strength** of employees, men and women, that the tender age of children are not abused, that citizens are not forced by economic necessity to enter avocations unsuited to their age or strength (**Article 39**)
- ▶ Just and humane conditions of work and maternity relief are provided (**Article 42**)
- ▶ for ensuring that no child below the age of 14 is employed to work in any factory or mine or engaged in any other hazardous employment (**Article 24**).

National Policy on Safety, Health and Environment at Work Place

Declared by
The Ministry of Labour and Employment
Government of India

On 20.04.2009

PREAMBLE

- ▶ The fundamental purpose of this National Policy on Safety, Health and Environment at workplace, is **not only to eliminate the incidence of work related injuries, diseases, fatalities, disaster and loss of national assets and ensuring achievement of a high level of occupational safety, health and environment performance through proactive approaches but also to enhance the well-being of the employee and society, at large.**
- ▶ Government of India firmly believes that without safe, clean environment as well as healthy working conditions, social justice and economic growth cannot be achieved and that **safe and healthy working environment is recognized as a fundamental human right**

GOALS

- ▶ establishing and developing the research and development capability in emerging areas of risk and providing for effective control measures.
- ▶ Including safety and occupational health as an integral part of every operation.

OBJECTIVES:

- ▶ Continuous reduction in the incidence of work related injuries, fatalities, diseases, disasters and loss of national assets.
- ▶ Improved coverage of work related injuries, fatalities and diseases and provide for a more comprehensive data base for facilitating better performance and monitoring.
- ▶ Continually increasing community expectation of workplace health and safety standards.
- ▶ Improving safety, health and environment at workplace by creation of "green jobs" contributing to sustainable enterprise development.

ACTION PROGRAMME – Compliance

- ▶ by encouraging the appropriate Government **to assume the fullest responsibility for the administration and enforcement of occupational safety, health and environment at workplace**, provide assistance in identifying their needs and responsibilities in the area of safety, health and environment at workplace, **to develop plans and programmes in accordance with the provisions of the applicable Acts and to conduct experimental and demonstration projects** in connection therewith;
- ▶ by continuous improvement of Occupational Safety and Health by systems approach to the management of Occupational Safety and Health including **developing guidance on Occupational Safety and Health management systems, strengthening voluntary actions, including mechanisms for self-regulatory concept and establishing auditing mechanisms** which can test and authenticate occupational safety and health management systems;

ACTION PROGRAMME – Compliance

- ▶ by providing specific measures to prevent catastrophes, and to co-ordinate and specify the actions to be taken at different levels, particularly in the industrial zones with high potential risks;
- ▶ by **recognizing the best safety and health practices and providing facilitation for their adoption.**
- ▶ by encouraging all concerned to adopt and commit to "Responsible Care" and / or "Corporate Social Responsibility" to improve safety, health and environment at workplace performance;

ACTION PROGRAMME – Compliance

- ▶ by ensuring a **suitable accreditation machinery to recognise institutions, professionals and services relating to safety, health and environment** at workplace for uniformity and greater coverage as also authenticating safe management system;
- ▶ by specifically focusing on such occupational diseases like pneumoconiosis and silicosis; developing a framework for its prevention and control as well as develop technical standards and guidelines for the same;
- ▶ by promoting **safe and clean technology and progressively replacing materials hazardous to human health and environment**;

ACTION PROGRAMME – Review

- ▶ National Policy and the action programme shall be reviewed at least once in five years and the policy is being reviewed by the Ministry this year....

Workers...

- ▶ Organised labour Vs Unorganised Labour
- ▶ Legal requirements for OSH in Factories, Mines, Docks and Building and other construction works.
- ▶ Measures are taken to include OSH requirements under other legislations – Plantation Labour Act, etc

Legal Framework

- ▶ The Factories Act, 1948, Model Rules and State Rules
- ▶ Dock Workers(Safety, Health and Welfare) Act, 1986 and Regulations 1990
- ▶ The Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996.
- ▶ The Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Central Rules , 1998 and State Rules.
- ▶ Industrial Dispute Act, 1947
- ▶ Employees Compensation Act, 1923
- ▶ ESI Act, 1948

Statistics of Factories at a Glance: 2011

▶ Registered Factories	3,25,209
▶ Working Factories	2,71,085
▶ Employment Total	1,16,34,070
▶ Men	98,26,210
▶ Women	18,07,860
▶ Qualified Safety Officers	3587
▶ Welfare Officers	3228
▶ Factory Med. Officers	7464
▶ Safety Policy	13458
▶ Total Injuries	29837
▶ Fatal Injuries	1433

Medical Facilities in factories for the year 2011 (P)

Full Time MO	Retainership or part-time MO	Factories having Ambulance Van	Factories having Ambulance Rooms
2286	5178	2220	2701

Manufacturing Industries – Factories

- ▶ Act is administered by DGFASLI, MoLE and enforced by the State Governments
- ▶ Annual CIF/DOF/DOFB conference is organized by DGFASLI/MoLE

Hazardous Process"

- ▶ 2(cb) "hazardous process" means any process or activity in relation to an industry specified in the [First Schedule](#) where, unless special care is taken, raw materials used therein or the intermediate or finished products, by-products, wastes or effluents thereof would-
 - (i) cause material impairment to the health of the persons engaged in or connected therewith, or
 - (ii) result in the pollution of the general environment:

List of Industries involving hazardous processes – The First Schedule [Section 2(cb)]

- ▶ Manufacture, handling and processing of asbestos and its products

THE THIRD SCHEDULE (Section 89 & 90) The List of Notifiable Diseases

- ▶ Asbestosis
- ▶ Occupational cancer.

Legal Safeguards

- ▶ Section 7A. General duties of the Occupier
- ▶ Section 7B. General duties of manufacturers, etc., as regards articles and substances for use in factories.
- ▶ Section-14 Dust and fume
- ▶ Section 41A Constitution Of Site Appraisal Committee
- ▶ Section 41 B Compulsory Disclosure Of Information – Health records
- ▶ Section 41 C Specific Responsibility Of The Occupier – Health Records or Medical Records; Medical Examination – Pre and periodical Post Examination; Competent Supervisor
- ▶ Section 41 H Right Of Workers To Warn Against Imminent Danger
- ▶ Provision, supply and Use of PPE

The Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Central Rules , 1998 and State Rules.

- ▶ [Schedule II](#)

Notifiable Occupational Diseases (Rule 230)

- ▶ Occupational Cancer
- ▶ Asbestosis

Ship Breaking

- ▶ The ship-breaking operations are covered under the provisions of the Factories Act, 1948 and the state factories Rules framed there-under.
- ▶ In addition, considering the hazardous nature of operations and health hazards associated with these operations, the Government of Gujarat has notified a separate schedule under Section 41 of the Factories Act, 1948.
- ▶ The Government of India have also taken special policy level measures as well as promotional activities for ensuring safety, health and welfare of workers employed in ship-breaking operations.

**Supreme Court of India
Consumer Education & Research ... vs Union Of India
& Others on 27 January, 1995**

Equivalent citations: 1995 AIR 922, 1995 SCC (3) 42

- ▶ (d) To direct the authorities to appoint a committee of experts to determine the standard of permissible exposure limit value of 2 fibre/cc and to reduce to 1-fibre/cc for Chrysotile type of asbestos, 0.5-fibre/cc for Amosite type of asbestos and for the time being 0.2-fibre/cc for Crocidolite type of asbestos at par with the international standards;
- ▶ It would appear from the record that in Karnataka, Andhra Pradesh and Rajasthan, there exists about thirty mines and the workmen employed therein are about 1061. There are about 74 asbestos industries in nine States, namely, Haryana, Delhi, Andhra Pradesh, Karnataka, Rajasthan, Maharashtra, Kerala, Gujarat and Madhya Pradesh. It would also appear that as on August 1986 there are about 11,000 workmen employed in those industries.

The Directions are....

- ▶ (1) To maintain and keep maintaining the health record of every worker up to a minimum period of 40 years from the beginning of the employment or 15 years after retirement or cessation of the employment whichever is later;
- ▶ (2) The Membrane Filter test, to detect asbestos fibre should be adopted by all the factories or establishments at par with the Metalliferous Mines Regulations, 1961; and Vienna Convention and Rules issued thereunder;

The Directions are....

- ▶ (3) All the factories whether covered by the Employees State Insurance Act or Workmen's Compensation Act or otherwise are directed to compulsorily insure health coverage to every worker;
- ▶ (4) The Union and all the State Governments are directed to consider inclusion of such of those small scale factory or factories or industries to protect health hazards of the worker engaged in the manufacture of asbestos

Thank you
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Step-by-step guidance for calculating AAMR

Department of Environmental Epidemiology, University of Occupational and Environmental Health, Japan

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AAI-7@Jakarta, Indonesia

29 Sep – 1 Oct, 2014

Contents

- How to **DOWNLOAD** and **COMPILE** the necessary data
 - Mortality Database
 - Population Database
- How to calculate the AAMR

2

Exercise for today is: Calculation of AAMR of Mesothelioma in Japan, 2000-2011

Necessary data:

- Data on Mesothelioma death in Japan during 2000-2011 (by age group)
- Population of Japan during 2000-2011 (by age group)

Software:

- Microsoft Excel

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How to DOWNLOAD the necessary data

Mortality Database

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How to download the necessary data: Mortality database

- Available (downloadable) from WHO website:

http://www.who.int/healthinfo/statistics/mortality_rawdata/en/

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How to download the necessary data: Mortality database

- Available (downloadable) from WHO website:

http://www.who.int/healthinfo/statistics/mortality_rawdata/en/index.html

(Last updated: 25 Feb 2014)

- Documentation
 - Contains a Word file with information on the WHO Mortality Database, file specifications and list of causes of death. Last updated: 25 February 2014.
- Availability
 - zip, 175kb
 - Contains an Excel file with the list of countries-years available for the mortality and population data. Last updated: 25 February 2014.
- Country codes
 - zip, 2kb
 - Country codes and names. Last updated: 09 July 2012.
- Notes
 - zip, 0kb
 - Notes pertaining to data for some countries-years. Last updated: 09 July 2012.
- Population and live births
 - zip, 529kb
 - Reference populations and live births (for regular users, figures are now in units). Last updated: 25 February 2014.
- Mortality: ICD-7
 - zip, 4.88Mb
 - Data file containing the detailed mortality data for the seventh revision of the ICD (International Classification of Diseases). Last updated: 18 February 2004.
- Mortality: ICD-8
 - zip, 5.43Mb
 - Data file containing the detailed mortality data for the eighth revision of the ICD (International Classification of Diseases). Last updated: 09 July 2012.
- Mortality: ICD-9
 - zip, 13.45Mb
 - Data file containing the detailed mortality data for the ninth revision of the ICD (International Classification of Diseases). Last updated: 25 February 2014.
- Mortality: ICD-10
 - zip, 13.45Mb
 - Data file containing the detailed mortality data for the tenth revision of the ICD (International Classification of Diseases). Last updated: 25 February 2014.

Click here

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- How to DOWNLOAD the necessary data

- Mortality Database
- Population Database

- How to COMPILE data

- Mortality Database
- Population Database

- How to calculate AAMR

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How to COMPILE data

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To COMPILE data

- Mortality Database
 - Combine data using same format of age-group.
 - Combine number of deaths for different anatomical sites and sexes in the same reported year.
- Population Database
 - Combine data using same format of age-group and combine both sexes.

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How to COMPILE the necessary data: Mortality database

Year	Cause	Sex	Death1	D2	D6	D21	D25
2000	C450	1	367	0	...	0	...
2000	C450	2	89	0	...	0	...
2000	C451	1	30	0	...	0	...
2000	C451	2	24	0	...	0	...
2000	C452	1	3	0	...	0	...
2000	C452	2	1	0	...	0	...
2000	C457	1	4	0	...	0	...
2000	C457	2	11	0	...	0	...
2000	C459	1	126	0	...	0	...
2000	C459	2	55	0	...	0	...

Combine anatomical sites and sexes
 Combine sexes
 Death 0-4
 Death 75+
 Combine age-groups into one, respectively

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How to COMPILE the necessary data: Mortality database

Mesothelioma Mortality Data of Japan (2000-2011)

Year	Deaths 0-4	Deaths 5-9	Deaths 10-14	...	Deaths 70-74	Deaths 75+	Unspecified	Deaths Total
2000	0	0	0	...	129	241	0	710
2001	0	0	0	...	115	265	0	772
2002	0	0	0	...	120	298	0	810
2003	0	0	0	...	131	327	0	878
2004	0	1	0	...	165	354	0	953
2005	0	0	0	...	153	359	0	911
2006	0	0	0	...	170	421	0	1050
2007	0	0	0	...	154	448	0	1068
2008	0	0	0	...	188	467	0	1170
2009	0	0	0	...	208	493	0	1156
2010	0	1	0	...	200	528	0	1209
2011	0	0	0	...	219	583	0	1258

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(C45, Both sex, 2000-2011)

How to COMPILE the necessary data: Population database

Year	Sex	Pop1	Pop2	...	Pop6	...	Pop21	...	Pop25
2000	1	61,488,005	596,408	...	602,842	...	1,621,115	...	...
2000	2	64,124,628	566,458	...	573,560	...	2,518,452	...	...
2001	1	61,595,000	599,000	...	604,000	...	1,776,000	...	...
2001	2	64,313,000	567,000	...	577,000	...	2,638,000	...	...
2002	1	61,591,000	594,000	...	608,000	...	1,921,000	...	...
2002	2	64,417,000	563,000	...	579,000	...	2,735,000	...	...
...
...
2011	1	61,453,000	544,000	...	543,000	...	2,670,000	...	65,000
2011	2	64,727,000	516,000	...	517,000	...	3,452,000	...	298,000

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Combine sexes
 Pop 0-4
 Pop 75+
 Combine age-groups into one, respectively

How to COMPILE the necessary data: Population database

Population Data of Japan (2000-2011)

Year	Pop 0-4	Pop 5-9	Pop 10-14	...	Pop 70-74	Pop 75+	Unspecified
2000	5,859,973	5,984,829	6,507,152	...	5,889,998	8,979,838	0
2001	5,844,000	5,952,000	6,333,000	...	6,039,000	9,499,000	0
2002	5,819,000	5,935,000	6,197,000	...	6,190,000	10,008,000	0
2003	5,743,000	5,936,000	6,073,000	...	6,338,000	10,511,000	0
2004	5,680,000	5,889,000	6,015,000	...	6,444,000	11,033,000	0
2005	5,547,395	5,899,562	5,990,607	...	6,634,850	11,596,534	0
2006	5,449,000	5,872,000	5,961,000	...	6,786,000	12,120,000	0
2007	5,380,000	5,823,000	5,936,000	...	6,893,000	12,657,000	0
2008	5,347,000	5,736,000	5,935,000	...	6,927,000	13,172,000	0
2009	5,323,000	5,639,000	5,902,000	...	6,879,000	13,662,000	0
2010	5,254,461	5,550,007	5,884,275	...	6,987,391	14,149,539	0
2011	5,256,000	5,446,000	5,865,000	...	7,151,000	14,662,000	0

(Population, Both sex, 2000-2011)

• How to DOWNLOAD the necessary data

- Mortality Database
- Population Database

• How to COMPILE data

- Mortality Database
- Population Database

• How to calculate AAMR

How to calculate AAMR

Calculation of AAMR (per million person) due to Mesothelioma in Japan, 2000

1. Calculate the Age-specific mortality rate
2. Adjust with standard population

Age group	Death	Pop
0-4	0	5,859,973
5-9	0	5,984,829
10-14	0	6,507,152
...
65-69	100	7,091,585
70-74	129	5,889,998
75+	241	8,979,838

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16-18 October, 2013

How to calculate AAMR

Calculation of AAMR (per million person) due to Mesothelioma in Japan, 2000

1. Calculate the ASMR

Age group	Death	Pop		Age specific crude mortality rate
0-4	0	5,859,973		0
5-9	0	5,984,829		0
10-14	0	6,507,152	\div	0
...	\times	...
65-69	100	7,091,585	\div	14.101
70-74	129	5,889,998	\div	21.902
75+	241	8,979,838	\div	26.838

$$\text{Age specific crude rate} = \frac{\text{Number of deaths at age group}}{\text{Population at age group}} \times 1,000,000$$

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How to calculate AAMR

Standard population

Age Group	Doll et al. World Standard (World 1966)	Scandinavian ("European") standard	WHO World Standard* (World 2000)
0-4	12.00	8.00	8.86
5-9	10.00	7.00	8.69
10-14	9.00	7.00	8.5
15-19	9.00	7.00	8.47
20-24	8.00	7.00	8.22
25-29	8.00	7.00	7.93
30-34	6.00	7.00	7.61
35-39	6.00	7.00	7.15
40-44	6.00	7.00	6.59
45-49	6.00	7.00	6.04
50-54	5.00	7.00	5.37
55-59	4.00	6.00	4.55
60-64	4.00	5.00	3.72
65-69	3.00	4.00	2.96
70-74	2.00	3.00	2.21
75-79	1.00	2.00	1.52
80-84	0.50	1.00	0.91
85+	0.50	1.00	0.63
All Ages	100.00	100.00	100.00

* For purposes of comparison, the WHO Standard age group 85+ is an aggregate of the age groups 85-89, 90-94, 95-99

Source: Age Standardization of Rates: A New WHO Standard, GPE Discussion Paper Series: No. 31, EIG/GPE/EBD, World Health Organization.

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How to calculate AAMR

Calculation of AAMR (per million person) due to Mesothelioma in Japan, 2000

2. Adjust with standard population

Age group	Death	Pop		ASMR		Age distribution of SP	AAMR
0-4	0	5,859,973		0		0.0886	0
5-9	0	5,984,829		0		0.0869	0
10-14	0	6,507,152	\div	0	\times	0.086	0
...	...	...	$\times 10^6$...			
65-69	100	7,091,585	\div	14.101		0.0296	0.417
70-74	129	5,889,998	\div	21.902		0.0221	0.484
75+	241	8,979,838	\div	26.838		0.0306	0.813

AAMR in year 2000 = Sum of AAMR of each age group

Apply same method for each year from 2001 to 2011

3.016

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Finding

AAMR of Mesothelioma in Japan during 2000-2011

25

WHO-Europe Workshop@Bonn, Germany

16-18 October, 2013

AAMR of Mesothelioma in Japan during 2000-2011 (per million persons/year)

The number of the report years	12
Number of deaths	11,945
AAMR (by year)	
2000	3.016
2001	3.223
2002	3.265
2003	3.453
2004	3.617
2005	3.362
2006	3.763
2007	3.724
2008	3.974
2009	3.806
2010	3.854
2011	3.858

AAMR for Mesothelioma, 2000-2010, Japan (Per million persons/year) **3.576131**

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AAI-7@Jakarta, Indonesia

29 Sep – 1 Oct, 2014

THANK YOU FOR YOUR ATTENTION

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AAI-7@Jakarta, Indonesia

29 Sep – 1 Oct, 2014

UOEH, Japan

Role of Weight in Means

$$\bar{x} = \frac{w_1x_1 + w_2x_2 + \cdots + w_nx_n}{w_1 + w_2 + \cdots + w_n}, \quad \bar{x} = \frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i}$$

Class of **20** during A.M. avg. = 80 ∴ But overall avg.
 Class of **30** during P.M. avg. = 90 is **not** 85!

$$\bar{x} = \frac{4300\%}{50} = 86\% \quad \bar{x} = \frac{(20)80\% + (30)90\%}{20 + 30} = 86\%$$

↑
Weighted Mean (Average) is used

1

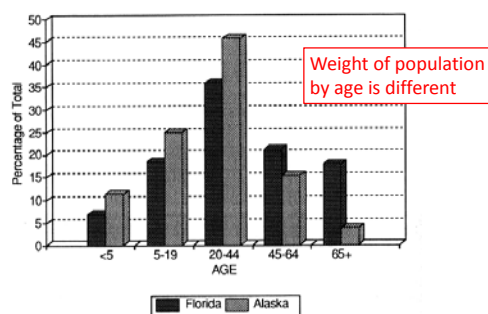
Crude mortality rates in Florida and Alaska

	FLORIDA	ALASKA
Number of deaths	131,000	2,064
Total population	12,335,000	524,000
Crude Mortality Rate	1062.4 deaths per 100,000 population	393.9 deaths per 100,000 population

Lilienfeld, Stolley. Foundations of Epidemiology, 3rd Ed.

2

Percentage distribution of age groups in the Florida and Alaska populations



Lilienfeld, Stolley. Foundations of Epidemiology, 3rd Ed.

Age-adjusted mortality rates for Florida and Alaska, 1998, calculated by direct method

Give same weight of population by age

AGE GROUPS	AGE-SPECIFIC DEATH RATES/100,000		U.S. POP. (MILLIONS)	EXPECTED NUMBER OF DEATHS	
	FLORIDA	ALASKA		FLORIDA	ALASKA
<5	284	274	18.3	52,000	50,000
5-19	57	65	52.9	30,000	34,000
20-44	198	188	98.1	194,000	184,000
45-64	815	629	46.0	375,000	289,000
>65	4425	4350	30.4	1,345,000	1,322,000
Total			245.7	1,996,000	1,879,000

$$\text{Expected death rate} = \frac{\text{Total expected deaths}}{\text{Total in standard population}} \times 100,000$$

$$\text{Expected death rate, Florida} = \frac{1,996,000}{245,800,000} \times 100,000 = 812.0$$

$$\text{Expected death rate, Alaska} = \frac{1,879,000}{245,800,000} \times 100,000 = 764.4$$

Age Standardization

Direct vs. Indirect Method

Direct method

- apply the rate of the target population to the standard population
- to obtain the expected number in the standard population

Indirect method

- apply the rate of the standard population to the target population
- to obtain the expected number in the target population

Calculations of Standardized Mortality Ratio (SMRs) for Florida and Alaska

AGE GROUPS	U.S. DEATH RATES*	POPULATION (MILLIONS)		EXPECTED DEATHS	
		FLORIDA	ALASKA	FLORIDA	ALASKA
<5	251.1	.85	.06	2,134	151
5-19	47.2	2.28	.13	1,076	61
20-44	161.8	4.41	.24	7,135	388
45-64	841.9	2.60	.08	21,859	674
>65	5,104.8	2.20	.02	112,305	1,021
Total expected				144,539	2,295
Total observed (from Table 4-2)				131,044	2,064
SMR (ratio of observed to expected multiplied by 100)				91	90

*Per 100,000 population

Crude mortality rates and age-adjusted mortality rates in Florida and Alaska

	FLORIDA	ALASKA
Crude Mortality Rate (per 100,000 population)	1,062.4	393.9
Age-adjusted mortality rate (direct method)	812.0	764.0
Standardized Mortality Ratio, SMR (indirect method)	91	90

Lilienfeld, Stolley. Foundations of Epidemiology, 3rd Ed.

7

Valid methods to compare rates of populations

- You can compare crude rates by age-groups
 - Problem is “many comparisons required”
- Compare age-adjusted rates
 - Either direct or indirect method is OK
 - Only one comparison required

8

Key Concepts in Epidemiology

- 1) Counting Numbers
- 2) Making Comparisons
- 3) Concerning health-status, diseases and their presumed causes (or exposure)
- 4) Either to describe
- 5) Or analyze

How

What

Why

A basic tool for objectively evaluating health-related issues, but the underlying principle of which is based on common sense

9

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Crude mortality rates in Florida and Alaska in 1988

	FLORIDA	ALASKA
Number of deaths	131,044	2,064
Total population	12,335,000	524,000
Crude (or overall) mortality rates	1062.4 deaths per 100,000	393.9 deaths per 100,000

Lilienfeld, Stolley. Foundations of Epidemiology, 3rd Ed.

FloridaとAlaskaの粗死亡率と年齢調整死亡率

	FLORIDA	ALASKA
粗死亡率(人口10万人当たり)	1,062.4	393.9
年齢調整死亡率(人口10万人当たり)	812.0	764.0
標準化死亡比(SMR)	91	90

EPIDEMIOLOGY is much about...

1. Counting numbers in a valid manner (but “easily said than done”)
2. Characterize group by calculating means
3. Discussion can be advanced by weighted mean

“Mean” → It's the Population Perspective

“Weighted Mean” → Differentiate Sample from Population

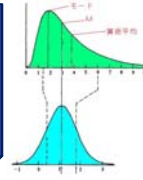
13

Simple Mean vs. Distribution

- Journal Impact Factor (IF for short) is defined as the average number of citations received per paper published in that journal during the two preceding years
- From a statistical (epidemiologic) perspective...

-----<ISI Journals, 2011>-----

Top 5 Ranked	Imp Fact
1. CA-Cancer J Clin	101.8
2. New Engl J Med	53.3
3. Lancet	38.3
4. Nature	36.3
5. Science	31.2



In a skewed distribution, arithmetic mean is not **xx**.

In a normal distribution, arithmetic mean is **xx**.

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UOEH, Japan

Inter-Agency WS and AAI-7
Jakarta, Indonesia
Sep-Oct, 2014

Asian Asbestos Initiative *Perspectives and Future*

Ken Takahashi MD, PhD, MPH
Professor of Environmental Epidemiology
Director of WHO-CC for Occupational Health
University of Occupational & Environmental Health, Japan

Global Master Plan (GMP) 2012-2017

Priority	Product	Key activities
Priority 1: Regional and national occupational and environmental health and safety management systems	WHO Regional Product 1.1: Occupational cancer prevention programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 1.2: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 1.3: Asbestos management programme for the WHO Region of the Eastern Mediterranean	WHO Regional Product 1.1: Occupational cancer prevention programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 1.2: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 1.3: Asbestos management programme for the WHO Region of the Eastern Mediterranean
Priority 2: National occupational and environmental health and safety management systems	WHO Regional Product 2.1: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 2.2: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 2.3: Asbestos management programme for the WHO Region of the Eastern Mediterranean	WHO Regional Product 2.1: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 2.2: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 2.3: Asbestos management programme for the WHO Region of the Eastern Mediterranean
Priority 3: Occupational and environmental health and safety management systems	WHO Regional Product 3.1: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 3.2: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 3.3: Asbestos management programme for the WHO Region of the Eastern Mediterranean	WHO Regional Product 3.1: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 3.2: Asbestos management programme for the WHO Region of the Eastern Mediterranean WHO Regional Product 3.3: Asbestos management programme for the WHO Region of the Eastern Mediterranean

SEA/WPR Regional Product 1.3 Asian asbestos initiative

What is AAI?



"The Asian Asbestos Initiative (AAI) is the international collaborative effort aimed at the prevention & elimination of ARDs with primary focus on Asian countries but aspiring to provide model for the world"

Designated by the WHO as a Regional Product of Asia within the GMP Framework for implementing the Global Plan of Action (GPA) on Workers' Health 2012-2017

3

1. Asian Asbestos Initiative
2. Prevention and Elimination of ARDs
3. Focus on Asian Countries

AAI, Its Development

Seminar (Year)	Host / Venue	National Funds	International Organizations
AAI-1 (2008)	Initiated by UOEH	JSPS/UOEH	WHO-WPRO, ILO
AAI-2 (2009)	Co-organized by MPH, Thailand and UOEH	JSPS/UOEH and MPH, Thailand	WHO-SEARO, WHO-WPRO, ILO, WHO-HQ
AAI-3 (2010)	Organized by UOEH	JSPS/UOEH	WHO-WPRO, WHO-SEARO, WHO-HQ, ILO, UNU-IIGH
AAI-4 (2011)	Organized by PNU	MOE, Korea	WHO-WPRO
AAI-5 (2012)	Co-organized by PNU and UOEH	MOE, Korea and JSPS/UOEH	WHO-WPRO, WHO-SEARO, UNU-IIGH
AAI-6 (2013)	Co-organized by Gov of Philippines and UOEH	Gov of Philippines and JSPS/UOEH	WHO-WPRO, WHO-SEARO, WHO-HQ, IARC, ILO, UNU-IIGH

For chronology and photos: <http://envepi.med.uoeh-u.ac.jp/aa/index.html>

5



- ✓ 8 countries
- ✓ 40-50 participants
- ✓ WHO-WPRO, ILO

- ✓ 22 countries, 224 participants
- ✓ WHO (HQ, WPRO, SEARO); ILO; IARC; UNU-IIGH





From Concept Note of 6th AAI International Seminar...

“Evidence continues to show that national burdens of ARD are directly proportional to national consumption of asbestos.”



“The most efficient way to eliminate ARD is to stop using all types of asbestos.”

Key message of WHO, 2006 Statement on Elimination of ARD

Outputs of AAI



Toolkit commissioned for ARD Elimination (UNEP-RCS)

Support to pillar activity on ARDs in Vietnam OSH Project

New grant application to JSPS

+ 30 scientific papers since inception of AAI

AAI, Its Characteristics

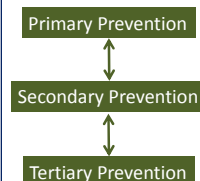
1. Respect and adhere to universally agreed principles/documents
2. Supported by and coordinated with international (UN) organizations
3. Voluntary effort and autonomy
4. Synergy by networking across countries, affiliation and expertise

Universally agreed principles/documents ...

- **Elimination of ARD (WHO, 2006)**
 - WHO Factsheet N 343 of July 2010
 - “1/3 of all occup ca.; stop using”
- Outline for Development of NPEAD (ILO/WHO, 2007)
- IARC Monograph Volume 100C (2012)
- ILO Factsheet of June 2012
 - ILO Convention 162 (1986), 139 (1974), Resolution concerning asbestos (2006)
- **Global Master Plan** for Workers' Health 2012-2017 (Sep, 2013)

(Q) Elimination or Prevention?

- **Prevent *future* burden**
*More relevant in **developing C** > developed C*
 - Stop using all asbestos
 - Industrial hygiene during transition to ban
 - Early detection
- **Respond to *present* burden**
*More relevant in **developed C** > developing C*
 - Improve recognition, diagnosis, treatment and compensation



(A) Elimination requires all three levels of prevention & focus on present and future burden

Why Asia? (Advanced by Driscoll *et al*, 2005)

- Of **43,000** estimated global mesothelioma cases annually,
 - WPRO: 16,300 cases (38%)
 - SEARO: 11,300 cases (26%)
 - Combined: 27,400 cases (**64%**)
- Similar breakdown for 564,000 DALYs for global mesothelioma

Why Asia? (Advanced by Takahashi K *et al*)

Asia (together with NIS countries) became global center of asbestos use	Asia has quintupled asbestos use vs. 1920-1970 to claim 64% of global use (<i>Occup Med</i> , 2008)
Currently, a substantial burden of ARD is missed in Asia	We estimate China, India and Thailand already missed 5,100, 2,200 and 550 mesothelioma cases (<i>EHP</i> , 2011)
Asia reports 13% of world's mesothelioma (<i>Bull WHO</i> , 2011)	Asian developing countries lack necessary resources to diagnose & report ARD (<i>Cancer Sci</i> , 2012)
Future prospects	Marked increase in use since 1970 likely to trigger a surge of ARD (<i>Respirology</i> , 2011)

Why Asia Continues to Use **CHR** Asbestos *vis-à-vis* West Discontinued

1. “**Public Health** Argument” has been unable to win over “**Economic** Argument” [Asbestos]
 - In middle of high economic growth
 - Own burden not fully evident (latency & technology)
 - Failure to learn from others' lessons
2. “**Relative Potency** Argument” used to justify “**Controlled Use**” [CHR]
 - Lobbied by exporters, used by local industry and believed by national administrators

WHO Recommendation (2006)

- (Q) What is the most important message?
- (A) “The most efficient way to eliminate ARD is to stop using all types of asbestos”
- (Q) Has the message been accepted by countries? (Y/N)
- (A) Of 55 banned countries, **8** banned ASB since 2006

Stop using asbestos ➡ Eliminate ARD

- Statement is undoubtedly **true**
- Whether the scenario **works** (in dependent countries) may be a different story

Arguments that are **true** but **failing**

- ASB(CHR) is a proven carcinogen
- Many developed countries banned ASB(CHR)
- UN organizations recommend to stop using ASB(CHR)
- Burden of disease is directly proportional to prior asbestos use

The Differential Case for Developing Countries vs. Developed Countries

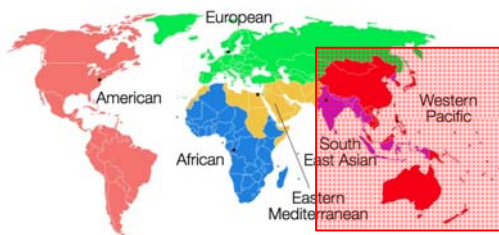
- Developing countries ➡ continue to use ASB(CHR) at substantial levels
- Developed countries ➡ many stopped using ASB(CHR) but preparation is inadequate for a pending ARD increase (epidemic?)

The Differential Case

Possible Solutions

- Translational Research of Empirical Knowledge
 - ASB(CHR) cannot be used safely
 - Developed countries forced to ban ASB(CHR) ... *insufficient*
 - Model to *break* societal dependence on ASB(CHR)
 - Roadmap to ban
 - Theorization and integration (of variable national experiences)
- Production of Scientific Knowledge (to directly contribute to ARD elimination)
 - Treatment modalities
 - Secondary prevention (early and effective detection: biomarkers, low-dose CT)

The six regions of the World Health Organisation



from Regional (AAI) *to* **Global** (GAI)

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To conclude,

- “Full-scale international cooperation ...needed, with industrialized countries sharing their experiences and technologies to enable industrializing countries to make smooth transitions to banned states”
- “The AAI aspires to provide a model that will pave the way for the ultimate elimination of ARDs *worldwide*.”

Park, Takahashi *et al.* Cancer Sci, 2012

**Inter-Agency Workshop on the Sound Management of Industrial Chemicals,
with Special Emphasis on Asbestos, for the Asia-Pacific Region
in collaboration with the 7th International Seminar of
the Asian Asbestos Initiative (AAI-7)**

**Jakarta, Indonesia,
29 September-1 October 2014**

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