



ROTTERDAM
CONVENTION



BASEL
CONVENTION



INTERNATIONAL
LABOUR
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WORLD HEALTH
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UNITED
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PROGRAMME

Inter-Agency Awareness-raising Workshop on the Sound Management of Industrial Chemicals, with Special Emphasis on Asbestos, for the Asia-Pacific Region, namely, *China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam.*

**UNESCAP
Bangkok, Thailand
31 August to 3 September 2010**



THE ROTTERDAM CONVENTION
ON THE PRIOR INFORMED CONSENT PROCEDURE
FOR CERTAIN HAZARDOUS CHEMICALS AND PESTICIDES
IN INTERNATIONAL TRADE

SECRETARIAT OF THE ROTTERDAM CONVENTION

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Introduction

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade establishes an international mechanism for regulating trade in the pesticides and industrial chemicals that are listed in its Annex III. The Convention conditions the movement of those chemicals on the prior informed consent of the parties over whose territories they are to be shipped. It also permits parties to refuse or limit the movement of Annex III chemicals over their territories, through a document known as an “import response”. A “decision guidance document” is prepared for each chemical to guide the parties in deciding whether to allow its movement over their territories.

The Convention covers chemicals that have been banned or severely restricted for health or environmental reasons by parties to the Convention. Of the 40 chemicals already listed in Annex III, 11 are industrial chemicals.

The core competencies that are required by a Party to properly implement the main actions under the Convention are the ability to assess the risks associated with the proposed importation of the chemicals listed in Annex III of the Convention and the ability to make risk management decisions for those chemicals that are deemed to present risks, especially if the chemicals are allowed to be imported for use by the Party (i.e., paragraph 2 of Article 10 of the Convention), in order to achieve safe international trade in these chemicals.

The entry into force of the Convention in 2004 and the progressive inclusion of industrial chemicals in its Annex III notwithstanding, the absence or insufficiency of regulatory programmes for industrial chemicals in many developing countries translates into a lack of tools for effectively protecting human health and the environment from the potentially harmful effects of industrial chemicals.

Maximizing safety and minimizing the risks posed by industrial chemicals are key to sustainable development for countries and to the success of the chemicals industry worldwide. While pesticides are controlled by many national, regional and international schemes, the regulation of industrial chemicals has lagged behind and developing countries often face limited capacity and knowledge when it comes to assessing and managing the risks that they pose.

Objectives

The overall goal is to provide developing countries in the Asia Pacific region improved capacity to manage industrial chemicals (especially asbestos) at all stages of their lifecycle, contributing to meeting the obligations under the Basel, Rotterdam and Stockholm Conventions and protect human health and the environment from the adverse effects of these chemicals. 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. The project will reach its goals through:

1. Needs assessment - to understand how decisions are made in countries; what tools and approaches are available for Parties to use to manage industrial chemicals; how policy, regulatory and scientific processes support decision-making; the challenges and needs for applying precaution in the context of industrial chemicals management

2. Increased awareness and understanding of the potential impacts of hazardous industrial chemicals (especially asbestos) on the environment, health and well-being and the benefits gained from the sound management of chemicals and product substitution - by targeting decision-makers; thus enhancing national capacity to make decisions that promote the sound management of chemicals
3. Strengthened legal and institutional infrastructure to meet obligations under the Basel, Stockholm and Rotterdam Conventions and foster the sound management of industrial chemicals in general
4. Increased collaboration, among national agencies, the chemical industry, and other stakeholders for environmental sustainability of industrial development activities
5. Availability of guidance and tools to enhance the capacity of key decision makers to set risk management strategies and identify priority interventions to reduce risks to an acceptable level.

Participants, outputs and agenda

Proposed countries for participation:

China, India, Indonesia, Malaysia, 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 -- Designated National Authorities for Rotterdam Convention (DNAs); Ministries of Health; Ministries of Labour/Trade -- for the eight countries will be invited and funded to attend the awareness-raising 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.

Duration of meeting: 3 Days

Output:

-Participants will be made aware of the impacts of industrial chemicals and especially asbestos to human health and the environment.

-Strengthen participant's understanding of how to apply the tools, approaches and processes for risk assessment and management that would support precautionary decision-making in the management of industrial chemicals to protect health and the environment in the implementation of Basel, Stockholm and Rotterdam Conventions, other legally binding MEAs and the SAICM Overarching Policy Strategy (OPS).

The following output is expected for each of the participating countries:

- How to draft elements of a national industrial chemicals management strategy (including asbestos)

Approach:

The consultation could operate through a series of plenary sessions and discussion groups. (Policy makers, Ministry of Health, Ministry of Labour, DNAs.)

Session 1: *Status of industrial chemicals (especially asbestos) management in the region.*

(Presentations to include the status of asbestos in the countries, that is, production, application, import and export, and disposal)

Presentations by participants from; **China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, Vietnam**

Presentations by participants from; **Australia, Japan, Singapore and South Korea**

(Examples of legal and institutional frameworks for the sound management of industrial chemicals (including asbestos))

Session 2: *The environmental and health impacts of industrial chemicals especially asbestos*

Presentation by international experts from WHO, UNEP Chemicals, individual specialist in other chemicals and asbestos, etc..

Session 3: *Principles and elements for a national chemicals policy in the context of industrial chemicals*

Expert presentations on:

1. Risk assessment and management (*factors that need to be considered in risk management*);
2. WHO Toolkit for chemical risk assessment
3. Legislative requirements for sound management of industrial chemicals and implementation of Rotterdam, Stockholm and Basel Conventions and other international instruments; (GHS, major components of legislation on chemicals)

There is a range of tools and approaches for making decisions in the management of chemicals in general. Some of the most widely mentioned tools for applying precaution include:

- Issuance of regulations to restrict an activity – such as transport of hazardous materials, waste controls, and import restrictions;
- Development of labeling and safety data sheets including implementation of the Globally Harmonized System of Classification and Labeling;
- Industrial Chemicals (non pesticides) registration processes;
- Application of safety factors and consideration of worst case impacts, particularly on vulnerable populations;
- Restrictions/bans on chemical use (and, in some cases, on structurally similar chemicals) and marketing including planning for chemical substitution and alternatives;
- Placing the onus on manufacturers and traders to provide safety data;
- Chemical monitoring and research on chemical effects;
- Environmental impact assessments;
- Consultations with government multi-stakeholder advisory panels and with international agencies and other countries;
- Chemical modeling and prediction used in risk assessment as well as development of guidance documents; and
- Outreach to industry on chemicals of concern.
- Polluter pays principle

Session 4: *Needs Assessment*

- What are the most important needs for more effective application of precaution (or making decisions in the face of uncertainty) and overcoming barriers in industrial chemicals management decision-making?
- Data on chemical toxicity/risks?
- Tools for prioritization?
- Tools for risk assessment?
- Decision-making tools/frameworks?
- Technical assistance in risk assessment processes?
- Technical assistance in risk management processes?
- Financial support for implementation?
- Information sharing to facilitate understanding of the issues
- Precautionary principle for addressing uncertainty

Agenda and timetable



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Inter-Agency Awareness-raising Workshop on the Sound Management of Industrial Chemicals, with Special Emphasis on Asbestos, for the Asia-Pacific Region Bangkok, Thailand, 31 August -3 September 2010

Time	Activity	Presenter
Tuesday 31 August		
Session 1:	Opening and introduction	Chair: Thailand
Morning	Registration of participants	
08:30-10:15	Opening Remarks – Representative of the Government of Thailand	
	Opening Remarks –Secretariat for the Rotterdam Convention/Basel convention	<i>Donald Cooper- Executive Secretary of the Rotterdam Convention Secretariat</i>
	Opening remarks – Regional Director (Regional Director and Representative of UNEP/ROAP)	<i>-Mr. Young-Woo Park</i>
	Opening Remarks – Representative of the World Health Organization	
	Opening Remarks – Representative of the International Labour Organization	<i>Mr Bill Salter, Director of the ILO Decent Work Team for East and South- East Asia and the Pacific</i>
10:15 - 10:30	Break	
Session 2	Status of industrial chemicals (especially asbestos) management in the region	
10:30-12:00	Scope, purpose and structure of the meeting	<i>Rotterdam Secretariat: A. Mangwiro</i>
	The carcinogenicity of asbestos with a special focus on chrysotile asbestos	<i>Dr Kurt Straif - WHO International Agency for Research</i>

	<ul style="list-style-type: none"> Presentations to include the status of asbestos in the countries, that is, production, application, import and export, and disposal (also challenges encountered) 	<i>on Cancer China, India, Indonesia, Malaysia</i>
12:30-13:30	Lunch	Chair: Vietnam
Afternoon 13:30-17:30	<ul style="list-style-type: none"> Presentations to include the status of asbestos in the countries, that is, production, application, import and export, and disposal (also challenges encountered) 	Philippines, Sri Lanka, Thailand, Malaysia
	Coffee Break	
	Common list of key questions and challenges identified by countries in country reports: Secretariat to present the compilation of key questions and challenges raised Plenary discussion	<i>Secretariat</i>
18:00	COCKTAIL RECEPTION	
	Wednesday 1 September	Chair: Sri Lanka
Session 3	International instruments for sound management of asbestos	
Morning 08:30-10:15	Asbestos and international environmental conventions - Basel and Rotterdam - requirements and good practice in implementation ILO action towards the elimination of asbestos-related diseases	<i>Rotterdam and Basel Secretariats Dr Igor Fedotov, ILO Geneva</i>
10:15 - 10:30	Break	
10:30-12:00	Promoting good practices to eliminate the use of asbestos in Asia WHO recommendations and regional initiatives for elimination of asbestos-related diseases Discussion on the roles of environment, health and labour sectors	<i>Dr. Yoshi, Kawakami, ILO Bangkok Salma Burton and Hisashi Ogawa</i>
12:30-13:30	Lunch	Chair: Philippines
	Developed country experiences	
Afternoon 13:30-17:30	Developed country experiences on the legal and institutional frameworks and mechanisms necessary for the sound management of industrial chemicals, especially, asbestos	<i>Japan, Singapore, Republic of Korea</i>
	Coffee Break	
	The economics of asbestos	<i>Prof. Syed Aljunid</i>
	Strategies for sound management of asbestos	
	Moderated discussion	<i>Barry Revile - Australia</i>
	Thursday 2 September	Chair:

		Malaysia
Morning 08:30-10:15	Development of national programmes for elimination of asbestos-related diseases	<i>Ivan D. Ivanov (WHO) and Igor Fedotov (ILO)</i>
	Discussion	
10:15 - 10:30	Coffee Break	
10:30-12:00	Conclusions/Recommendations of the meeting	<i>Donald Cooper – Executive Secretary Rotterdam Convention Secretariat</i>
12:00-13:30	Lunch	

Compilation of challenges and key questions from Country Presentations

China

- Vast amounts of application of chemicals: *new toxic chemicals invented everyday*;
- Weak enforcement of chemicals management laws: *employers escape their responsibilities*;
- Large numbers of small and medium-sized chemical enterprises with poor working condition: *lack of safe working condition – little or no training for the workers*;

India

- Implementation of laws;
- Inefficient awareness programmes;
- Lack of Safety Measures;
- Use of alternatives and how to encourage substitution;
- How to phase out with the intention of banning;

Indonesia

- Asbestos fibers endanger the health of workers directly and indirectly in the production process of asbestos-containing materials;
- Chrysotile asbestos is still allowed to use, but requires very high and efficient management systems;
- The monitoring and supervision of asbestos workers to prevent adverse health effects;
- The continuous development of safe and responsible ways of using chrysotile asbestos and other hazardous substances;

Malaysia

- Studies involving 124 workers and visits to 16 factories that process asbestos and related products revealed the following;

- Spirometer Test (Lung Function Test) – Results showed 2% severe, 42% normal, 12% moderate and 44% mild;
- Analysis of workplace asbestos monitoring records – below PEL;
- Survey on probability of asbestosis symptoms – 54.8% having a symptoms of exposure of asbestos;

Dialogue on Asbestos with Industries on October 2009

- Roofing Manufacturers –requested for 5 years extension. Agreed on banning asbestos by 2015.
- Ban all imported asbestos;
- Brake pad manufacturers – showed a willingness to stop using asbestos immediately and switch over alternative materials- such as, aramid fibres;
- Full cooperation from DOSH, KASTAM(CUSTOM), SIRIM, MIDA and MITI regarding the phasing out and total ban on asbestos, tentatively, by 2015;

Proposal for Prohibition

- Discussions currently ongoing on “Proposal for Prohibition of Use of Asbestos” among all related stakeholders, namely, Government, Industry, Public, Consumers, Academia, Professionals, etc;
- Current agreement is to maintain the existing controlled use regime in its present form, while setting an appropriate time frame for review, say, once every 5,7 or 10 years;
- Considering the now established risks of all asbestos types, they should be the least preferred options;
 - **Outright ban 1:** Prohibit all forms of asbestos-both amphibole and serpentine types-immediately; If this is decided upon, it may be feasible in principle, but could encounter implementation problems related to costs, convenience and practicability;
 - **Outright ban 2:** Prohibit all amphibole forms of asbestos immediately; and prohibit chrysotile with a gradual and staggered phase-out time frame for different industries, products or uses; If this is decided upon, this option may be the best, most flexible and least disruptive of all;
 - **Third way solution:** Prohibit all forms of amphibole asbestos immediately; but Keep chrysotile as a controlled-use option, while setting an appropriate time frame for review, say, once every 5,7 or 10 years; This option could work if a ‘somewhere-in-between’ alternative is sought and accepted;

Philippines

- Cancer is the third leading cause of morbidity and mortality in the Philippines;
- Leading cancer sites/types are lung, breast, cervix, liver, colon and rectum, prostate, stomach, oral cavity, ovary and leukemia

Challenges

- Chemical Management at the Workplaces;
- Medical Surveillance of occupationally exposed workers;
- Waste Management of Asbestos and related products;
- Negative Economic Impact of Chrysotile asbestos ban;

- Alternatives for use as friction materials;

Pending Bills banning asbestos

- HB 3079 by Reps. Narciso Santiago and Marcelino Teodoro (Nov 2007), “An Act Banning the Importation, Manufacture, Processing or Distribution in Commerce of Asbestos Containing Products”;
- SB 741 by Sen. Miriam Defensor Santiago (2007), supporting HB 3079
- HB 5931 by Rep. Risa Hontiveros (Feb 2009), Expands the coverage to include asbestos containing materials; widens research components; limits exemptions to the military uses; and massive public education and safety campaigns on asbestos;

Sri Lanka

- No Asbestos mines in Sri Lanka, so 100% importation of asbestos products from different countries;
- In Sri Lanka there are 3 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, construction, demolition and disposal, are not satisfactory at all;
- Pure asbestos had been used as thermal insulation material for industrial applications; and some low quality automobile components such as brake shoes, brake pads & clutch plates;

Occupational Exposure to Asbestos

- Construction workers both in formal & informal sectors;
- Carpenters, technical officers and engineers;
- Employees of Asbestos cement manufacturing plants;
- Maintenance workers and fitters that are involved in repairing of machines that have asbestos-containing materials;
- Automobile technicians, vehicle service station personnel;
- Employees in the cleaning services;
- Employees involved in solid waste disposal and management;

Problems related to PCBs in Sri Lanka

- Lack of adequate legislation to control imports;
- Lack of acceptable treatment, disposal and storage systems for PCB-contaminated oils and equipment;
- Contaminated sites yet to be identified
- Cross contamination of Non PCB oil with PCB oil;

Thailand

Only chrysotile is used (crocidolite was banned in 1995 and amosite was banned in 2001, the other 3 amphiboles were banned in 2009).

- Ministry of Public Health is not the main responsible authority;
- There is no systematic health data to convince policy makers and the public regarding impact assessments at national level;
- There is continuous interruption of the decision process by pro-asbestos agencies;

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

- **Taxation:** - Tax relief for substitution from 5% to 1% (*currently not working because it is cheaper to import a finished product than to import separate ingredients*)

- **Consumer protection policy:** - Enforcing the enactment of the legislation on the labeling policy to label a warning sign on asbestos-containing products;

Aims of National Strategic Plan

- To control, reduce, and finally ban the use of asbestos within 5 years (2007-2012);
- To prevent and control asbestos-related diseases;
- Protection of workers and the public;
- Prevention, 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;

Vietnam

- Only less than 20% of asbestos-factories control asbestos dust at workplace;
- Some monitoring of asbestos samples shows figures that are over national standards (30-40%);
- Most of asbestos-factories are privately owned or joint-stock companies, thus, the compliance with the national laws is limited;
- The man-power for taking and analyzing asbestos samples are very limited (only 2 Institutes and Construction Occupational Health Centers);

Health surveillance

- Periodical health checking:
 - Only ~ 50% of factories implemented;
 - Number of workers: ~ 50 – 85%;
- Occupational diseases checking:
 - Chest X-ray:
 - Only 10-12 factories implement;
 - Only 5 – 8% of total exposed workers taking chest X-ray (500 – 700 cases/year);
 - Above number is so small in comparison with total exposed worker

Challenges:

- Technology is out of date;
- Low awareness on asbestos hazards of employers and employees;
- Low state management: Most of factories belong to private and joint-stock companies;
- Weak labour inspectorate;
- Health and environmental surveillance capacity is weak;
- No database on disposal of asbestos

Comments and recommendations

Positive comments from the Evaluation Form:

The evaluation at the end of the workshop revealed that participants thought that this workshop was well arranged and of benefit to all. The organization was also found to be very good. The participants expressed appreciation for the interactive and participatory approach used. One of the major objectives of facilitating national dialogues among the national stakeholders was achieved as participants discussed issues and shared different experiences from their countries. The quality

of presentations was said to be high and interaction between participants was commended. Some of the comments from the forms are stated below:

- This workshop was beneficial in helping us understand the Asian situation with respect to asbestos issues from the different countries;
- Enjoyed the sharing of experiences among countries;
- What was particularly helpful was to hear the experiences from the developed countries in the region (South Korea, Japan and Singapore);
- Liked the interactive sharing of information, knowledge development and lessons learned from other countries;
- It was encouraging to hear the success stories from other countries;
- Organizers had a good roster of experts;
- Multi-stakeholder approach used in getting different Ministries dealing with the asbestos management issue together is very commendable;
- Liked the way countries came up with strategies or draft plans for the elimination of asbestos-related exposures;

Some participants expressed the need for such type of workshops annually, funds permitting. Others thought it would be beneficial if there were a range of related activities, to follow, after this workshop. Most echoed their gratitude to the Japanese Government for funding this project.

Negative comments from the Evaluation Form:

- This forum lacked the information on engineering solutions. Would have liked to see presentations on experiences related to the collection, storage, demolition and disposal of asbestos plus detailed presentation on alternatives.
- The moderated discussion could have been group discussions instead so as to have better interactions in the development of draft work plans for the management of asbestos;

General Workshop Recommendations

1. 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. The continuing use of asbestos, even increase in some countries, is of particular concern in view of its serious health effects and the difficulties to ensure complete protection of human health and the environment during its manufacture, use and disposal in countries and settings with constrained resources.
2. All participating countries have undertaken national action to eliminate asbestos-related diseases and have set up immediate or longer term goals to reduce the use of asbestos and ultimately to phase out as the most efficient way to prevent asbestos-related diseases. Such programmes should be further developed and implemented in a consistent way and should be given higher priority in the national strategies for chemicals management, and the programmes for occupational safety and health. There is additional potential to link the action on sound management of asbestos and elimination of asbestos-related diseases to the national agenda on climate change mitigation and adaptation.
3. All countries need to build their capacities for sound management of asbestos, particularly 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. It is necessary to strengthen the collaboration across the government and to 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 intercountry 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. Special international assistance to countries is needed in the following areas: (a) provision of tools for sound management of asbestos and for elimination and asbestos-related diseases and building capacities for their implementation; (b) exchange of experience between countries regarding national situation, progress made and solutions applied; (c) awareness raising and building of political commitment for sound management of asbestos and elimination of asbestos-related diseases; (d) facilitating the international transfer of technologies for prevention, for example for substitution and removal of asbestos; (e) support for mobilizing international donor assistance for sound management of asbestos.
 7. Further support by countries is needed to strengthen the international regulatory mechanisms for sound management of asbestos through inclusion of chrysotile in the annex 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 are kindly inviting the government of Thailand to circulate these recommendations among the concerned governments in the Asia Pacific Region.

Country presentations:

China

China

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

Chemical Safety Management In China

Qiu Kaidong
State Administration of Work Safety(SAWS),P.R.China
Email:Qiukd@chinasafety.gov.cn

content

- Progress of Chemicals management
- Status of implementation of Chemicals Conventions,1990(No.170)
- About Asbestos
- Challenges
- Recommendation
- Conclusions

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

government agency involved in Chemicals management

- State Administration of Work Safety(SAWS)
- Ministry of Environmental Protection(MEP)
- Ministry of Industry and Information Technology(MIIT)
- Ministry of Health (MOH)
-

*The relevant Government Departments
in Charge of Chemicals management*

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graph TD; MOH[Health management of Chemicals and Occupational health Diagnosis (MOH)] --- MEP[Environment management of Chemicals and Disposal (MEP)]; MEP --- MIIT[Production management of Chemicals (MIIT)]; MIIT --- SAWS[Safe management of Chemicals and supervision (SAWS)]; SAWS --- MOH;
```


China



The main functions in Chemicals management by SAWS

- The laws and standards developing
- Strength the management of Chemicals safety
- Strength the supervision of Chemicals safety
- Take responsibility for the issuance and administration of the safe permits for Dangerous Chemicals Producers
- Organize to investigate the accidents of Chemicals and the violations of laws and regulations.



Chemicals management Legislation

Legal Frameworks of Chemicals management

- The Law of the PRC on safety in Production
promulgated on June 29, 2002
- The Law of the PRC on Occupational Diseases Prevention and Control
promulgated on Oct. 27, 2001
- The Law of the PRC on Preventing solid wastes from Polluting the Environment and its control
promulgated on Dec 29, 2004
-



Chemicals management Legislation

Regulations promulgated by the State Council

- Regulations for Safe Management of Dangerous Chemicals
promulgated on Jan 9, 2002
- Regulations for Protection of Labor in Workplace Using Toxic Substances
promulgated on April 30, 2002
- Regulations for Safe Production Licences
promulgated on Jan 7, 2004
-



Chemicals management Legislation

Procedures promulgated by SAWS

- The procedures for Implementing safe Production Licences for Dangerous Chemical Producers
promulgated on April 19, 2004
- The procedures for Implementing safe Sale Licences for Dangerous Chemical sellers
promulgated on Oct 18, 2002
-

China



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Chemicals management Criteria

- *The Dangerous Chemicals List
promulgated on 2002
contain 3823 Dangerous Chemicals
- *The Virulent Chemicals List
promulgated on 2002
contain 335 Virulent Chemicals



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Status of implementation of Chemicals Conventions 1990 (No. 170)

Chinese government ratified the Chemicals Conventions 1990 (No. 170) in 1994, and series of laws and regulations indicated above were promulgated according to the Chemicals Conventions.

The implementation of GHS and TDG :

The criteria for classification in force include the national standard "General rule of notification of Classification and dangerousness of chemicals (GB 13690-2009)", adopted the content of the "Globally Harmonized System of Classification and Labelling (GHS)".

The national standard "Classification and marking of dangerous goods (GB 6944-2005)", adopted the content of the "Recommendations on the transport of dangerous goods (TDG)" prepared by the Economic and Social Council, and its addendum "UN model regulations on the transport of dangerous goods", and supplementary addendum "Manual of tests and criteria".



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About Asbestos

- *Asbestos is under strict control in china, for it is one of the Dangerous Chemicals in the Dangerous Chemicals List.
- *The policy to restrict and ban on asbestos is issued by the government.

The General Office of the State Council issued "National Program on Occupational Health (2009-2015)" --- emphasis in the prevention and treatment on coal-worker's pneumoconiosis, silicosis, asbestosis, etc.



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Challenges

- *Vast amounts of application of chemicals
new chemicals invented everyday
new dangerousness of chemicals discovered everyday
- *Weak enforcement of chemicals management laws
employer escape their responsibilities
- *Large numbers of small and medium-sized chemical enterprises with poor working condition
lack of safe working condition
short of training for the workers

China



Recommendation

*The experiences on the legal and institutional frameworks and mechanisms of chemicals (especially asbestos) management should be shared between developed country and developing country.



Conclusions

*China is a responsible country. Although China is one of the main countries in the world to produce and use chemicals, it has undertaken policies for whole-process management of chemicals (production, application, sale, transport, disposal, etc).
*China is making great efforts to restrict and ban the use of asbestos according to the economic developing level.



Thank you !

Indonesia



Legal Instruments:

1. Act Number 32 Year 2009 on Environment Protection and Management.
2. Act Number 13, year 2003 on Manpower
3. Act Number 36, Year 2009 on Health
4. Government Regulation Number 74, Year 2001 on Toxic and Hazardous Substance Management
5. Government Regulation Number 18, Year 1999 on Toxic and Hazardous Waste Management

6. Ministry of Manpower Regulation Number 3, year 1985 on Safety and Health of Asbestos User
7. Decision of Director General for Labor Supervision Development, Number 104/DJPPK/IX/2006 on Technical Guideline for the Implementation of Health and Safety Work for the User of Asbestos Containing Material in the workplace.
8. Letter of Director General of Labor Supervision Development No. 165/DJPPK/ VII/2010 Concerning on Increasing Supervision of OSH Conditions for Companies Using Asbestos-Containing Materials
9. Circular Letter of Ministry of Manpower No. 1/1997 concerning on Threshold Limit Values of Chemical Factor (TLV - Chrysotile, 2 fiber/cc)

Technical Standards

1. SNI 03-1027-2006 Chrysotile Fiber Sheet.
2. SNI 03-2050-2006 Wave Cement Sheet
3. ILO Convention No. 162 concerning on Safety in Usage of Asbestos
4. ILO Recommendation No. 172, 1986 on Asbestos

Regulation (1)

Act Number 32 Year 2009 Article 58

Every person who entering toxic and hazardous substance into the territory of Republic of Indonesia, producing, transporting, distributing, storing, utilizing, processing, disposing, and piling up has an *obligation to manage* toxic and hazardous substance

GR Number 74 Year 2001 Article 1 paragraph 1

Toxic and hazardous substance are substance because of its nature and/or concentration and/or amount, directly or indirectly can pollute or degrade the environment, and/or may harm the environment, health, human and other living creatures survival;

Regulation (2)

GR Number 74 Year 2001, Article 5 paragraph 1

Toxic and hazardous substance can be classified as follow:

Explosive	Harmful
Oxidizing	Corrosive
Extremely flammable	Irritant
Highly flammable	Dangerous to the environment
Flammable	Carcinogenic
Highly toxic	Toxicogenic
Moderately toxic	Mutagenic

GR Number 74 Year 2001, Article 5 paragraph 2

Toxic and hazardous substance as paragraph 2, can be classified as follow:

1. Substance that can be use;
2. Substance that banned to use;
3. Substance that can be limited use.

Regulation (3)**GR Number 18/1999**

Used asbestos fiber is categorized as toxic and hazardous waste from unspecific sources, its waste code is D1004 for disposal to landfill area.

Asbestos :

- Based on the mineral composition, there are two classes of asbestos, namely:
 - Serpentine class (chrysotile asbestos)
 - Amphibole class (crocidolite, anthophyllite, amosite, and tremolite asbestos)
- According to GR No. 74/2001
 - Chrysotile asbestos is classified as toxic and hazardous substance that can be use, whereas the amphibole group is classified as toxic and hazardous substance that is banned for use.
 - All Companies importing Chrysotile asbestos should be registered

Asbestos (1)

- In Indonesia, Chrysotile Asbestos is used as building material for roofings, ceilings, sheet flats, heat insulation, and automobile brake pads.
- The volume of chrysotile asbestos for industrial production is estimated around 80,000 metric tons per year and is imported from Brazil, Canada, China, Russia and South Africa

Volume of Chrysotile fiber imported :

Countries	TOTAL PERIOD OF USAGE (MT)								
	Jan-Dec 2001	Jan-Dec 2002	Jan-Dec 2003	Jan-Dec 2004	Jan-Dec 2005	Jan-Dec 2006	Jan-Dec 2007	Jan-Dec 2008	Jan-Dec 2009
Canada	21,394	18,614	11,018	15,422	17,735	15,315	15,724	29,241	22,985
Africa	7,478	8,790	6,870	9,815	3,394	1,299	9,940	4,812	142
Brazil	4,980	4,480	8,244	20,340	26,288	21,996	27,724	39,680	28,666
Russia	8,363	8,186	12,254	15,172	19,282	17,380	18,849	23,139	17,995
China	-	-	-	-	-	-	-	6,903	11,978
Others	2,406	3,073	1,238	2,072	474	142	92	-	-
Total	45,053	43,064	39,640	62,949	67,883	51,825	71,271	103,141	100,997

Companies and workers in the asbestos-containing products industry:

No. of Cement Fiber Companies = **13 Companies**

• Friction Material Importer Companies = **9 companies**

• Number of Workers
 - Direct Worker = **8,223**
 - Indirect Worker = **8,000**
 - Total = **16,223**

Asbestos, Health Problems and the Government of Indonesia's Efforts

- Exposure to dust from asbestos or asbestos-containing materials causes asbestosis (lung fibrosis)
- The Bangkok Declaration (2006) recommended international organization such as ILO, WHO, International Trade Unions to increase the vigilance by promoting preventive actions so as to reduce health problems due to asbestos.
- In response to the declaration, Indonesia has issued a Decision of Director General for Labor Supervision Development Number 104/DJPPK/IX/2006 on Technical Guideline for the Implementation of Health and Safety Work for the User of Asbestos Containing Material in the workplace.

Indonesia's Efforts (2)

- Requires companies to conduct monitoring on asbestos exposure with the aim to :
 - Ensuring the health of the manpower
 - Ensuring the preventive action is still effective
 - Ensuring the level of concentration on the previous monitoring result has not changed or decreased
 - Ensuring that any production process change will not produce asbestos dust exposures that exceed the threshold value
 - Promoting the information on effective preventive actions

The Government of Indonesia Efforts (3)

To improve the health and safety of asbestos product user, the Government of Indonesia has established a national standard of Indonesia for chrysotile fiber cement flat sheets is SNI-03-1027-2006 and wave cement sheet SNI 03-2050-2006

- The aim of setting the national standard is:
 - Protecting the consumer;
 - Improving the quality of product;
 - Providing safety and health for the user of chrysotile fiber cement flat sheets

Research conducted by Hiperkes, Ministry of Manpower and Transmigration in 2004 – 2005 in 5 provinces, indicated that the concentration of chrysotile fibers was under the threshold limit value of 2 fiber/cc

Prevention and Supervision:

Government Obligation: Policy, guideline, supervision, promotion and education

Employer Obligation: Supervision, monitoring and maintaining the control asbes dust; Providing Personnel Protective Equipment.

- Periodical Health Examination that the results is used as early warning to detect and diagnose "Occupational Lung Disease";
 - Occupational Health and Industrial Hygiene Programmes should be conducted and integrated comprehensively;
 - Giving information to workers, government and visitor;
 - Training and socialization
- Workers Obligation:**
- Obey Standard Operation Procedure (SOP); Wear PPE; implement Hazard Communication Program;
- Cooperation and Consultation:**
- Related Association (FICMA, Communication Forum); Safety Committee; Occupational Health Services;
 - Continuous Research on chrysotile fiber in all type of workplace activities (producer and User) (Universities & Research Institution)

Conclusion

1. Asbestos fibers in air endanger the health of workers in the production processes of asbestos-containing materials.
2. Chrysotile asbestos is still allowed for use, but must be well managed.
3. To prevent adverse health effects of asbestos to the workers and public, it is required to conduct monitoring and supervision.
4. Continuous development of Safe and Responsible uses of Chrysotile asbestos.

ASBESTOS MANAGEMENT IN MALAYSIA Current Situation



•Occupational Safety and Health Department
•Ministry of Human Resources
•Malaysia

TOPICS

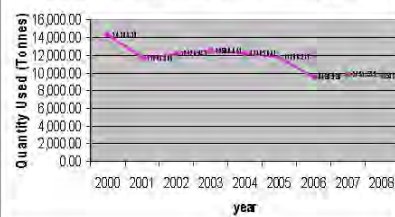
1. Current Situation
 - Asbestos Usage
 - Trend
 - Working Environment
 - Occupational Health
2. Asbestos Management in Malaysia
 - Legislation on Asbestos Use in Malaysia
 - Dialogue on Asbestos
3. Future Plan and Expectation
 - Proposal of prohibition

Asbestos Usage

Type of Asbestos

1. Serpentine
 - Chrysotile (White Asbestos)
2. Asbestos Management in Malaysia
 - Amosite (Brown Asbestos)
 - Crocidolite (Blue Asbestos)

Statistics on Asbestos Consumption in Malaysia



Asbestos Usage in Malaysia (Statistics)

- 22 companies/factories identified as user or importer of asbestos
 - 3 companies trading in asbestos
 - 14 factories producing asbestos products
 - 5 factories not operating
- Only Chrysotile (White Asbestos)
- High demand (brake lining & pad, disc pad) in commercial vehicles compared to passenger vehicles.
- In 2008 - 3 companies stop using Asbestos.

Applications of Asbestos in Industry

- Automotive paint (undercoating)
- Brake lining and brake pad
- Asbestos roofing

Workers Exposed to Asbestos

- 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
- Worker arranges asbestos packaging on conveyor
- Weighing asbestos fibre mixture manually and placing a 'Brake Pad' into the 'Trimming Machine'
- Asbestos package on conveyor

Asbestos Management in Malaysia:

- Legislation on Asbestos Use
- Law Enforcement

Inter agency collaboration for asbestos management in Malaysia

Customs

- Prohibition of Import Order 1998
- Prohibition for import/export for blue asbestos

DOSH

- Enforcement of managing asbestos in workplace

DOE

- Enforcement of managing disposal of asbestos

MOH

- Provision health services, technical support and consultancy on occupational related diseases including asbestos

Legislation on Asbestos Use in Malaysia

- Factories and Machinery (Asbestos Process) Regulations 1986;
- Occupational safety and health -(prohibition of substances) Order 1999;
- OSH (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000;
- Environmental Quality (Scheduled Waste) Regulation 2005;
 - SW 201 – asbestos waste in sludge, dust or fibre forms
 - disposal at prescribed premises – Kualiti Alam Sdn Bhd

10

Factories and Machinery (Asbestos Process) Regulations 1986

- Prohibition of Crocidolite (blue asbestos). Other types of asbestos still allowed with controlled – use approach.
- Controlled – use approach :
 - Employee exposure monitoring
 - Engineering control and safe work practices
 - Medical surveillance to employees
 - Information, instructions and training to employees
 - Keeping of exposure monitoring and medical examination records

PEL = one fibre per milliliter of air average over eight-hour period

Occupational safety and health (prohibition of substances) order 1999

- Make under Section 33, Occupational Safety and Health Act
- Crocidolite is banned except for research and analysis purposes

Occupational safety and health (Use and Standards of Exposure Chemical hazardous to health) Regulations 2000

- PEL = 0.1 f/ml
- Chemical health risks assessment
- Control measures to prevent exposure exceeding PEL
- Provide, information, instruction and training
- Health surveillance program
- Record keeping

Screening Activities for Employees Exposed to Asbestos

- Visits to 16 factories with asbestos process with 124 workers involved.
- Spirometer Test (Lung Function Test) – Results shows 2% severe, 42% normal, 12% moderate and 44% mild.
- Analysis of workplace asbestos monitoring records – below PEL
- Survey on probability of asbestosis symptoms – 54.8% having a symptoms of exposure of asbestos

Dialogue on Asbestos with Industries on October 2009

- Roofing Manufacturer –requested for 5 years extension. Agree banning asbestos by 2015.
- Ban all imported asbestos .
- Brake pad Manufacturer – can willingly to stop using asbestos immediately. (Alternative material- aramid fibre)
- Expected to ban all asbestos tentatively on 2015 with fully cooperation between DOSH, KASTAM(CUSTOM), SIRIM, MIDA and MITI to ban asbestos.

Future Plan and Expectations

Proposal for Prohibition:

- Ongoing discussion between Government and Industry, Public, Consumers, Academia, Professionals etc. on Proposal for Prohibition of Use of Asbestos

Several Proposed Prohibition Strategies

1. Controlled use-existing form: Maintain the existing controlled use regime in its present form, while setting an appropriate time frame for review, say once every 5,7 or 10 years.
 - Considering the now established risks of amphibole asbestos types, this should be the least preferred option.
2. Outright ban 1: Prohibit all forms of asbestos-both amphibole and serpentine types-immediately.
 - If outright ban is decided, this option may be feasible in principle, but could encounter implementation problems related to costs, convenience and practicability.

3. Outright ban 2: Prohibit all amphibole forms of asbestos immediately; and Prohibit chrysotile with a gradual and staggered phase-out time frame for different industries, products or uses.
 - If outright ban is decided, this option believed to the best, most flexible and least disruptive one.
4. Third way solution: Prohibit all forms of amphibole asbestos immediately; but Keep chrysotile as a controlled-use option, while setting an appropriate time frame for review, say once every 5,7 or 10 years.
 - This option could work if a 'somewhere-in-between' alternative is sought and accepted.

Asbestos Content in Finished Products

(Association of Asbestos Industries in the Philippines, 2001)

Asbestos products	Estimated % of asbestos in products
Construction materials	
-roof tiles	8%
-sidings, walls and ceilings	8%
-Insulator	No data
-vinyl tiles	5%
Fraction materials	
-clutch discs	45%
-brake linings	45%
Gaskets	No data

Description, Utilization, Importation and Analytical Methods of Asbestos.

Methods of Testing and Analysis

Polarized Light Microscopy (PLM)

Transmission Electron Microscopy (TEM)

Determines the mineralogy (variability) of asbestos.

Fourier Transformed Infrared Spectroscopy (FTIR)

FTIR spectra can identify the existence of asbestos and distinguish it from other forms.

Exposure Assessment

Qualitative Analysis:

- X-ray Diffraction Method (XRD)
- Infrared Spectroscopy (FTIR)

Quantitative analysis:

- Membrane Filter Method
- (Phase Contrast Microscope)

Fiber – is a particle of asbestos with a Diameter of $< 3\mu\text{m}$ and $> 5\mu\text{m}$ in length, with a length to diameter ratio of 3:1

NIOSH Method 7400

- Asbestos fiber by PCM
- PCM – Phase Contrasting Light Microscope Counting
- Using cellulose-based membrane filter sampling
- Using high magnification (450x) PCM
- Measure fibers $> 0.25\mu\text{m}$ diameter and $> 5\mu\text{m}$ length

Asbestos-Related Diseases

- Surveys in 1992 to look for cases
 - 4 companies participated
 - 86 workers examined
 - Chest x-ray performed and classified according to ILO International Classification of Radiographs for Pneumoconioses

- The Lung Center of the Philippines' Asbestos Screening Program (1992 to 1996) examined former workers from the Subic Naval Base in Zambales for the presence of asbestos-related disease.
- Out of the 1,542 screened, 58.75 % demonstrated asbestos-related interstitial lung or pleural disease.

Research

- Exposure Assessment Study in Asbestos Using Industry, 1990 . This covered the workers engaged in the manufacture of roofing sheets, walls, ridges and pipes
- Asbestos-Related Diseases

Lung Center of the Philippines Asbestos Screening Program Frequency Distribution and Percentage of Diagnosis

Diagnosis	Frequency	Percentage
Asbestosis/Possible	366	62.35%
Asbestos Pleural Disease	132	22.48%
Combination	1	0.17%
Poss. Cancer	15	2.55%
Asbestosis + Poss. Cancer	20	3.41%
Negative	4	0.68%
NQS	49	8.34%
587		

P.D. 626 Employees Compensation and State Insurance Fund

- Prescribed Minimum Standards for Periodic Medical Examinations Designed for the Early Detection of Occupational Diseases:
- Periodic examinations at intervals not exceeding one year in cases of all other exposure enumerated in the "List of Occupational Diseases"
- The medical examination shall be as complete as possible, but shall primarily be directed towards the early detection of occupational diseases. This necessitates that certain aspects of the examination be stressed in certain types of exposures:
Examination of the lungs in workers exposed to risk of tuberculosis infection, silica dust, asbestos and cotton dust.

Other Reported Cases* Employee Compensation

Diagnosis	Year						
	1997	1998	1999	2000	2001	2002	2003
Asbestosis	3	5	3	6	1		1
Asbestos Disease - Pleural Disease							
Asbestos-related pleural disease;						1	
arthrotic changes in lumbar spine							1

*Provided by the Trade Union Congress of the Philippines
* (from GSIS/SSS database on Employees Compensation)
*With reported 1 death

Code of Practice on Asbestos

Draft Code of Practice for Asbestos (2008) - 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 and data to be gathered shall be the basis for the total ban of chrysotile asbestos by 2018.

OBJECTIVES OF THE CODE OF PRACTICE FOR ASBESTOS

- 1) Develop and provide practical guidance and information for proper dismantling, transport and disposal of Asbestos containing material (ACM) for use of concerned industrial owners and related sector, workers, environmental authority, occupational safety and health professionals and the general public.
- 2) Support and complement the preventive and mitigation measures to minimize if not avoid potential exposures risks and health related-diseases of asbestos to workers.
- 3) 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.

Association of Chrysotile Industries in the Philippines

- Formed in 1998
- Members: 55 registered Filipino-owned manufacturers of Chrysotile-containing products
 - have been operating for close to 50 years
 - employ 2,000 workers; provide indirect employment to 10,000 more
- Sets quality, environmental, health & safety standards for the industry
- Ensures compliance with EMB-DENR CCO for Asbestos among manufacturers and users of asbestos-containing products

Chemical Industry Association of the Philippines

- Formed in Manila in 1977 by the leading companies' top executives
 - Industry categories:

✓ Agrichemicals & Fertilizers	✓ Inorganic Chemicals
✓ Oleochemicals & Surfactants	✓ Petroleum
✓ Industrial Gases	✓ Specialty Chemicals
✓ Petrochemicals & their derivatives	✓ Chemical Service Providers
✓ Plastics, Surface Coatings	

Responsible Care[®]

- Global initiative of working together for the continuous improvement of health, safety and environmental performance
- 46 countries where 85% of the world's chemicals are manufactured
- Contributes to sustainable development
- Promotes cooperation with government & organizations

Trade Unions (ALU/TUCP/BWI)

- Support the Passage of law banning asbestos and asbestos containing materials
- Formation of a trade union network
- Engagement with government agencies
- Monitoring people exposed to asbestos
- Public information campaign

Strategic Plan

Outline for the Development of National Programmes for Elimination of Asbestos-related Diseases (NPEAD)
National Programme for the Elimination of Asbestos-Related Diseases:

- Health Policy
- Capacity/Capability Building
- Service Delivery
- Resource Mobilization
- Medical Surveillance and Preventive
- Strategies
- Networking
- Monitoring & Evaluation

Issues and Challenges

- Chemical Management at the Workplace
- Medical Surveillance
- Waste Management of Asbestos
- Economic Impact of Chrysotile ban
- Alternatives for friction materials

Pending Bills Banning Asbestos

- HB 3079 by Reps. Narciso Santiago and Marcelino Teodoro (Nov 2007), "An Act Banning the Importation, Manufacture, Processing or Distribution in Commerce of Asbestos Containing Products"
- SB 741 by Sen. Miriam Defensor Santiago (2007), supporting HB 3079
- HB 5931 by Rep. Risa Honúveros (Feb 2009), Expands the coverage to include asbestos containing materials; widens research components; limit exemption to the military use and massive public education and safety campaign on asbestos

Management of Asbestos and other Industrial chemicals in Sri Lanka

Dr. H Y Akmalawela (National Professional Officer/WHO)

S. Amaranthunge (Snr. Research Officer Department of Labour)

S T K Fernando (Environment Management Officer/ Ministry of Health)

T.D.A.Gamage, (Assistant Director, Pollution Control Division,
Central Environmental Authority of Sri Lanka)

Key tools being used for Chemicals Management:

- Implementation of the Basel Convention
- Implementation of the Rotterdam Convention
- Implementation of the Stockholm Convention
- Legislation [Guidelines & Environmental Protection License procedures]

Chemical conventions implementation

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 Committee is functioning to discuss Technical and legal issues
- Participating institutions- TEC
Sri Lanka Customs Department, Central Environmental Authority, Ministry of Environment, Industrial Technology Institute, Universities, Ministry of Health, Registrar of Pesticides, 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
Ministry of Environment, Central Environmental Authority, Sri Lanka Customs Department, Department of Import and export, Department of Government Analyst, Ministry of Industrial Development, Industrial Technology Institute, Universities, Ministry of Health, Ministry of Labour, Registrar of Pesticides, Board of Investment.

Present Status of the industrial Chemicals

- Registrar of pesticides [ROP] - for pesticides
- CEA - for industrial chemicals
- Pesticides technical advisory committee under the Control of Pesticides Act No. 33 of 1980
- No chemical production at present
- Few chemical related industries in the country

PCB

- Technical Advisory Committee for the Rotterdam Convention met on 17th October 2008 and also decided not to allow importation of PCB since Sri Lanka has to phase out PCBs
- In addition, various NGOs are also carrying out programmes related to the management of PCBs

Asbestos

- Blue asbestos controlled under the provisions of the Import and Exports Control Act No. 1 of 1969.
- The requisite regulations are gazette in Extraordinary Gazette notifications No. 452/4 published on 06th May 1987
- Awareness raising programmes - Ministry of Education

Present Status of Asbestos

- No Asbestos mines in Sri Lanka and 100% imported from different countries
- 3 major Asbestos roofing sheet manufacturing industries
- Safety measures during manufacturing, transportation, building constructions, demolition and discarding are not satisfactory.
- Used as thermal insulation material for industrial applications.
- Automobile components such as brake shoes, brake pads & clutch plate may contained asbestos. Asbestos Containing Materials
- ACM Inside some machineries.

Industrial Asbestos waste dumping yard

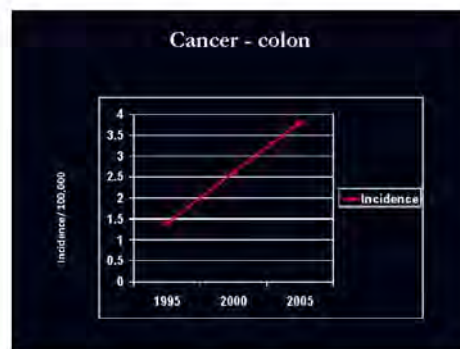
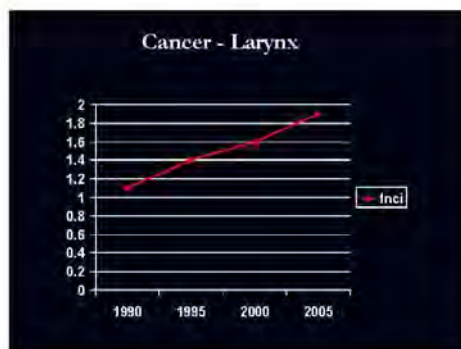
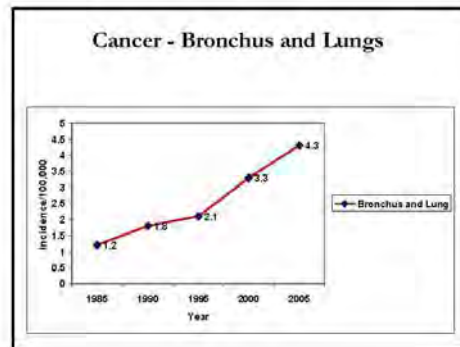
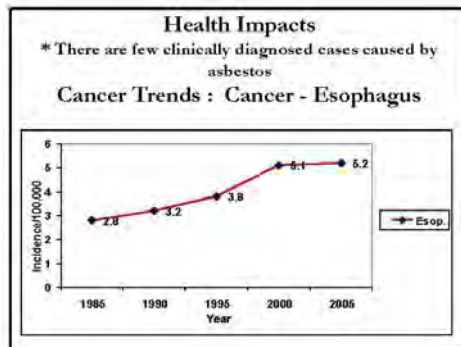


Asbestos sludge transportation



Occupational Exposure to Asbestos

- Construction workers in formal & informal sectors (Carpenters, general workers, Engineers)
- Employees of Asbestos cement manufacturing plants.
- Maintenance workers involved in repairing of machines.
- Automobile technicians, Vehicle service station personals.
- Cleaning services employees.
- Solid waste disposal employees.



Unsafe situations leading to exposure for the public:

- Transportation of Asbestos sheets
- Demolished Asbestos debris
- Asbestos Sheets Storage at Sales outlets

Status of the control of Asbestos use

- Technical Advisory Committee for the Management of Industrial Chemicals [TACMIC] - October 2009 – recommendation for National Policy in the use of all type of Asbestos in order to eliminate Asbestos-related diseases.
- Same committee -December 2009- decided to carry out a study on the use of Asbestos in Sri Lanka.
- The Study results submitted by Ministry of Labor

Implementation of Stockholm Convention

- Sri Lanka became a signatory to the Stockholm convention on Persistent Organic Pollutants (POPs) on 5th Sept, 2001 and ratified the convention on 22nd December 2005
- Obligation towards the Convention was to prepare the National Implementation Plan for the control of POPs with the assistance of UNEP/GEF

National Implementation Plan

- Establishment of coordinating mechanism
- Formulation of POPs inventories and assessment of infrastructure and capacities
- Priority setting and determination of objectives
- Endorsement of the NIP by the stakeholders

POPs Chemicals

Responsible Institutions for POPs Management

- Ministry of Environment and Natural Resources
- Office of the Registrar of Pesticides
- Customs Department
- Central Environmental Authority
- Imports and Exports Control Department
- Board of Investment

Legislation and Regulations on POPs

- The control of Pesticides act No.33 of 1980 and the amendment act No.6 of 1994
- Malathion control act No. 22 of 1985
- Customs Ordinance
- Import and Export control Act
- National Environment Act of 1988 No. 47 and its amendment acts in 1988 and 2000

PCBs – Industrial Chemicals

Problems related to PCBs

1. Lack of adequate legislation to control imports
2. Lack of acceptable treatment, Disposal and Storage systems for PCB contaminated oil & equipment
3. Contaminated sites yet to be identified
4. Cross contamination of NON PCB oil with PCB oil

Opportunities for PCBs management

- Cabinet of Ministers have been given the approval to ban the importation and use of PCBs in Sri Lanka
- Regulations to be drafted and gazetted soon
- Three pilot tests have been conducted for the destruction of the transformer oils (PCBs) using a Cement Kiln

Legislation on Hazardous Waste Management

- National Environmental Act No.47 of 1980 and the amendment acts No. 56 of 1988 and No.53 of 2000,
 - The National Environmental [Protection & Quality] Regulation No 1 of 1990 published in the Gazette extraordinary No 595/16 of 2nd Feb 1990
 - The gazette extraordinary No 924/13 of 23rd May 1996
 - the Gazette Extra Ordinary No 1534/18 of 01st Feb. 2008

This regulation controls the Generation, Storage, Collection, Transportation, Recycle and Disposal of Hazardous Wastes

Guidelines for the operator of HW storage, recovery, recycle, treatment and disposal facility:

- license and compliance
- general waste analysis requirements
- storage requirements
- declaration system, record keeping and reporting
- treatment & disposal
- disposal methods (landfill and incineration)

Currently methods used in managing Hazardous Waste

- Use of cement Kilns as a disposable facility for certain types of Hazardous Chemicals
- Promotion of recycling and exportation for recycle purpose
- Temporary storage at generation sites
- Encourage CP interventions (through EPL procedure) to reduce quantity of waste



The Current Situation of Asbestos and asbestos-related Diseases in Thailand

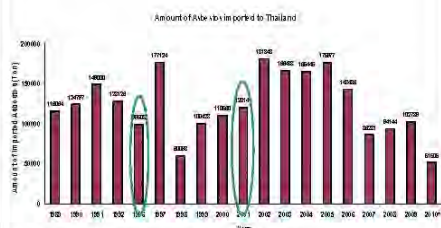
Dr. Somkiat Siriruttanapruk
Director, Bureau of Occupational and Environmental Diseases
Department of Disease Control, Ministry of Public Health

31st August 2010

The Situation of Asbestos in Thailand

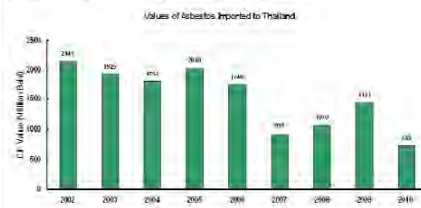
- Thailand is the world top 5 in terms of importer and user of asbestos (~150,000 ton/year)
- Asbestos has been imported for >70 years
- No asbestos mine in the country
- Raw material are imported for manufacturing
 - 90% in cement roof tile, & cement pipe manufactures
 - 7% in production of break & 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 1989 – June 2010



Source: Thai Customs Department Import & Export Statistics
*Data from Jan-Jun 2010 only

Value of Imported Asbestos in Thailand during 1989 – June 2010



Source: Thai Customs Department Import & Export Statistics
*Data from Jan-Jun 2010 only

Asbestos Imported to Thailand, 2007- June 2010

Asbestos	2007		2008		2009		Jan-Jun 2010	
	Quantity (Mkgs)*	Value (MB)*	Quantity (Mkgs)*	Value (MB)*	Quantity (Mkgs)*	Value (MB)*	Quantity (Mkgs)*	Value (MB)*
Amosite	2.55	28.57	1.81	9.35	-	-	-	-
Chrysotile	45.91	458.15	45.16	551.25	46.31	659.60	25.35	358.61
Others	39.53	481.68	44.97	479.58	36.45	775.14	23.97	376.29
Total	86.29	915.40	94.14	1,070.1	102.74	1,452.7	51.30	734.90

Source: Customs Import-Export Statistics
Note: *Quantity and CIF Value are shown in Million kilograms and Million Baht, respectively

Top 3 countries of (Chrysotile) asbestos importers to Thailand in 2007-2010

- Russian Federation
- Brazil
- Canada

Top 4 countries of (Others) asbestos importers

- Russian Federation
- Canada
- Kazakhstan
- China

No. of asbestos factories (by type) in Thailand in 2007-2008

Type	No. of factories In 2007	Still use asbestos In 2008
Brake & clutch	27	13
Roof Tile producer	11	8
Pipe producer	3	2
Glue	1	1
Others	2	-
Total	43	24

Organizations and Legislation

Ministry of Industry:

Control of import, use, and storage
Hazardous Substances Act 1992

Ministry of Labour:

Regulation of an occupational exposure limit
Labour Protection Act 1998

Ministry of Public Health:

Provision of Occupational health and safety guidelines and services

Asbestos concentration in working environment

Factory type	Year 2009 ¹		
	Sample	No. of sample >0.1 fiber/cc	Asbestos concn (fiber/cc)
Roof tile & pipe	12	4	0.01-2.41 (Mean = 0.11)
Break & Clutch	13	12	0.01-8.72 (Mean = 2.63)

Source: Data collected by the Department of Labour Protection and Welfare under "The Occupational Lung Disease Surveillance in the Workplace Program 2009"
¹ means > ACGIH TLVs 0.1 fiber/cc

Comparison of Asbestos Concentrations in Break and Clutch Factories between year 2000 and 2008

Jobs	Asbestos Concentration (fibers/1 cc)					
	2000 (5 factories)			2008 (13 factories)		
	Sample size	Asbestos Mean	Asbestos SD	Sample size	Asbestos Mean	Asbestos SD
Blending and Mixing	11	10.59	6.17	11	2.98	2.46
Cold press	14	9.90	12.46	12	1.74	1.37
Hot press	20	3.39	3.92	9	0.86	0.55
Polish	26	8.60	9.65	31	1.19	1.20

Source: Data collected by the Department of Labour Protection and Welfare under "The Occupational Lung Disease Surveillance in the Workplace Program 2000-2009"

Comparison of Asbestos Concentrations in Roof Tile & Pipe Factories between year 2000 and 2008

Jobs	Asbestos Concentration (fibers/1 cc)					
	2000 (3 factories)			2008 (12 factories)		
	Sample size	Asbestos Mean	Asbestos SD	Sample size	Asbestos Mean	Asbestos SD
Transferring	6	1.00	0.62	-	-	-
Mixing	9	0.66	0.79	12	0.11	0.08
Producing	-	-	-	17	0.23	0.62
Press Molding	-	-	-	7	0.02	0.09
Polishing	2	0.24	0.30	2	0.35	0.38

Source: Data collected by the Department of Labour Protection and Welfare under "The Occupational Lung Disease Surveillance in the Workplace Program 2000-2009"

Asbestos-Related Diseases

Active health surveillance data in asbestos use factories during 1987-2006

Year	No. of Factories	No. of workers	No. of abnormal CXR	No. of pleural thickening	No. of suspected asbestosis
1987	24	701	13	13	-
2000	6	669	7	-	-
2003	0	140	41	5	-
2004	0	106	31	9	1
2006	1	907	7	37	7

The First Reported Case of Asbestos-induced Mesothelioma in Thailand

- 75 years old, Male
- Work as an engineer in a local roof tile production company for 24 years
- Retired in 1985
- First symptoms: August 2007
- Diagnosis: November 2007
- Passed away: January 2008

Estimation of cases of asbestos-related diseases in Thailand

- Tossavainen indicated a significant linear correlation between consumption of asbestos and the number of mesothelioma cases
- Calculating as follow:
 - $Y = 6.82 \times \text{amount of consumption (25-30 years ago)} + 0.43$
- Where:
 - Y = No. of cases/million/year
 - Amount of consumption = No. of Kg/capita/year (3.0 Kg/capita/year)
- $Y = (6.82 \times 3.0) + 0.43 = 20.9 \text{ cases/million/year}$
- Total new case/year = $17.5 \times 65 = 1,358 \text{ cases}$

National strategy for prevention & control of asbestos-related diseases

Aims of National Strategic Plan

- To control, reduce, and finally ban the use of asbestos within 5 years (2007-2012)
- To prevent and control of asbestos-related diseases

Summary of the Bangkok Declaration on the elimination of asbestos and its-related diseases

- 1) Total of Asbestos Ban
- 2) Protection of Workers and the Public
- 3) Alternatives
- 4) Information Exchange
- 5) Transition and Prevention of Asbestos Dumping
- 6) Corporation Social Responsibility
- 7) Surveillance, Fair Compensation and Treatment of Asbestos-related Diseases
- 8) International Collaboration

The National Workplan

- Protection of workers and the public
- Prevention, 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

Some current activities (1)

1. Increasing of the awareness in industries and the public:
 - 1.1 Releasing of information to medias
 - 1.2 Supporting the labeling of warning sign on asbestos containing products
 - 1.3 Setting up of training courses for workers and safety officers

Training courses for workers and safety officers

- In 2009, project entitled "Mobilization stakeholder supports and willingness to response to the development of the coalition for prevention and control of asbestos-related diseases" was conducted under the funding support by WHO:
 - Aims: 1) to strengthen occupational health service providers and, 2) to increase awareness for the workers and public
 - Results: Target participants included
 - ~1,000 workers and safety officers
 - ~500 factories/companies (especially SMEs)
 - 154 governmental officers
 - 9 provinces adopted the program

Some current activities (2)

2. Proposed Policy and Strategic Plan for reduction of asbestos use and promotion of substitution:
 - 2.1 Taxation:
 - Tax relief for substitution from 5% to 1%
 - 2.2 Consumer protection policy:
 - Enforcing the enactment of the legislation on the labeling policy to label a warning sign on asbestos-containing products

The enactment of labeling policy

- legislation on the labeling of asbestos-containing products was proposed in 2008 and enacted by the Consumer Protection Agency in September 2009:
 - According to this law, all asbestos-containing products must have labels with information details on safe handling and PPE, plus a warning sign on the products stating "this product contains asbestos which may cause lung cancer and diseases"

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



May Cause Lung Cancer and Diseases

Some current activities (3)

3. Improvement of diagnosis of asbestos-related diseases:

3.1 Training for Chest X-ray reading on pneumoconiosis according to the ILO classification

3.2 AIR Pneumo Project

Improvement of Diagnosis of Asbestos-related Disease

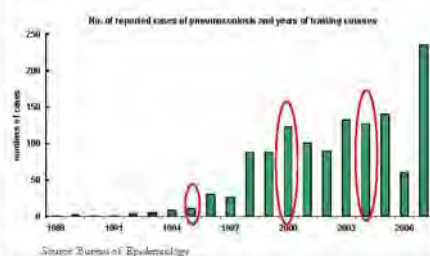
■ Training for Chest X-ray reading on pneumoconiosis according to the ILO classification:

- 3 training courses were held with the support of ILO in 1995, 2000, and 2004: attended by 70 participants
- 2 additional training courses in Thai language were held by local core group and attended by 50 participants

■ Air Pneumo Project:

- The 1st Air Pneumo examination was conducted in 2008, with 29 participants that included:
 - 24 physicians from Thailand – 23 Passes
 - 5 from International countries – 4 Passes

No. of reported cases of Pneumoconiosis and years of training courses



Some current activities (4)

4. Surveillance of asbestos-related diseases:

4.1 Workers' health surveillance (26 factories in 2009)

4.2 Mesothelioma surveillance in hospitals

Association between asbestos exposure and CXR among workers in break/clutch & roof tile/pipe factories in 2008

Exposure status	Chest X-Ray Normal		Chest X-Ray Abnormal	
	Sample (No.)	%	Sample (No.)	%
Exposure	435	92.6	35	7.4
Non-Exposure	17	85.0	3	15.0
Total	452	92.2	38	7.8

† Reported with High resolution CT Scan and found 20 cases of abnormal CT that are compatible with asbestos-related pleural plaques.

Source: Data collected by the Bureau of Occupational and Environmental Diseases

Workers' health surveillance in 24 factories in 2009

Factory type	No. of Lung Function Test			No. of CXR		
	Total	Normal	Abnormal	Total	Normal	Abnormal
Roof tile & pipe	82	62	13 (15.9%)	1,683	1,639	44 (2.6%)
Break & Clutch	181	117	45 (24.9%)	468	444	20 (4.3%)

Source: Data collected by the Department of Labour Protection and Welfare under "The Occupational Lung Disease Surveillance in the Workplace Program 2008-2009"

Some current activities (5)

5. 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 November 2009, the "Foundation of Consumer" has launched a meeting which included ~100 representatives of non-governmental consumer organizations from all over the country to set up a work plan to ban asbestos-containing product by next year

Some current activities (5) cont.

5. Activity toward the control and ban of asbestos use:
 - In 2010, "No Asbestos in Thailand Measures" issue has been proposed by the NGOs and Bureau of Occupational and Environmental Diseases to Thailand National Health Assembly in year 2010 (on going process)
 - In 2010, "Strategic Road Map toward the ban of Asbestos use" has also been proposed to National Economic and Social Advisory Council to take it into action (on going process)

Some 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 (55 factories)
- Reduction of exposure standard: from 5 fibers/cc. to 2 fibers/cc (on going process)

Obstacles

- Ministry of Public Health is not the main responsible authority
- No systematic health data to convince policy makers and public
- Continuous interruption of the process by pro-asbestos agencies

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
- To achieve the goal is still a long way

Thai actions after the 1st Asian Asbestos Conference

- Set up the committee from relevant organizations
- Set up and developed the national strategic and work plan for control and ban of asbestos/elimination of the diseases (with the support of international agencies such as WHO and ILO)
- Developed the road map of action plan

Asbestos in Vietnam

MD. MSc. Tran Anh Thanh
The Health Environment Management Agency,
Ministry of Health of Vietnam

Contents

- Introduction
- Vietnamese legislation related to Asbestos
- Asbestos materials use in Vietnam
 - Imports
 - Production of A-C products
 - A-C enterprises
- Occupational exposure
- Working environment monitoring
- Health surveillance
- Conclusions and Challenges

Introduction

- Asbestos is one kind of silica mineral of fibres:
 - Special property: heat resistance, electric isolation, good duration of abrasion,
 - Used as raw material for production of more than 3,000 products: roof sheet, pipes, wall petition, friction materials, etc
- Asbestos types:
 - Serpentine: Chrysotile, White asbestos
 - Amphibole: all other types of asbestos

- First use of Asbestos in Vietnam was in 1963 (A-C slate in Dong Nai and Thu Duc province now with name of NAVIFICO, ~6 M m²/year).
- In the North parallel with Thai Nguyen (1st industrial zone in the North) – A-C slate in the North (80s).
- Most of the asbestos consumers were A-C Slate Roofing Factory. (About 100 M m²/year)
- Other companies produce - automobile brakes, fertilizer products, etc
- Estimated nearly 90% A-C Slate factory come from private, joint-stock section..

Vietnam is one of the 10 countries that use Asbestos the most (Source: American Statistics):

2007 Nº	Country	Asbestos consumption, tons/year
1	China	626,099
2	India	302,139
3	Russia	280,019
4	Kazakhstan	108,951
5	Brazil	93,780
6	Thailand	86,525
7	Uzbekistan	86,488
8	Ukraine	85,602
9	Viet Nam	64,429
10	Zimbabwe	57,329

Data Source: American Statistics: 2008.

Country	Asbestos consumption, tons/year	Ranking	% Compare to the world
China	565,419	1	26.98
Russia	359,973	2	17.18
India	348,538	3	16.63
Kazakhstan	185,625	4	8.86
Brazil	98,641	5	4.71
Indonesia	78,037	6	3.72
Thailand	69,291	7	3.31
Ukraine	64,330	8	3.07
Sri Lanka	58,109	9	2.77
Viet Nam	49,998	10	2.39

Asbestos legal instruments

- Decision No 115/2001/OD-TTg:
 - Use of substitute materials to replace asbestos;
 - Environment and health standards for the industry;
 - Production phase out and stop use by 2004 (all types of asbestos).
- Decision No 133/2004/OD-TTg and 121/2008/ OD-TTg Amending:
 - Prohibition of use and import of amphibole asbestos;
 - Requirements for environmental and health standards.

- Asbestos exposure and hazardous works.
- PPE for workers: Helmets, Clothes, Goggles, Gloves, Masks and related equipment such as full mask with external air provided in cases of exposure to higher dust standards;

Regulated by Ministry of Labour, Invalids and Social Affairs

Working environment standards: Regulated by Ministry of Health at Decision 3733/2002/QĐ-BYT.

Nº	Name	Average 8-hour (fiber/ml)	Average 1-hour (fiber/ml)
1	Serpentine (Chrysotile)	0,1	0,5
2	Amphibole	0	0

Medical check ups: Circular 13/2007/BYT-TT, 13/1996/BYT – TT

- Pre-employ health checking:
 - Full health checking especially the lungs;
 - Full chest X-ray plus lung function.
- Periodical health checking:
 - 2 health periodical checking time per year;
 - Annual chest X-ray;
 - In cases of suspended, request to occupational disease checking (after 3 years)

Occupational diseases checking: Circular 12/2006/BYT-TT

- Only asbestosis is accepted as Ods – 1976
- First occupational health checking after 3 years of exposure; Occupational diseases screening based on periodical health checking and working environment results;
- Full health checking with emphasis to respiratory organs; Full chest X-ray and lung function test are required; Look for lung abnormalities, annually

Others regulations:

- Training and information propaganda: Circular 37/2005/TT-BLĐTBXH: Annual training for the employers and employees are required; Contents: OSH;
- Social insurance: In case of confirmed occupational asbestosis, worker could get social compensation;
- Follow up and re-checking for occupational diseases were implemented as legislation, annually.

Asbestos usage

Asbestos import: Data source from VN Custom

Nº	Year	Chrysotile, tons/year
1	2005	73,448
2	2006	63,014
3	2007	75,116
4	2008	67,975
5	2009	64,826

Asbestos import: From 5 main import countries 2009

Nº	Country	Amount of exporting asbestos, tons/year	%
1	Russia	57,482	88.67
2	Kazakhstan	2,894	4.46
3	Canada	2,252	3.47
4	Brazilia	1,320	2.04
5	China	878	1.35
	Total	64,826	100

Asbestos import: Countries and import data from 2005 – 2009

Nº	Country	Year				
		2005	2006	2007	2008	2009
1	Russia	61,189	50,286	62,280	38,396	57,482
2	Kazakhstan	1,037	0	0	4,925	2,894
3	China	1,875	6,599	1,580	1,734	878
4	Canada	1,098	1,860	980	819	2,252
5	Zimbabwe	0	2,186	756	0	0
6	Brazilia	0	0	540	1,168	1,320
7	Thailand	0	0	9,000	0	0
8	Dominica	5,927	1,037			
9	USA	2,372	0	0	0	0
10	Taiwan	0	0	0	994	0
11	Japan	0	1,036	0	0	0
	Total	73,448	63,014	75,116	67,976	64,826

Remarks:

- Quantity of chrysotile asbestos imported into Vietnam from 2005 to 2009 changed from 63,000 to 75,000 tons/year
- From 2007 to date, importation of asbestos has decreased
- Russia is the biggest exporter of asbestos to Vietnam, accounting for more than 88%.

- Most of the Asbestos used to produce A-C Slate products.
- There are 27 A-C factories in 23 provinces with
 - 70 working lines;
 - Productivity ~ 100M m² per year;
 - About 10,000 workers with 75% exposed to asbestos;

Asbestos import products: Blankets, insulation, A-sheet, anti-fire clothes,...

Imported value 2005-2009:

Total value, USD	
Year	Value, USD
2005	26,834,134
2006	22,147,382
2007	26,873,473
2008	34,413,724
2009	4,053,199

Import (2009) by countries

Nº	Country	Value, USD
1	India	1,043,578
2	China	1,041,734
3	Thailand	1,004,837
4	Japan	230,295
5	Indonesia	139,218
6	Others	602,537
	Total	4,053,199

Remark:

- ACP are mainly blankets used in cars, automobile industry;
- Three biggest exporters of asbestos containing products to Vietnam are:
 - India;
 - China; and
 - Thailand.
- All 3 countries account for 75% of value of ACP.

Occupational exposure

Workers at Asbestos factories:

Year	Total		Male		Female	
	No workers	Rate %	No workers	Rate %	No workers	Rate %
2005	11,170	100	8,765	78.47	2,405	21.53
2006	10,843	100	8,620	79.50	2,223	20.50
2007	11,458	100	9,070	79.16	2,388	20.84
2008	11,935	100	9,648	80.84	2,287	19.16
2009	11,186	100	9,032	80.74	2,154	19.26

Working environment monitoring

Only 40% of A-enterprises have working environment monitoring

Year	No of Ent.	No. of Ent. taking total dust sample	No of Ent. taking respirable dust sample	No of Ent. taking asbestos dust sample	Result asbestos samples
2005	46	10	5	4	0.3-0.36 f/ml
2006	46	12	5	4	0.12-0.3 f/ml
2007	46	15	7	5	0.14-0.45 f/ml
2008	46	16	7	10	0.11-0.37 f/ml
2009	46	15	7	5	0.14-0.72 f/ml

Remarks

- Less than 20 percent of A-factories control asbestos dust at workplace;
- Some monitoring asbestos samples are over national standards (30-40%);
- Most of A-factories are private and joint-stock company therefore the complying is limited;
- The man-power for taking and analyzing asbestos samples are very limited (2 Institutes and Construction OH Center)

Health surveillance

- Periodical health checking
 - Implemented by 50% of factories;
 - Number of workers: ~ 50 – 85%;
- Occupational diseases checking
 - Chest X-ray:
 - Implemented by 10-12 factories;
 - 5 – 8% of exposed workers get chest X-ray (500 – 700 cases/year);
 - Above number is so small in comparison with total exposed worker.

- Chest X-ray results (2009): Total 36 cases of abnormalities:
 - 13 cases of silicosis;
 - 8 cases of tuberculosis;
 - 11 cases of bronchiitis;
 - Others (non pneumoconiosis): 18 cases.
- Lung function testing (2009):
 - Total 12 factories
 - 3016 workers
 - 150 cases of change (4.97%)
- 3 cases of asbestosis, some mesothelioma detected

Conclusions

- Annual import of asbestos to Vietnam is about 60 – 70 thousand tons;
- Vietnam has legal instruments for the control of the production of asbestos products;
- There are 46 factories (27 A-C) with more than 10,000 workers (exposed ~ 80%);
- Health aspect & diseases: Long latency

Challenges

- Technology in the country is out of date;
- Low level of awareness on asbestos hazards for both employers and employees;
- Most factories belong to private and joint-stock companies;
- Weak enforcement and labour inspectorate.
- Health and environmental surveillance capacity is weak;
- No database about disposal of asbestos

What can we learn from the Japanese experiences in global perspectives?

Eun-Kee Park, PhD
Department of Environmental Epidemiology
University of Occupational and Environmental Health
JAPAN

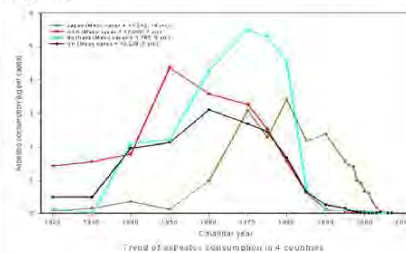
What is asbestos ?

- Naturally occurring mineral fiber (not man made)
- Most common asbestos types used in industry
 - Chrysotile (white asbestos): excretion from lung
 - Crocidolite (blue asbestos): bio-persistent on lung
- High demand of all varieties of asbestos due to durability and resistance against fire, cold, corrosion, acid, electricity, noise etc.
- Products
 - Over 3000 products (majority of building products)
 - ex: Insulation, fire retardants, brake pads etc.

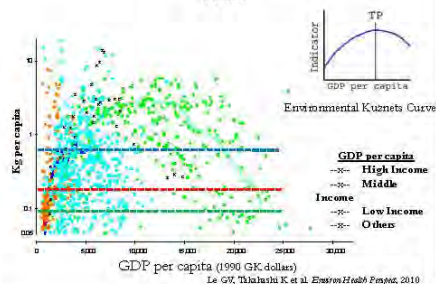
Distribution of asbestos exposure

- Direct occupational exposure: workers, including self-employed
- Indirect occupational exposure: workers, including self-employed
- Domestic exposure: families/relatives of exposed workers
- Neighborhood exposure: residents lived near asbestos plant, mine etc
- Environmental exposure: public, from building

A view of past asbestos usage pattern in developed countries:



Asbestos use vs. economic development in world scale



Burden of asbestos-related diseases in global perspectives

- 90,000 annual deaths by illness related to occupational asbestos exposure
- Mesothelioma mortality is yearly 43,000 cases
- 125 million people are occupationally exposed to asbestos in the World
- A transition period "BAN to USE ASBESTOS"

Burdens related to historical use of asbestos in global perspectives

- Asbestos-related diseases (up)
- US\$ 8.5 billion for compensation only (Australia)
- Patient care and management cost (up)
- Anxiety in an apparently healthy population with a history of asbestos exposure
- Government pressure (up)
- Asbestos removal cost (house aging) (up)
- Non-occupational exposure case (up)
- Waste treatment (disposal issue) – landfill/plasma

ASBESTOS is still recognized as important materials (?) Ranking of asbestos consumption* in the world (1998-2007)

Ranking	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1	Russia (1412)	Russia (1412)	Russia (1449)	Russia (1422)	Russia (1440)	China (1507)	China (1517)	China (1517)	China (1441)	China (1500)
2	USA (1387)	USA (1375)	USA (1362)	USA (1361)	USA (1375)	Russia (1429)	Russia (1421)	Russia (1421)	Russia (1381)	USA (1397)
3	Russia (1172)	Russia (1172)	Russia (1172)	Russia (1172)	Russia (1172)	China (1373)	China (1373)	China (1373)	China (1348)	Russia (1383)
4	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)
5	Japan (1123)	Japan (1123)	Japan (1123)	Japan (1123)	Japan (1123)	Japan (1123)	Japan (1123)	Japan (1123)	Japan (1123)	Japan (1123)
6	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)
7	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)
8	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)
9	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)
10	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)	China (1105)

Asbestos: high demand in Asian markets

- Asian takeover of global asbestos share
From 19% (840/3,500) in 1985 to 47% (950/2,040) in 2000
- Data scanty
 - Only 4 Asian countries reported 17.8% of all mesotheliomas in WHO-DB (1994-2004)
 - True? Short lag-time? Inadequate surveillance systems?

Takahashi, Occup Med (Oxford) 2008

Mesothelioma

- Aggressive, fatal and rare cancer
- Long latency period (10 – 50 yrs)
- Median survival rate (< 18 months)
- No curable treatments



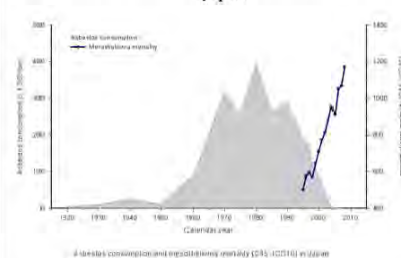
N Engl J Med 2005;353:1591-1603



Lancet 2005;366:397-408

The Japanese Experience

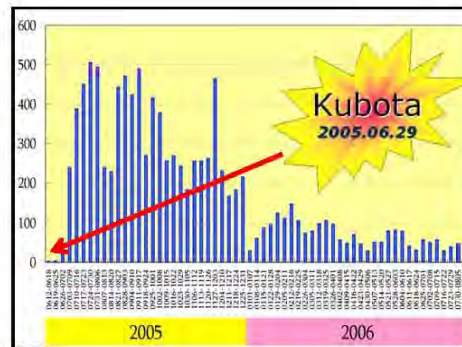
Usage pattern of asbestos and mesothelioma incidence in Japan



Kubota Shock of 2005
Japanese Asbestos Scandal

Asbestos scandal rocked Japanese society: asbestos affected not only workers but also residents who had lived near an asbestos plant

2005.6.29
Mainichi Newspaper



Chronology of related laws and regs.
ISHL=Industrial Safety & Health Law; its enforcement order (EO); its ordinance
Ordinance=on Prevention of Hazards Due to Specified Chemical Substances

1971	Ordinance* enforced & regulated as Group 2 Substance (prevention of leakage; appointment of Operation Chief; implementation of Work Environment Measurement)
1975	Ordinance* amended: asbestos spraying is prohibited; implementation of Specific Medical Examination for asbestos-handling workers (on placement and every 6 mo.)
1995	EO (ISHL) amended: prohibition of <u>crocidolite</u> and <u>amosite</u> Ordinance amended: PPE mandated for designated jobs; reinforcement of regulatory procedures for removal of sprayed asbestos
1996	Health Administration Diary distributed and Medical Examination provided to retired workers who handled asbestos under a particular condition
2004	EO (ISHL) amended: <u>chrysotile</u> prohibited in principle (construction material, abrasive material, etc.)
2005	Ordinance on Prevention of Asbestos Hazards separated from Ordinance*

Total Ban of Asbestos Effective Sep.1 2006

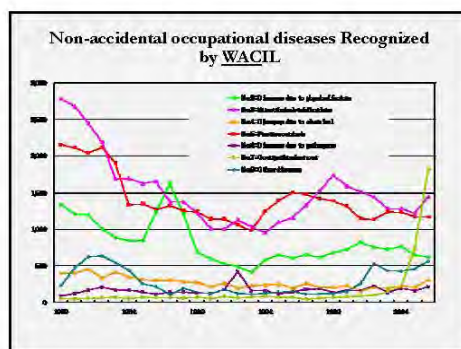
アスベスト全面禁止

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、製造の過程において、原料の含有率の0.1%以下のものを除く。

Prohibition of manufacture, import, sale, provision, use for products containing 0.1%+ weight of asbestos

● 天然石綿 (石綿)
クロシロ (石綿)
● 角閃石系石綿
クロシロ (石綿)
アモナイト (石綿)
アモナイト
アモナイト



5 top occupational cancers in Japan - cumulative number, 1987-2006

Cumulative number of compensated cases

1	Mesothelioma & lung cancer (asbestos)	3,362
2	Urinary tract Cancer (Benzidine, β -naphthylamine)	608
3	Lung and upper resp tract Ca. (chromium)	194
4	Skin cancer (Soot, Mineral Oil, Tar, Coal tar, Pitch, Asphalt, Pasty)	145
5	Lung or skin cancer (arsenic)	77
	Lung cancer (coke oven emissions)	76

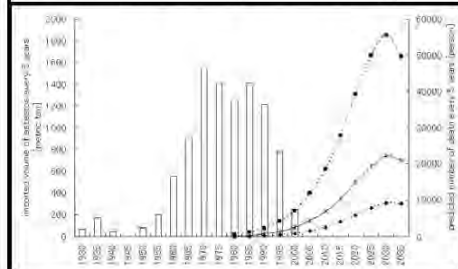
5 top occupational cancer in Japan recent trends, 2000-2006

Recent trends of compensated cases (annual number)

- 1 Mesothelioma & lung cancer (asbestos) $\uparrow \uparrow$ 1000+
 - 2 Urinary tract Cancer (Benzidine, β -naphthylamine) \rightarrow 5 to 10
 - 3 Lung and upper resp tract ca. (chromium) \rightarrow 3 to 5
 - 4 Skin cancer (Soot, Mineral Oil, Tar, Coal tar, Pitches, Asphalt, Parafyn) \searrow 0 to 1
 - 5 Lung or skin cancer (arsenic) \searrow 0
- Lung cancer (coke oven emissions) \nearrow 3 to 12

Lung cancer among pneumoconiosis
P 30 (2000-01) to 100+ (2002-07)

Prediction: Estimated future deaths from male pleural mesothelioma in Japan



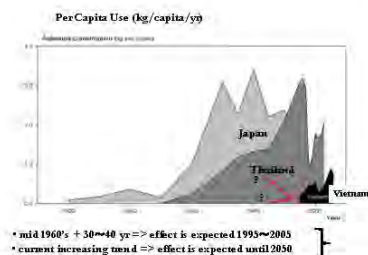
Murayama T, Takahashi K *et al* Am J Ind Med, 2006

Messages from the Japanese experience

- Asbestos use vs. economic development (positive)
- Asbestos use vs. mesothelioma (positive)
- Lack of asbestos awareness programs
- Gov action / social attention toward asbestos after the Kubota Shock (asbestos scandal)
- Clinical oriented research programs began
- Patient management system began
- Compensation / relief law (financial pressure)

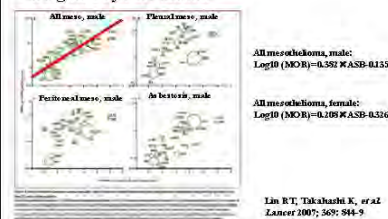
Sharing and Connecting Costly Experience (research project)

There *are* indications that A-C factories operated in the mid 60's



Ecological relationship

MORTality (2000-04) regressed on ASBESTOS (1960-69),
weighted by POPulation



Important issues to be considered

- Effective communication and collaboration (vision)
- Experiences to be shared
- Joint research and training programs
- Continuous pursuing GOV policy and regulation
- "Lag" in national phases provides opportunities for technology share and transfer
- Smooth flow of basic & essential information
- Top priority: a future economic burden
- A biz plan how to replace ACP using substitutes
ex: Viet Nam (roofing sheet 1M m²/yr)

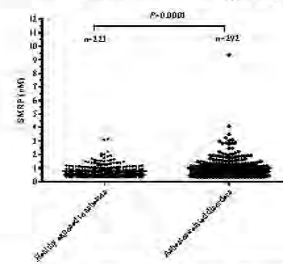
What is the University of Occupational and Environmental Health (UOEH) doing?

- The Asian Asbestos Initiative
international seminar (3 series seminars)
- Asbestos-related research
- International collaboration with
academic / gov. sectors & Int'l. organizations
- Asbestos-related training programs
- Developing a toolkit for elimination of ARDs

Underlying Principles of AAI

- Share & transfer technologies at all Three Levels of Prevention with due regard to primary prevention
- Recognize Societal Transitions may take some time with need to recognize unique national situations and variable-term goals
- Co-ordinate among academia & administration in close line with International Organizations

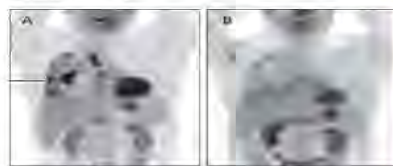
Application of biomarker to detect mesothelioma in early stages



Bark EK et al Am J Respir Crit Care Med 2006;173:632-7

Early detection of mesothelioma using biomarkers

Positron emission tomography/computed tomographic images of a 51-year-old male before and after treatment of mesothelioma.



A: Before treatment, increased tracer uptake is visible in the apex of the right lower lobe, extending into the oblique and horizontal fissures (arrow). B: One year after radical surgery and radiotherapy, no abnormal tracer uptake is visible.

© Lone EI, Bark EK et al MJA 2005;190:156-9

Toolkit for elimination of ARDs A Milestone for the Future

➤ UOEH and Rotterdam Convention (UNEP)

PI: Professor Ken Takahashi (UOEH)

8 institutions from 4 countries involved

➤ Specific Aims:

To develop a universally accessible toolkit for the elimination of asbestos-related diseases. The focus will be on Asian countries, while attempting to formulate a regional model from existing materials and information

**Toolkit for elimination of ARDs
A Milestone for the Future**

Main activities;


1. Asbestos exposure assessment, risk identification and substitutes
2. Asbestos-related legislations and regulations
3. Diagnostic tools for asbestos-related diseases
4. Economic cost/burden incurred by asbestos exposure and asbestos-related diseases
5. Risk communication

Issues to be considered

- Centralized a free accessible information source (Toolkit)
- Approaching a balanced policy between agencies and situation
- Current company size (survival rate)
- Lag will give us a precious time
- Who has a responsibility in future?
- When is a right time to prepare a future plan?

Management of Industrial Chemicals (especially Asbestos) in Singapore

Evelyn Koh
Occupational Safety and Health Division



**MINISTRY OF
MANPOWER**

A Great Workforce A Great Workplace

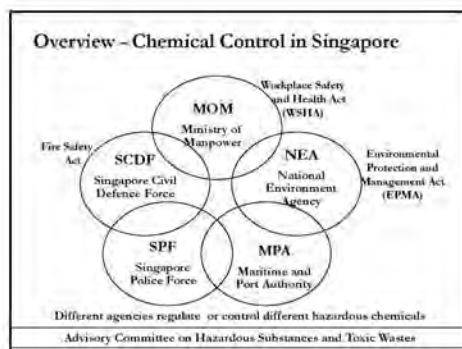
Workplace Safety & Health Strategy

To improve workplace health management

Targeted Intervention Programmes

None-Induced Disease Prevention Programme	Confined Space Management Programme	National Asbestos Control Programme	Management of Hazardous Chemicals Programme
---	-------------------------------------	-------------------------------------	---

Strategy 1 Developing standards	Strategy 2 Providing compliance assistance	Strategy 3 Building capability	Strategy 4 Educating / engaging stakeholders	Strategy 5 Targeted enforcement
---	--	--	--	---



Relevant Regulations

NEA

- Environmental Protection and Management Act (EPA)
- EPM (Hazardous Substances) Regulations
- Environmental Public Health Act (EPAH)
- EPH (Toxic Industrial Waste) Regulations

- ❖ Licence for import, sell or export of HS
- ❖ Permit for purchase, store and / or use of HS
- ❖ Licence to collect, transport, store, treat and dispose of TIW

SCDF

- Fire Safety Act
- Fire Safety (Petroleum & Flammable Materials) Regulations

- ❖ Licence for import, transport and storage of petroleum and flammable materials

Relevant Regulations

MOM

- Workplace Safety and Health Act
- WSH (General Provisions) Regulations
- Factories (Medical Examinations) Regulations
- WSH (Risk Management) Regulations

WSH (General Provisions) Regulations:

- ❖ Reg. 5 Ventilation
- ❖ Reg. 26 Precautions with regard to explosive or flammable substance
- ❖ Reg. 39 Toxic dust, fumes or other contaminants
- ❖ Reg. 40 Permissible exposure levels of toxic substances
- ❖ Reg. 41 Hazardous substances
- ❖ Reg. 42 Warning labels
- ❖ Reg. 43 Safety data sheets
- ❖ Reg. 44 Safety and health management system

Standards & Guidelines

- Occupational Exposure Standards – PEL & BIV
- Singapore Standard SS586:2008 Code of Practice for Hazard Communication for Hazardous Chemicals & Dangerous Goods
- MOM Guidelines:
 - Guidelines on prevention & control of chemical hazards
 - Air sampling & analysis guide
 - Guidelines on solvent degreasing
 - Designated Factory Doctor Statutory Medical Examination Guidelines

Enforcement

Inspect / audit on chemical safety – major hazard installations & high risk workplaces

Probe on Hazardous Substances Investigation of accidents – involving hazardous chemicals

Capability Building

Training courses:

- Management of Hazardous Chemicals
- Sampling & Monitoring of Airborne Contaminants
- GHS Users, GHS Awareness, GHS Classification

Engagement & Promotion

Technical Advisories:

- Safe Usage of Degreasing Solvents
- Prevention and Control of Chemical Hazards
- Flammable & Hazardous Substances

Seminars & Workshops

- Seminars on hazard communication for chemical suppliers and users

Self-Regulation

In-plant Management of Hazardous Chemicals Programme

Hygiene monitoring – database on chemical exposure

Medical surveillance – database on biological exposure results

Other Initiatives

Risk Assessment

- Developed the Semi-Quantitative Risk Assessment (SQRA) Tool

Hazard communication

- GHS hazard communication implementation

Studies and Surveys

- Chemical industry profiling
- HF study

Partnership with Industry Associations

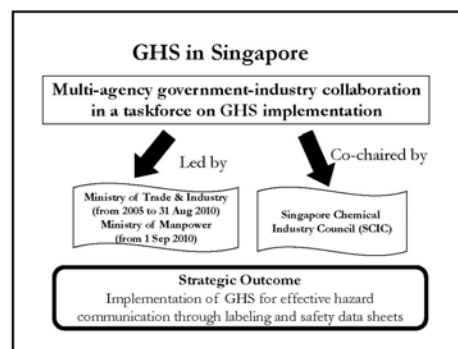
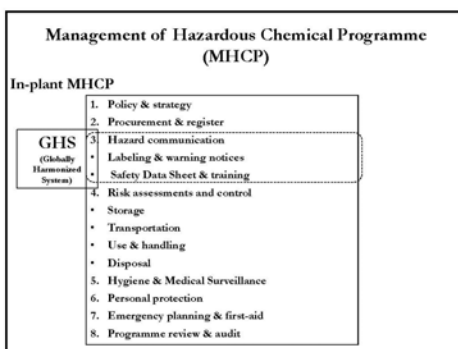
- Guidebook on Transport and Handling of Dangerous Goods
- Guidebook on Warehousing & Storage of Hazardous Materials and Dangerous Goods
- Guidebook on GHS of Classification and Labelling of Chemicals

Information Sharing

- Sharing case studies of successful health hazards control on the internet.

Incentives & Awards

- WSH Practice Awards (including chemical hazard control category)
- Tax incentive scheme for chemical hazards control



National GHS Implementation Task Force

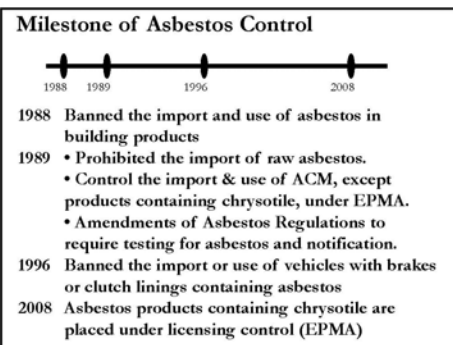
- Ministry of Trade and Industry [MIT]
- Singapore Chemistry Industry Council [SCIC]
- Ministry of Manpower [MOM]
- National Environment Agency [NEA]
- Economic Development Board
- Standards Productivity and Innovation Board
- Maritime and Port Authority [MPA]
- Singapore Civil Defence Force [SCDF]
- Singapore Police Force [SPF]
- Agri-Food & Veterinary Authority of Singapore
- Health Science Authority
- Singapore Institution of Safety Officers

Asbestos Control in Singapore



Ministry of Manpower (MOM)	Safety and health of persons at work with asbestos
National Environment Agency (NEA)	Control on the import, sale and export of asbestos
	Control on asbestos waste

Relevant Regulations		
MOM	• Workplace Safety and Health Act	2006
	• WSH (Risk Management) Regulations	2006
	• WSH (General Provisions) Regulations	2006
	• Factories (Medical Examinations) Regulations	1985
	• Factories (Asbestos) Regulations	1980
	• WSH (Incident Reporting) Regulations	2006
NEA	• Work Injury Compensation Act	2008
	• Environmental Protection and Management Act	1999
	• Environmental Public Health Act	1988
	• Environmental Public Health (Toxic Industrial Waste) Regulations	1988
	• Hazardous Waste (Control of Import, Export & Transit) Act	1998
	• Hazardous Waste (Control of Import, Export & Transit) Regulations	1998



Past exposure to Asbestos:

1. Manufacturing of building & construction materials containing asbestos
2. Installation of asbestos- containing materials (ACM):
 - During construction of buildings
 - During ship-building
 - In petrol-chemical plants

Present exposure to asbestos:

1. Demolition or renovation of buildings with ACM
e.g. removal of roof sheets, ceiling board
2. Removal of ACM from vessels and from process piping during maintenance / renovation
e.g. removal of pipe insulation, gaskets, laggings
3. Use of ACM e.g. gaskets

Rotterdam Convention & Control of Asbestos Products

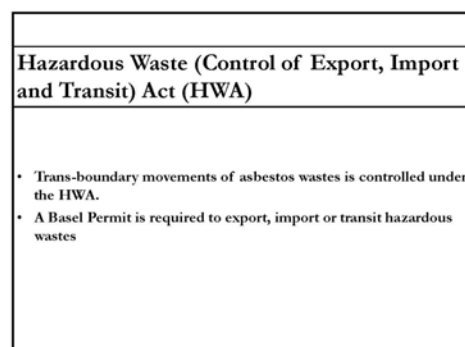
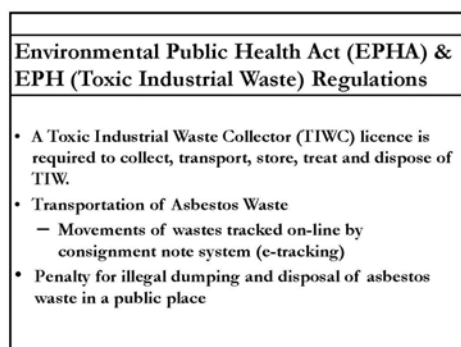
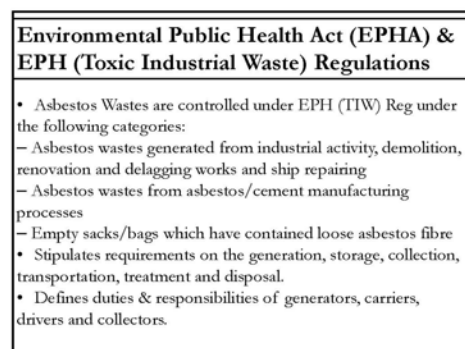
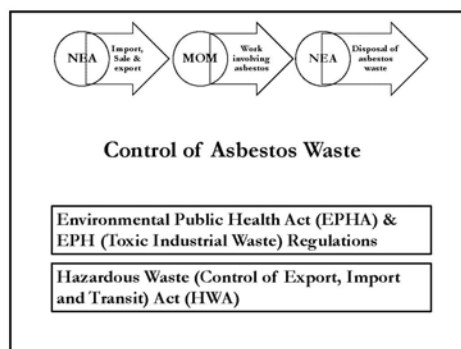
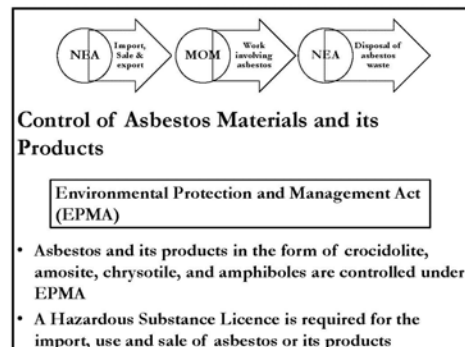
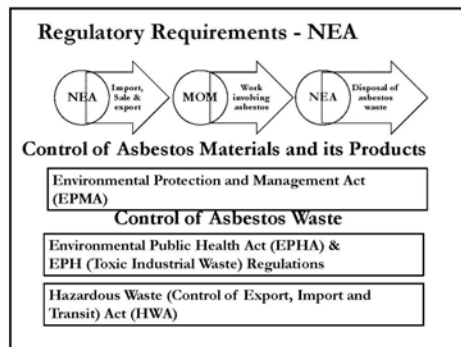
- Singapore is a party to the Rotterdam Convention* since 24 May 2005
- Asbestos in the form of crocidolite, anthophyllite, actinolite, amosite and tremolite are controlled under the Rotterdam Convention.
- PIC (Prior Informed Consent) is required for import and export of the asbestos products into and out Singapore respectively

*Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

Basel Convention & Control of Asbestos Wastes

- Singapore became a Party to the Basel Convention* on 2 January 1996
- Asbestos (dust and fibres) is listed as Y36 of Annex I of the Basel Convention
- PIC procedures are required for the import, export and transit of asbestos wastes

* Basel Convention on the Control of Transboundary Movements of Hazardous Wastes & their Disposal





Packing of asbestos waste



Barge operated by private operator

- Asbestos and its waste shall only be collected by licensed asbestos disposal contractors
- To be barged directly to Semakau Landfill



Regulatory Requirements - MOM

Safety & Health of Person at work with Asbestos

Workplace Safety and Health Act
Factories (Asbestos) Regulations
WSH (General Provisions) Regulations
WSH (Risk Management) Regulations
Factories (Medical Examinations) Regulations
WSH (Incident Reporting) Regulations & Work Injury Compensation Act

Workplace Safety and Health Act

Duties of Occupier

- Take reasonably practicable steps to ensure workplace is safe

Duties of Employer

- Take reasonably practicable steps to ensure the safety and health of employees

Powers of inspectors & powers to take samples

Factories (Asbestos) Regulations

Definition of "Asbestos":
 –crocidolite, amosite, chrysotile, fibrous anthophyllite or a mixture containing any of those minerals

Application:
 Every process involving asbestos or asbestos containing products (ACM) in which asbestos dust can be given off

Factories (Asbestos) Regulations

Before work:

1. Ascertain the presence of asbestos in work processes
2. Notify the Commissioner 28 days before commencement

Factories (Asbestos) Regulations

3. Engineering control - exhaust ventilation to prevent the spread of asbestos dust
4. Personal protective equipment (PPE):
 - respiratory protective equipment
 - protective clothing
5. Provide separate accommodation for:
 - putting on and taking off of PPE
 - storage of PPE when not in use

Factories (Asbestos) Regulations

After work

6. Cleanliness - factory premises, machineries and equipment kept clean and free from asbestos dust
7. Storage & Distribution - loose asbestos or asbestos waste kept separately in closed receptacles and marked with
"Asbestos – do not inhale dust"

WSH (General Provisions) Regulations

1. Control of & protection of workers against toxic dust and airborne contaminants
2. Regular workplace monitoring to be conducted by competent person
3. Asbestos dust are not present in quantities exceeding the permissible exposure limit (PEL).
4. PEL is 0.1 f/cc for all types of asbestos

WSH (Risk Management) Regulations

1. Conduct risk assessment for all work activities / processes before commencement of asbestos work
2. Identify, evaluate and control the risk
 $Risk = f(Severity, Likelihood)$
3. Take all reasonably practicable steps to eliminate the risk. If not possible,
 - (i) minimise the risk – substitution, engineering control, administrative control and PPE
 - (ii) implement SWPs

Factories (Medical Examinations) Regulations

1. Workers to be certified fit by DFD before employment
2. Medical examinations to include:
 - (i) A clinical examination for signs and symptoms of asbestosis, lung cancer and mesothelioma
 - (ii) A full size chest x-ray examination
3. Periodic examination - once every 36 months.

WSH (Incident Reporting) Regulations & Work Injury Compensation Act

1. Asbestosis and Mesothelioma are reportable occupational diseases (OD)
2. Duty of employer and registered medical practitioner to report
3. Employees who contracted OD arising out of their work can claim compensation

Capacity Building

1. *Asbestos Removal and Management Course* – jointly organized and conducted by MOM & NEA
2. Train personnel to be competent in:
 - (i) asbestos removal and management
 - (ii) supervising asbestos removal work
3. Publications:
 - *Guidelines on the Removal of Asbestos Materials in Buildings*
 - *Guidelines on the Handling of Asbestos Materials*
 - *Guide to Management of Asbestos Containing Materials in Buildings*
 - *Curricular on Safe Removal of Asbestos-containing Materials in Buildings*

National Asbestos Control Programme (NACP)

To reduce / eliminate

- Exposure to asbestos
- Asbestos-related diseases

1) Strengthening legislative requirements & enforcement	<ul style="list-style-type: none"> • Review asbestos regulations • Stricter control on contractors
2) Building capabilities	<ul style="list-style-type: none"> • Enhance training courses • Competency in identifying asbestos
3) Outreach & engagement of stakeholders	<ul style="list-style-type: none"> • Seminars and dialogue sessions • Build stronger partnerships

Asbestos Management in Korea

September 1, 2010
Eun-A Kim / OSHRI of KOSHA
Occupational Safety and Health Research Institute of Korea
Occupational Safety and Health Agency

Contents

- 1. Asbestos Import and Use
- 2. Asbestos Containing Materials
- 3. Asbestos Related Diseases
- 4. Policy and Plan
 - Ministry of Labor
 - Ministry of Environment

Asbestos use and import

- roof tiles (slates)
- brake pad
- asbestos cement
- textile
- packing
- tape
- blanket(fire-proof)

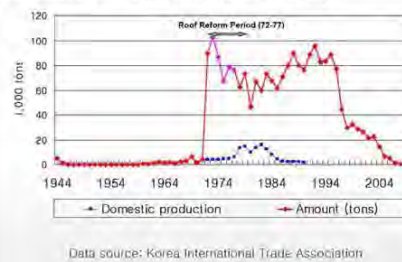
Asbestos Use in Korea

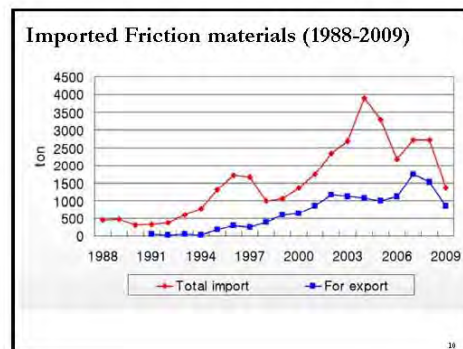
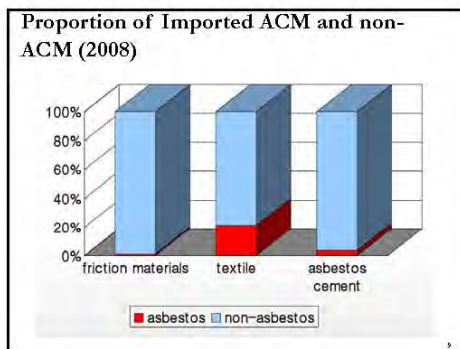
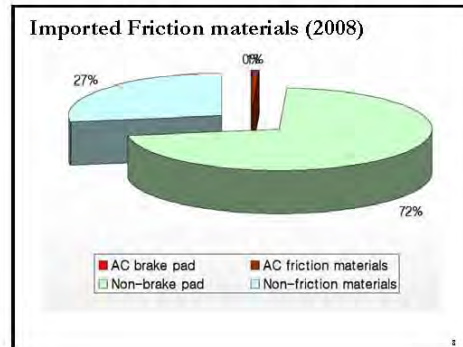
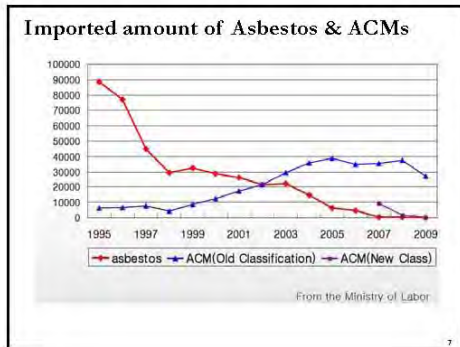
- Production in domestic mine
 - Started in 1930s, closed in 1990
 - Chrysotile, some tremolite
 - Highest production: 15,933 tons in 1982
- Import
 - mostly from Canada (Chrysotile)
 - Highest consumption: 95,000 tons in 1992
 - 1 ton in 2009

Imported Asbestos in Korea (1976-2009)



Asbestos Use in Korea (1944-2009)





Asbestos-containing materials

Workplaces permitted to use Asbestos in 2002

	Number of Workplaces	Asbestos (ton/year)	%	Employees	Workers
Construction	4	50,354	85.5	1,254	107
Friction	18	4,453	7.6	1,051	301
Textile	1	132	0.2	5	5
Chemicals	7	692	1.2	1,261	40
Machines	6	3,182	5.4	319	73
Others	3	84	0.1	29	6
Total	39	58,896	100.0	3,919	532

Chung YH et al, Asbestos Content in Buildings, 2002, OSHRI

Asbestos Use by Period of Construction

	Fiberless Building	Outside	Fiberglass	Chrysotile/Amosite	ACM Building
1950s-1960s	10	2	4	4	6(60%)
1970s	20	14	5	1	15(75%)
1980s	38	11	23	4	15(39%)
1990s	43	9	26	6	15(35%)
2000s	14	7	6	1	8(58%)
Unknown	15	13	1	1	14(93%)
Total	140	56	67	17	73(52%)

Chung YH et al. Asbestos Content in Buildings, 2002, OSHRI

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Asbestos Use by the Type of Building

	Fiberless Building	Asbestos	Fiberglass	Chrysotile/Amosite	ACM Building
Building	97	26	61	10	36(37%)
Workplace	21	16	2	3	19(90%)
Station	8	5	1	1	5(83%)
Hospital	4	2	1	1	3(75%)
Underground shopping center	7	8			7(100%)
Public Office	5	1	2	2	3(60%)
Total	140	56	67	17	73(52%)

Chung YH et al. Asbestos Content in Buildings, 2002, OSHRI

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Asbestos Contents (wt%) by Product

Product name	Company	Product			Content	Content range
		Type	Company	Number		
Fiber reinforced cement	KSL5114	Slate	2	2	Roof	10±3
		Board	1	1	Ceiling	5±1
		Partition	2	2	Wall	8±2
Decorated asbestos cement plate	KSF3210	Partition	1	1	Wall	8±2
Concrete panel	KSF4735	Walls	1	1	Wall (outside)	10±2
Plaster cement plate	KSL5509	Board	2	2	Ceiling	5±1

Chung YH et al. Asbestos Content in Buildings, 2002, OSHRI

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Actions toward for Ban on Asbestos

- * Industrial Safety and Health Act
 - 2000 Crocidolite, Amosite
 - 2003 All Asbestos except Chrysotile
 - 2007: asbestos cement product, friction materials with some exception
 - 2008: all asbestos products
 - With 0.1 weight percent with some exception
 - 2009: all asbestos product
 - Exception until its substitutes are developed
- * Required permission
 - Manufacturing and Using Chrysotile since 1990
 - Removal or demolition of AC buildings since 2003
- * Enforced Occupational Exposure Level
 - 0.1 fiber/cc since 2002

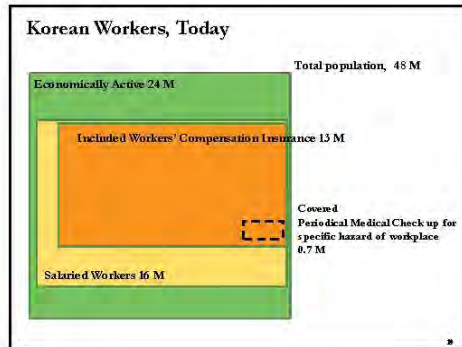
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Remaining Issues

- Demolition, removal, or repair of buildings with ACM
- Compensation issue
 - Workers without any proof of employment
 - Workers who worked at the workplace which was not eligible to the compensation
- Inhabitants near the abandoned asbestos mines

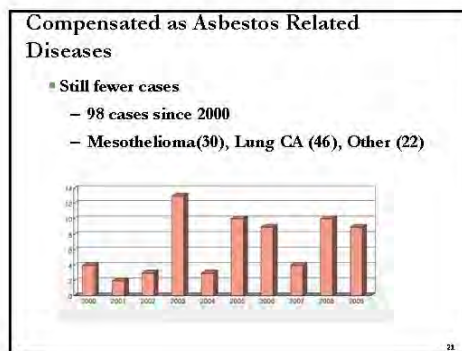
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Asbestos-related Diseases



Policy for Hazard exposed workers

- Periodic medical test for 177 kinds of occupational hazards
 - about 70 thousands of workers annually
- 206 Kinds of workplace Hazard were monitored in the air
- Quality control program for sine 1993
 - pneumoconiosis ILO film reading for 120 institutes
 - Environmental measurement of chemicals

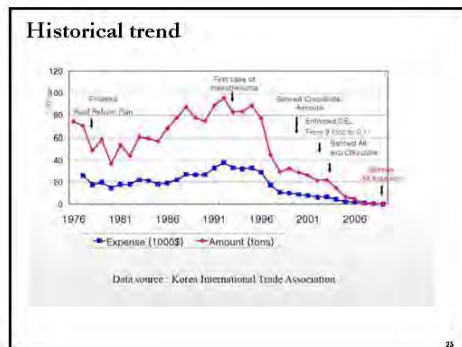


The global burden of disease due to occupational carcinogens (Driscoll et al. 2005)

Table IX Attributable fractions (per cent) for lung cancer and leukemia caused by workplace exposure

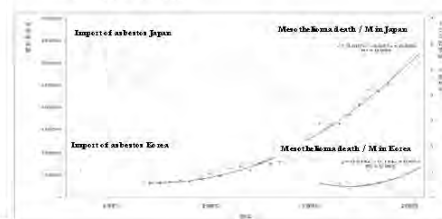
Region ¹	Lung cancer			Leukemia		
	Male	Female	Total	Male	Female	Total
AFR(2)	0	4	2	3	1	2
AFR(3)	0	3	1	0	2	1
AMEL(4)	0	2	1	0	1	1
AMR(5)	11	3	6	2	2	2
AMR(2)	12	2	6	3	2	3
EUR(6)	12	2	6	3	2	3
EUR(3)	9	3	7	2	1	1
EUR(4)	7	2	5	1	1	1
EUR(5)	13	4	10	3	1	2
EUR(6)	15	6	10	2	2	2
SEAR(8)	10	6	8	2	2	2
SEAR(3)	11	4	6	2	1	1
WPR(4)	8	5	6	2	2	2
WPR(5)	12	7	10	2	1	1
World	10	6	8	2	2	2

¹ Regions: AFR = Africa; AMR = Americas; EUR = Eastern Mediterranean; EUR = Europe; SEAR = South-East Asia; WPR = Western Pacific; ² Very low adult mortality; ³ Low child, low adult mortality; ⁴ Low child, high adult mortality; ⁵ High child, high adult mortality; ⁶ High child, very high adult mortality



Expectation of Mesothelioma in Korea

- Still, No spurt of mesothelioma yet in Korea
- Cumulative death of Mesothelioma will be 10,000 until 2035 (Ahn YS 2006)



Policy for Prevention of Asbestos Exposure

Actions taken by the MOL

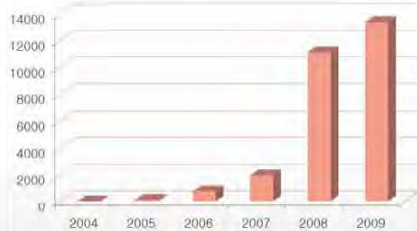
- Ban Asbestos
 - Prohibit to produce, manufacture, import and export any asbestos and ACMs
- Regulation for removal work of AC buildings
 - Before: Mandatory reporting by an authorized investigator
 - During: Should be performed by a registered agency
- Following up on workers exposed to asbestos
 - Complimentary annual Health Examination for workers who hold the Health Management Pocketbook

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Legislation against Asbestos in 2009

ISH Act	Decree	Ordinance	Health Regulation	Notice
Prohibition of Manufacturing, etc. (art. 37)	Asbestos except chrysotile	Exception for a test and research	Prevention for health effect (art. 13)	Ban ACMs
Permission of Use (art. 38)	Chrysotile	Condition of permission	Standard of manufacturing (art. 12)	—
Pre-investigation removal of asbestos (art. 38, (c) 2-5)	Organization for investigation, removal/demolition	Condition for designation (equipment, manpower etc.)	Work standard of asbestos removal (art. 12)	Analysis, Quality Control, Education
Health Management Pocketbook (art. 44)	—	Target group (annex 14-2)	—	—

Permission for Demolition of AC Buildings



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Asbestos Removal/Demolition Policy

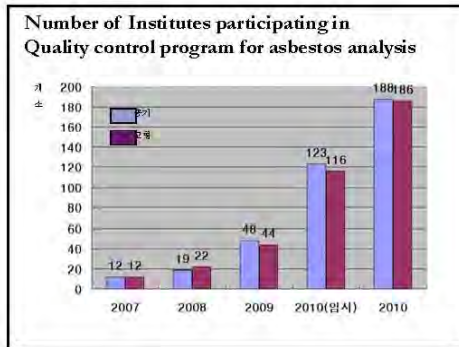
- Obligation to pre-investigation, removal and demolition of AC buildings by authorized agencies
 - When buildings and facilities over certain scale are planned to be removed or demolished
 - Pre-investigation of asbestos by an authorized agency
 - Removal or demolition by a registered agency to MOL
- Removal must be performed by a registered agency
 - If sum of area for removal or demolition exceeds more than 50 m²
 - over 200 m² in the place of residence
 - If sum of area for insulation is over 15 m² or 1 m³
 - If the length of insulation pipe is over 80m

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Asbestos Management Policy

- Quality Control for Analyzing Asbestos
 - Agencies that passed the QC program are eligible to analyze asbestos in work environment.
 - Requires to join the program annually
 - The QC is operated by OSHRI, KOSHA.
- Education
 - Investigators : 18 hours
 - Hazard, policy, method for pre-investigation, PPEs etc.
 - Managers (removal/demolition) : 18 hours
 - Hazard, policy, removal method, management of workers, PPE etc.
 - Workers : more than 2 hours
 - Special education is required to workers exposed to asbestos.

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Results of QC for asbestos analysis program

- 2007 (2007.10.15~2008.3.20)
 - Air : Pass 11/12, Bulk : Pass 11/12
- 2010 (2009.11.17 ~ 2010.2.10)
 - Air : Pass 118/123, Bulk : Pass 114/116

- #### Management of Asbestos Workers
- Health Management Pocketbook
 - Eligible to workers who worked at asbestos work for a certain period
 - Exposure Period
 - More than 3 months
 - At asbestos or asbestos textile manufacturing work
 - More than 1 year
 - At manufacturing or processing work of ACMs
 - Removal or repairing of insulation: sprayed and fire resistive coating materials
 - More than 10 years
 - Removal, demolition or processing work of ACMs
 - In case of that $b + 10 + c \geq 120$

Asbestos Management Plan by the Ministry of Environment

- #### Relief of Asbestos Victim
- Occupational Exposure
 - Mesothelioma, lung cancer, and asbestosis who exposed to asbestos at work
 - Industrial Accident Compensation Insurance Fund
 - Environmental Exposure (plan)
 - Eligibility
 - New ARD after the relief act is effective
 - Survivors of ARD before the act is effective
 - Coverage
 - Medical expense and allowance
 - A gratuity and funeral expense

- #### Recent Issues on Asbestos
- Asbestos in underground stations
 - Air level was not high, but people are concerned about it.
 - Started removal of asbestos and ACMs by stages
 - Flying asbestos during removal or demolition of Building
 - During reconstruction of old buildings
 - Baby powder by asbestos contaminated talc
 - Asbestos was found in the baby powder
 - Health issue of inhabitants near asbestos mines
 - Pleural plaque and asbestosis were found in inhabitants near abandoned asbestos mines.

Asbestos Safety Management Act

- Proposed by Min of Environment
 - Under discussion among relevant Ministries
- Main contents
 - Management of AC building
 - Asbestos map
 - Certification of asbestos free building
 - Support for investigation of building
 - Management of asbestos generating work
 - Removal, demolition, repairing of buildings
 - Build the infrastructure
 - Agency, manpower, monitoring system
 - Management of NOA

37



Figures on Asbestos

Annual work-related deaths – 107'000
Population exposed in the workplace 125 million
(WHO Fact Sheet, 2010)

Annual deaths

UK: 153 in 1968, 1'874 in 2003, increase to 2'450 by 2015
France: 2'000 at present, peak 3'000 by 2020
USA: around 10'000 cases

Projected deaths during 1995-2020

200'000 (mesothelioma) in 6 countries of Western Europe (France, Germany, Italy, Netherlands, Switzerland, United Kingdom)
500'000 - for the whole Western Europe (mesothelioma and lung cancer)

«One in seven people in western societies may have been adversely affected by exposure to asbestos» European Respiratory Society, Congress Report, 2001

Compensation costs for ARD

Germany: €290 million by 2001, several billions Euros by 2020

France: €27-37 billion for the next 20 years

United States

600'000 cases filed in courts by 2000
50'000 new complaints lodged every year
\$21.6 billion paid by insurers by 2000
\$32 billion paid by prosecuted enterprises
\$200-265 billion increase is expected

Asbestos environmental exposures

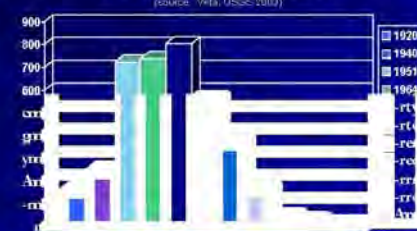
Natural sources (erosion of asbestos containing rocks)

Residence in the vicinity of mines or plants manufacturing asbestos products

Release of fibers from public, residential and commercial buildings containing friable asbestos

Contamination of homes by work clothes

US Asbestos Consumption,
metric tons x 1000,
selected years 1920-2000
(source: WHO, USGS 2003)



International Programme on Chemical Safety

IPCS evaluation of the health effects of chrysotile asbestos, EHC 203

- Exposure to chrysotile asbestos poses risks for asbestosis, lung cancer and mesothelioma in a dose-dependent manner
- No threshold has been identified for carcinogenic risks
- Where safer substitute materials for chrysotile are available, they should be considered for use

Review of human carcinogens, IARC, 2010

Conclusion concerning Asbestos

“Epidemiological evidence has increasingly shown an association of all forms of asbestos (chrysotile, crocidolite, amosite, tremolite, actinolite and anthophyllite) with an increased risk of lung cancer and mesothelioma. Although the potency differences with respect to lung cancer or mesothelioma for fibres of various types and dimensions are debated, the fundamental conclusion is that all forms of asbestos are carcinogenic to humans (Group 1)”

ILO International Instruments

Legal frameworks for action:

Labour Inspection C.81
Occupational Cancer C.139
Working Environment C.148
Occupational Safety and Health C.155
Occupational Health Services C.161

Asbestos Convention 162

Chemicals Convention 170

➤ 35 Codes of Practice

➤ A formidable body of definitions, principles, obligations, duties and rights, and technical guidance on how to deal with asbestos hazards



ILO Convention Occupational Cancer Convention 139

Key provisions of Convention 139 concern:

- periodically determining the carcinogenic substances and agents to which occupational exposure shall be prohibited or made subject to authorization or control;
- making 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;
- reducing the number of workers exposed to carcinogenic substances or agents and the duration and degree of such exposure to the minimum.

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.

Policy Guidance on Asbestos

Resolution on Asbestos adopted by ILC, 2006

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

"The Asbestos Convention, 1986 (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

Advocacy and partnerships

EU/ILO Asbestos Conference, 2003

- Asbestos remains the primary carcinogenic substance in the workplace
- Asbestos-related diseases are amongst the most serious and costly occupational illnesses
- In transition and developing countries asbestos will be a "time bomb" in 20-30 years

Asbestos in shipbreaking

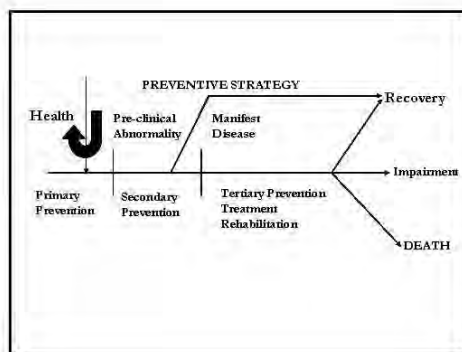
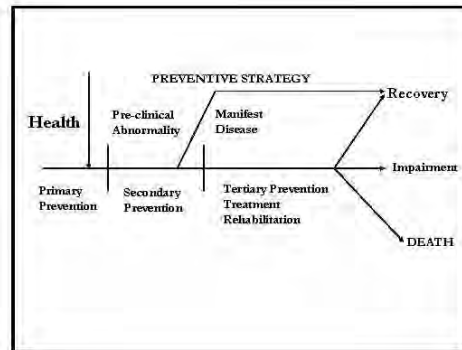
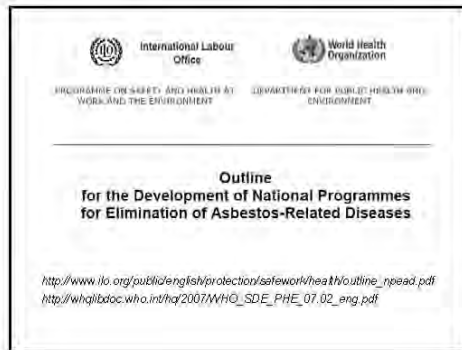
Up to 3000 ships need to be scrapped annually (Bangladesh, China, India, Pakistan, Turkey)

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

New IMO Convention of Ship Recycling, 2009, with ILO and BC/UNEP contribution



Roles and action towards the elimination of ARD

Governments

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

Roles and action towards the elimination of ARD

Employers/Enterprises

Introduction of substitutes for asbestos:

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

Trade Unions/Workers

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



Future action and assistance

Promote the ratification of Occupational Cancer C.139 and Asbestos C.162 ;

Assist in establishing comprehensive NPEADs;

Strengthen national capacities to prevent ARD, train physicians in early detection of ARD with the use of the ILO;


Classification of Radiographs;

Develop national certification schemes with AIR Pneumo Project, Japan;

Share knowledge on substitutes and transfer of safe technologies

Inter-agency cooperation (ILO, WHO, ILO and BC of UNEP, ISSA, UNITAR);


Support national and regional initiatives (AAI) to eliminate ARD.



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 to the forthcoming peak of asbestos-related diseases
- The continuous use of asbestos represents serious health risks to individuals and is damaging to the economy and the society

The elimination of conditions inevitably leading to asbestos-related diseases means not 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

 UNITED NATIONS
UNIVERSITY
International Institute For Global Health (UNU-
IIGH)

Economics of Asbestosis

Professor Dr Syed Mohamed Aljunid
 United Nations University-International Institute For Global
 Health
 Kuala Lumpur

Outline

- Introduction
- Burden of Diseases Linked to Asbestos
- Burden of Non-Communicable Diseases
- Getting Attention of Policy Makers
- Cost of Illness Studies
- Cost of Lung Cancer
- Cost of COAD
- Cost of Asthma
- Actions on Asbestos
- Conclusions

Introduction

Asbestos

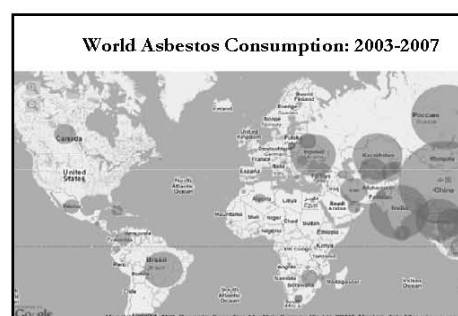
- Natural occurring mineral
- Long thin fibre and fibre bundles
- Great tensile strength, poor conductor of heat and resistant to chemicals (acids)
- Non biodegradable
- Small airborne fibres when inhaled cause severe lung disease
- Proven human carcinogen

Types of asbestos

- Chrysotile (white asbestos)- most common
- Crocidolite (blue asbestos)
- Amosite (brown asbestos)
- Anthophyllite
- Tremolite
- Actinolite

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.



Burden of Diseases Linked to Asbestos

- Current production of Asbestos
 - 2.04 to 2.5 million metric tonnes per annum
- 125 million people exposed to Asbestos at workplace
- 90,000 people die each year due to exposure to asbestos

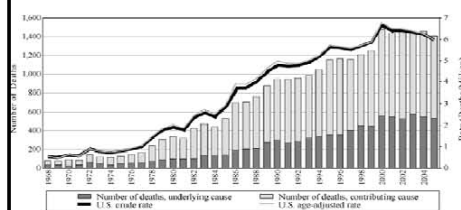
Exposure to Asbestos

- 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

Asbestosis 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

Asbestosis: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1968–2005



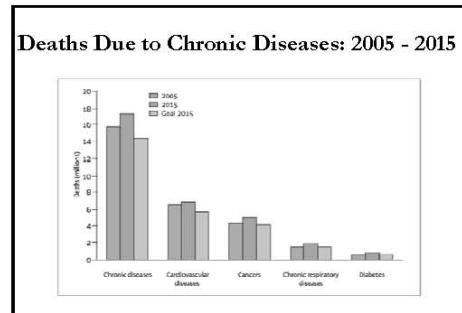
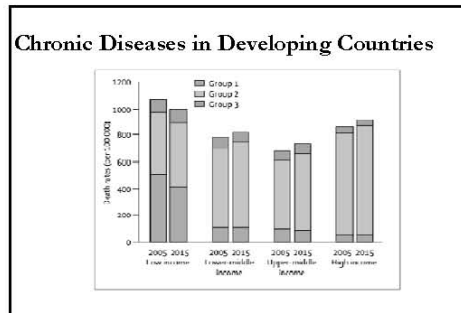
Global Burden of Diseases – Occupational Risk Factors

	Annual Deaths	DALYs 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 Supp 12005; no 1:55-61

Projected Global Burden of Chronic Illness (2005 – 2015)

Age Group	DEATHS (Millions)		DALYS (Millions)	
	2005	2015	2005	2015
0-29 years	1.7	1.5	220	219
30-59 years	7	8	305	349
60-69 years	7	8	101	125
>=70 years	20	24	99	116
All Ages	35	41	725	808



- ### Getting Attention of Policy Makers....
- Epidemiology Data
 - Morbidity
 - Mortality
 - Disease Burden (DALYs)
 - Financial Data
 - Economic Evaluation Studies

- ### Epidemiology Data
- Routinely collected data
 - Surveillance Data
 - Asbestos related diseases
 - Other Occupational Diseases
 - Ad-Hoc Research
 - Incidence
 - Prevalence

- ### Economic Evaluation
- Types
 - Cost Analysis
 - Cost-minimisation Analysis
 - Cost-effective Analysis
 - Cost-Utility Analysis
 - Cost-Benefit analysis

- ### Measuring the economic burden of illness
- Cost of illness studies
 - To quantify the burden of a disease by expressing it in monetary terms
 - Three costs components
 - Direct Cost
 - Cost of Prevention, Diagnosis, Treatment and Rehabilitation
 - Indirect Cost
 - Loss of current and future income due to morbidity and premature deaths
 - Intangible Cost
 - Cost due to pain, bereavement, anxiety and sufferings

Economic Burden of Illness

- Cost of illness studies
 - Two Approaches
 - Prevalence approach
 - Estimates cost of a disease in a given year
 - Most common approach
 - Incidence approach
 - Estimates lifetime cost of diseases diagnosed in a given year
 - More demanding in terms of data
 - Can be used to assess benefits of new intervention

Economic Burden of Illness

Cost of Illness Study

- Three Steps
 - Define the illness
 - Itemise the Resource Implications
 - Value and Sum the Elements

Cost of Illness Study

Advantages

- Tell us how much society is spending on the diseases
- Identify different components of cost and size of the contribution of each sector in society
- Highlight funding priorities and areas of deficiencies
- Identify areas for research priority

Cost of Illness Study

Issues

- Accurate measurement of cost is difficult
- Lack of technical capacity in developing countries
- High cost illness may not necessary be amenable to treatment approach
- Savings from treatable conditions may not arise immediately

Cost of Lung Cancer in Malaysia (Cost per case)

		<i>MEAN (RM)</i>	<i>MIN (RM)</i>	<i>MAX (RM)</i>
Patients Costs	Primary Care Visits	644.55	352.92	9,585.60
	Specialists Clinics Visits	1,405.66	688.83	2,468.63
	Admissions and Procedure	928.04	521.12	1,755.52
	Palliative Care	4,779.63	2,056.43	65,301.44
	Total Patients Costs	7,757.88	3,620.30	77,111.28
Providers Costs	Specialists Clinics Visits	8,276.29	4,580.64	11,982.07
	Admissions and Procedure	17,521.32	12,161.66	25,427.68
	Palliative Care	8731.8	3,612.80	44,961.60
	Total Providers Costs	34,529.41	20,355.10	82,371.35
TOTAL COSTS		42,287.29	23,975.40	159,482.63

Annual Cost of Lung Cancer in Malaysia (RM)

	Mean	Min	Max
Patient	26,749,170	12,482,794	265,879,693
Providers	119,057,406	70,184,385	284,016,415
Total	145,806,576	82,667,179	549,896,108

Cost of COPD in Malaysia (RM)

		MEAN (RM)	MIN (RM)	MAX (RM)
Patients Costs	Primary Care Visits	1,689.11	468.55	2,329.66
	Specialists Clinics Visits	8,746.41	8,606.28	9,232.83
	Admissions and Procedure	2,330.77	287.35	6,631.74
	Total Patients Costs	12,757.29	9,356.18	18,194.23
Providers Costs	Specialists Clinics Visits	5,593.50	4,051.61	8,109.12
	Admissions and Procedure	13,821.70	2,153.71	25,999.97
	Total Providers Costs	19,415.20	6,205.32	34,109.09
TOTAL COSTS		32,172.49	15,561.49	52,303.32

Annual Cost of COPD in Malaysia (RM)

	Mean	Min	Max
Patient	1,184,196,830	861,353,412	1,916,611,858
Providers	1,880,566,143	633,182,726	3,378,677,302
Total	3,064,762,973	1,494,536,138	5,295,289,160

Budget impact of Lung Cancer and COPD in Malaysia

	Mean	Max	Min
Total Cost	3,065 Mil	1,495 Mil	5,295 Mil
% of GDP	0.8	0.4	1.3
% Health Spending	17.3	8.4	29.9
%MOH Budget	24.9	8.4	44.7

Asthma

- The most common chronic disease among children.
- 300 million people currently suffer from asthma.
- Most asthma-related deaths occur in low- and lower-middle income countries.

Cost of Asthma**Asthma Insights and Reality in Asia Pacific (AIRIAP) study**

- Sept to Dec 2000
- 8 countries
- Household Interviews
- Malaysia (Kelang valley, Penag, JB and Ipoh); 404 subjects
- Lai et al (2006) *Eur Respir Review* 15(98): 10-16

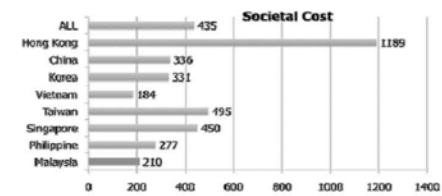
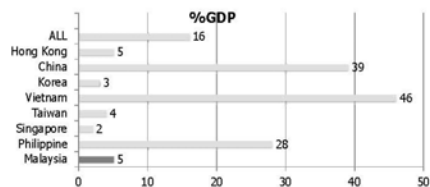
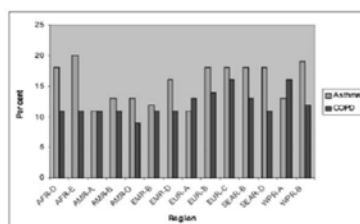
Cost of Asthma**Direct per-patient cost/year**

- Total cost USD 108 (SE= 13)
- Urgent vs Maintenance Care
 - 63% Urgent Care
 - 47% Maintenance
- Drugs vs Others
 - 12% Drugs cost
 - 88% Non-Drugs

TABLE 2 Maintenance care visits by area

Country	GP visits	Specialist visits
China	16.56	0.94
Hong Kong	6.46	0.78
Korea	18.81	2.72
Malaysia	10.63	1.08
The Philippines	8.40	2.54
Singapore	5.10	0.66
Taiwan	12.24	0.94
Vietnam	4.64	1.03
Total	10.32	1.33

Data are presented as mean number of visits. GP, general practitioner.

Annual Total Societal Cost of Asthma (USD)(2000)**Annual Total Societal Cost of Asthma as % of GDP (2000)****Annual Direct Patient Cost of Asthma as % of Health Spending (2000)****Attributable Fraction For Mortality Due to Asthma and COPD (2000): Workplace Exposure****Action On Asbestos**

- Stop using all types of asbestos
- Provide information on solution to replace asbestos with safer substitutes
- Develop economic and technological mechanisms to stimulate replacement
- Take measures to prevent exposure to asbestos
- Improve early diagnosis, treatment and social and medical rehabilitation of asbestos-related diseases
- Establish registries of people with past and current exposure to asbestos

Issues to think about....

- What is the scale of the problem in developing countries?
- What is the cost of replacing Asbestos?
- How much can be saved by using alternatives?
- How do we get the policy makers to act?
- What about tax incentives and disincentives?

Conclusion

- Exposure to Asbestos causes significant morbidity and mortality
- Asbestos caused chronic diseases with substantial economic impact
- Chronic non-communicable disease is an important public health problem in developing countries; part of it is linked to Asbestos
- Cost of Illness Studies can be used to influence policy makers to take appropriate action to stop the use of Asbestos
- Urgent need to improve health financing system in developing countries

The Carcinogenicity of Asbestos

Kurt Straif, MD MPH PhD

The IARC Monographs

Consensus evaluations of the weight of the evidence that an agent can increase the risk of cancer in humans

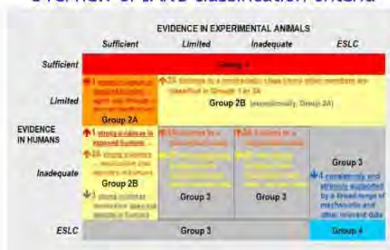
Approximately 900 agents evaluated since 1971

1 - carcinogenic to humans	110
2A - probably carcinogenic to humans	64
2B - possibly carcinogenic to humans	243

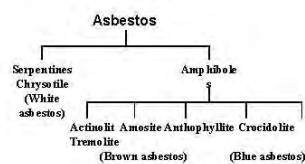
National and international health agencies use the *Monographs*

- As a source of information to identify potential carcinogens
- As scientific support for their actions to prevent cancer

Overview of IARC classification criteria



IARC Monographs on Asbestos



IARC Monographs on Asbestos: 2, 1973 Carcinogenicity to animals

- Inhalation experiments can produce fibrotic lesions in the lung and pleura similar to those found in man
- Injection of asbestos into the pleural cavity: all major commercial forms can produce mesotheliomas.
- By inhalation, mesotheliomas and lung carcinomas in rats exposed to the 4 commercial types of asbestos.
- Probably not due to contaminants such as oils
- More likely the size and shape of the particles

IARC Monographs on Asbestos: 2, 1973 Carcinogenicity to humans

- Risk of lung carcinoma and mesothelioma in workers in chrysotile mines and mills
- Mesotheliomas have been observed in Communities in the neighbourhood of these mines
- In manufacturing and application industries mesotheliomas have been caused by exposure to crocidolite, and less frequently to amosite and chrysotile.

IARC Monographs on Asbestos: 14, 1977 Carcinogenicity to animals

- All commercial forms of asbestos tested are carcinogenic in mice, rats, hamsters and rabbits
- Oral administration of asbestos filter material to rats also resulted in an increased incidence of tumours
- The size and shape of the fibres influence the incidence of tumours

IARC Monographs on Asbestos: 14, 1977 Carcinogenicity to humans

- Small amounts of chrysotile has also caused an increased incidence of lung cancer
- Many pleural and peritoneal mesotheliomas observed after occupational exposure to chrysotile
- Excess risk of laryngeal & gastro-intestinal cancers in groups exposed occupationally to chrysotile
- Not possible to assess whether there is a safe level of exposure in humans

IARC Monographs on Asbestos

Actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite

- Vol 2, 1973: sufficient evidence in humans, sufficient evidence in animals (1)
- Vol 14, 1977: sufficient evidence in humans, sufficient evidence in animals (1)
- Suppl 7, 1987: sufficient evidence in humans, sufficient evidence in animals, 1

<http://monographs.iarc.fr/>

IARC Scientific Publications, 140, 1996 Mechanisms of fibre carcinogenesis

5 mechanistic hypotheses for fibre carcinogenicity

- Fibres generate free radicals that damage DNA
- Fibres interfere physically with mitosis
- Fibres stimulate proliferation of target cells
- Fibres provoke a chronic inflammatory reaction leading to prolonged release of ROS, cytokines & growth factors
- Fibres act as co-carcinogens or carriers of chemical carcinogens to the target tissue

IARC Scientific Publications, 140, 1996 Mechanisms of fibre carcinogenesis

Conclusions

Insufficient understanding of how the physical and chemical properties of fibres contribute to mechanisms of fibre-induced carcinogenesis

Overall, the available evidence in favour of or against any of these mechanisms leading to the development of lung cancer and mesothelioma in either animals or humans is evaluated as weak

Environmental Health Criteria

Inter-organization programme for the sound management of chemicals

IOMC: UNEP, ILO, FAO, WHO, UNIDO, UNITAR, OECD

Chrysotile Asbestos, EHC 203, 1998

- In numerous long-term inhalation studies in laboratory rats various samples of chrysotile fibres have caused interstitial fibrosis and cancer of the lung and pleura
- Fibrogenic and carcinogenic effects found in long-term animal studies (mainly in rats) using other modes of administration (e.g., intratracheal instillation and intrapleural or intraperitoneal injection)

Chrysotile Asbestos, EHC 203 Quantitative estimates and mechanistic evidence

- Data from **inhalation studies** are **inadequate** for providing quantitative estimates of the risk to humans, and there are uncertainties concerning the sensitivities of the animal studies for predicting human risk.
- The **mechanisms** by which chrysotile and other fibres cause fibrogenic and carcinogenic effects are **not completely understood**.

Chrysotile Asbestos, EHC 203 Conclusions and Recommendations

- Exposure to chrysotile asbestos poses increased risks for asbestosis, **lung cancer** and **mesothelioma** in a dose-dependent manner.
- No threshold** has been identified for carcinogenic risks.
- Where safer substitute materials for chrysotile are available, they should be considered for use.
- Asbestos exposure and cigarette smoking** have been shown to **interact** to increase greatly the risk of lung cancer.

IARC Monographs, Volume 100 A Review of Human Carcinogens

- Scope of volume 100
 - Update the critical review for each carcinogen in Group 1
 - Identify tumour sites and plausible mechanisms**
 - Compile information for subsequent scientific publications
- The volume was developed over the course of 6 meetings
 - A. *Pharmaceuticals* (23 agents, Oct 2008)
 - B. *Biological agents* (11 agents, Feb 2009)
 - C. *Metals, particles and fibres* (14 agents, Mar 2009)
 - D. *Radiation* (14 agents, June 2009)
 - E. *Lifestyle factors* (11 agents, Sept 2009)
 - F. *Chemicals and related occupations* (34 agents, Oct 2009)

Asbestos: Mesothelioma and lung cancer, V100C

- The epidemiologic evidence has only strengthened over time and there is currently overwhelming evidence that **all commercial forms of asbestos fibers** are **causally associated** with an increased risk of **mesothelioma and lung cancer**.
- There are still current **controversies** 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). However, these issues do not alter the fundamental conclusion that the epidemiologic evidence indicates that **all forms and sizes of commercial asbestos fibers** are **carcinogenic to humans**.

Asbestos: Laryngeal cancer, V100C

- Fairly **consistent findings** of both the occupational cohort studies as well as the case-control studies, plus the evidence for **positive exposure-response relationships** between cumulative asbestos exposure and laryngeal cancer that is reported in several the well conducted cohort studies.
- Meta-analyses of 29 cohort studies** encompassing 35 populations and of **15 case-control studies** of asbestos exposure and laryngeal cancer undertaken by the Institute of Medicine (2006).
- There is sufficient evidence to infer a causal relationship between asbestos exposure and laryngeal cancer.

Asbestos: mechanistic data, V100C

- The mechanistic basis for asbestos carcinogenicity is a **complex interaction** between these crystalline mineral fibres and target cells in vivo.
- The most important **physicochemical properties of asbestos fibres** related to pathogenicity are **surface chemistry and reactivity, surface area, fibre dimensions, and biopersistence**.
- Multiple direct and indirect mechanisms** have been proposed based on numerous in-vitro cellular assays and acute and subchronic animal bioassays. These complex mechanisms most likely **interact at multiple stages** during the development of lung cancer and diffuse malignant mesothelioma.

Asbestos: mechanistic data, V100C

Direct interaction between asbestos fibres and target cells in vitro.

- a) Asbestos and erionite fibres have been shown to generate free radicals that directly induce genotoxicity as assessed by DNA breaks and oxidized bases in DNA.
- b) Asbestos fibres have also been shown to interfere with the mitotic apparatus by direct physical interaction resulting in aneuploidy and polyploidy.

Asbestos: mechanistic data, V100C

Indirect mechanisms

- In laboratory animals, asbestos fibres have been shown to induce macrophage activation and persistent inflammation that generate reactive oxygen and nitrogen species contributing to tissue injury, genotoxicity and epigenetic alterations.
- Persistent inflammation and chronic oxidative stress have been associated with activation of intracellular signalling pathways, resistance to apoptosis, and stimulation of cell proliferation.

Asbestos: mechanistic data, V100C

Species differences

- There are significant species differences in the responses of the respiratory tract to inhalation of asbestos fibres.
- The biological mechanisms responsible for these species differences are unknown.
- Based on comparative animal experimental studies, there may be differences in deposition and clearance of fibres in the lungs, in severity of fibrosis, in kinetics of translocation of fibres to the pleura, and in levels or types of antioxidant defence mechanisms.

Asbestos: Overall evaluations, V100C

- There is sufficient evidence in humans for the carcinogenicity of all forms of asbestos (chrysotile, crocidolite, amosite, tremolite, actinolite and anthophyllite). All forms of asbestos cause mesothelioma and cancers of the lung, larynx and ovary.
- 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.
- There is limited evidence in humans for cancers of the pharynx and of the stomach.

Other International & National Evaluations

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

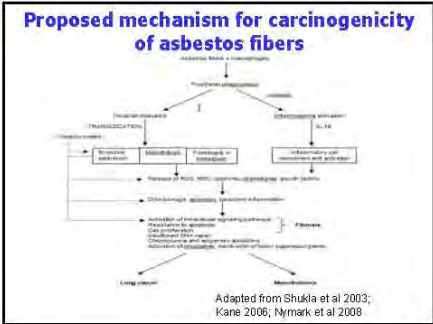
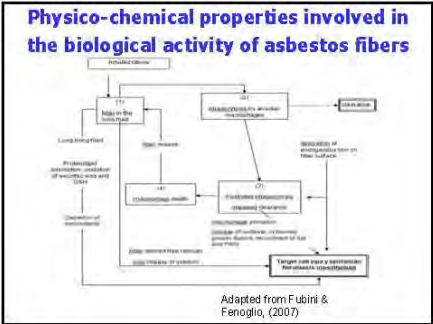
IOM Report (2006)

Asbestos: Selected Cancers

The committee concluded that the evidence is sufficient to infer a causal relationship between asbestos exposure and laryngeal cancer.

suggestive but not sufficient to infer a causal relationship between asbestos exposure and cancer of the pharynx, stomach and colorectum.



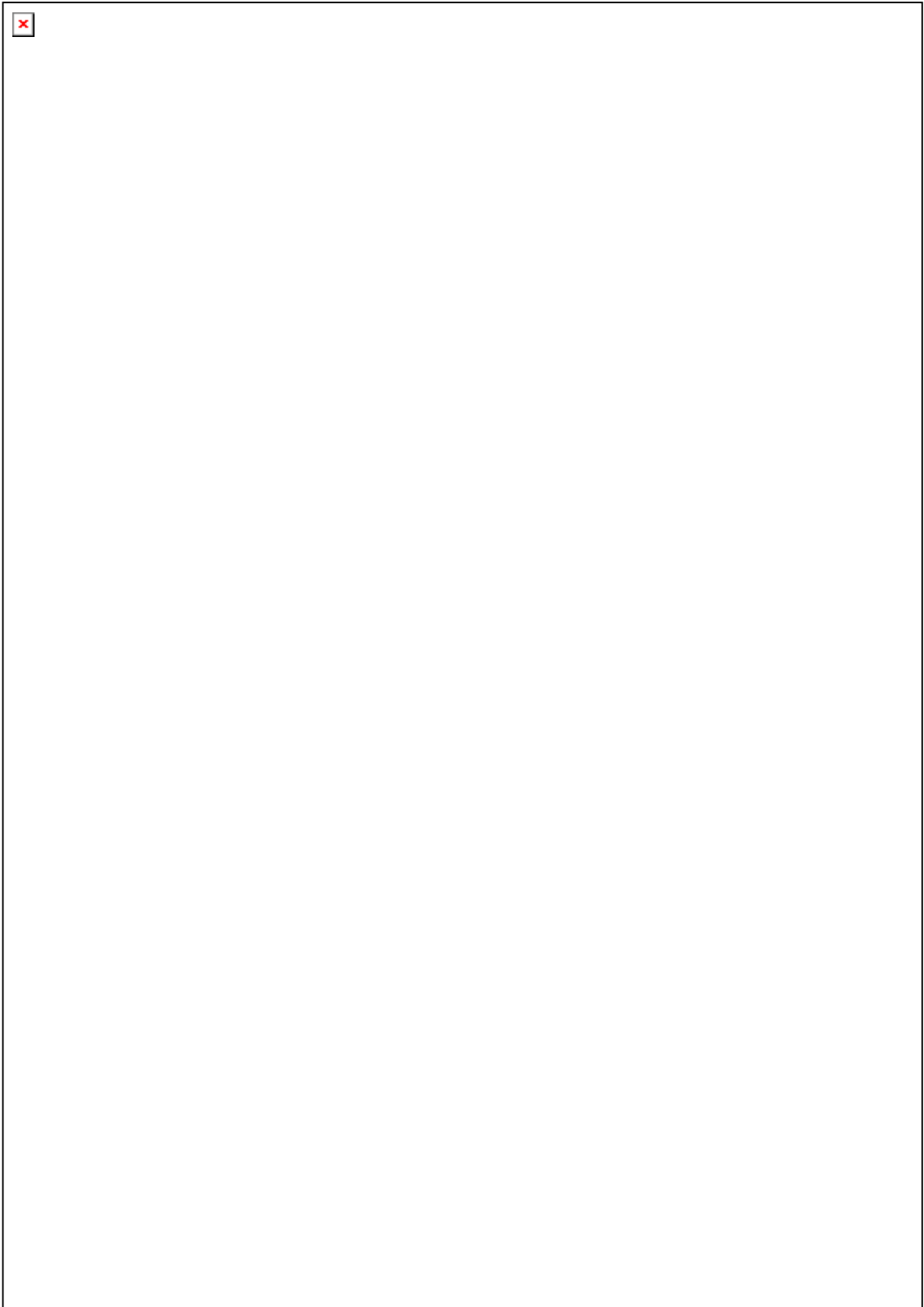


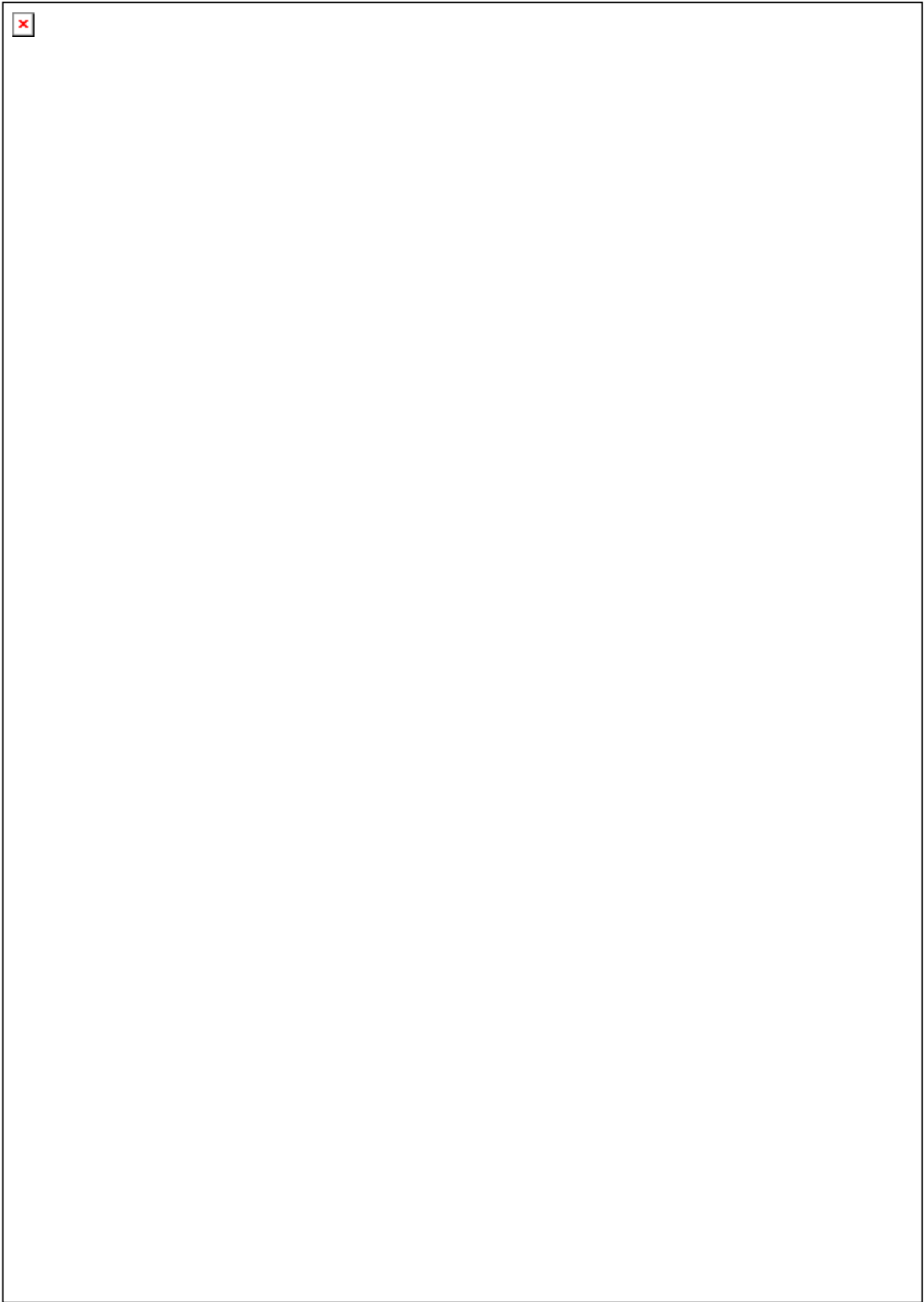
IARC Scientific Publications, 140, 1996
Mechanistic Hypotheses for Fibre Carcinogenicity

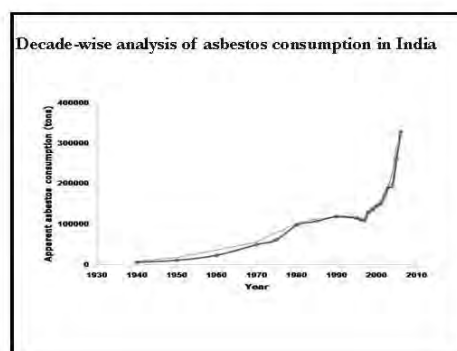
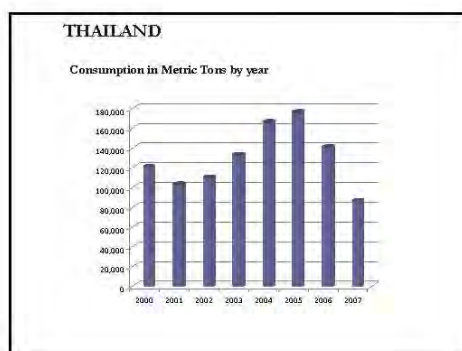
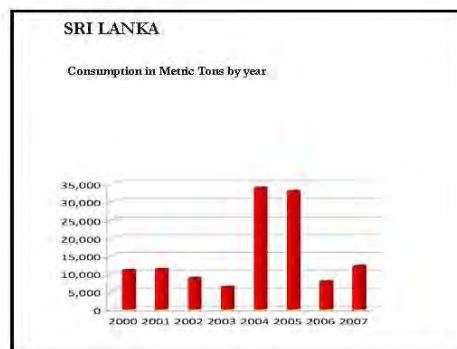
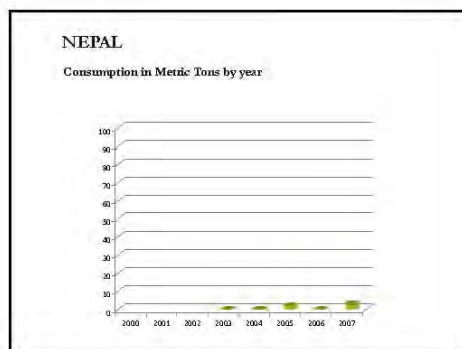
Experimental design	Oxidant induced damage	Aneuploidy	Cell proliferation	Inflammation	Co-carcinogenicity
<i>In vitro</i>					
Rodent cell lines	++	++	+/-	++	+/-
Human cell lines	+	+/-	0	++	0
<i>In vivo</i>					
Rodents - short term	+	0	++	++	0
Rodents - long term	0	0	++	++	+/-
Humans	0	0	0	++	+/-

++, strong effect; +, weak effect; -, no effect; 0, no data; +/-, contradictory data

- Asbestos: open questions**
- Lung cancer potency varies by fiber type?
pro: review by Hodgson & Darton 2000 (10x),
con: review by Stayner et al. 1996
 - Lung cancer potency varies by fiber size?
indirect epidemiologic evidence (textile industry)
supports belief that fibers > 10 µm have higher carcinogenic potency for lung cancer
 - Mesothelioma potency varies by fiber type?
chrysotile < amphiboles, amosite may be < crocidolite,
but: mesothelioma among Chinese workers exposed to "pure" chrysotile (Yano 2001)
 - Mesothelioma potency varies by fiber size?
pro: mesothelioma at South Carolina > Quebec miners
con: South Carolina textile < New Orleans cement plant







- ### WHO RECOMMENDATIONS
- The 58th session of World Health Assembly urged Member States to pay special attention to cancers for which avoidable exposure is a factor, particularly exposure to chemicals at the workplace and the environment. Asbestos is one of the most important occupational carcinogens causing about half of the deaths from occupational cancer. Therefore, WHO is committed to work with countries towards elimination of asbestos-related diseases in the following strategic directions:
 - recognizing that the most efficient way to eliminate asbestos-related diseases is to stop the use of all types of asbestos;
 - provide information about solutions for replacing asbestos with safer substitutes and developing economic and technological mechanisms to stimulate its replacement;
 - take measures to prevent exposure to asbestos in the workplace and during asbestos removal (abatement);
 - improve early diagnosis, treatment, social and medical rehabilitation of asbestos-related diseases and to establish registries of people with past and/or current exposures to asbestos.

- ### REGIONAL PROGRAMMES
- Current ongoing initiatives on sound management of priority industrial carcinogens in Thailand, Indonesia and Sri Lanka (SAICM):
 - Priority setting – asbestos as one priority
 - Preventive interventions – technical, regulatory, economic
 - National programmes
 - New proposals to SAICM
 - Better links and increased collaboration with other sectors re other funding

Chemical HelpDesk

- WHO Collaborating Centre on Chemical Safety
- Pilot project for a Regional *Chem Help Desk* to strengthen the sound management of chemicals and to reduce knowledge gap and achieve SAICM objectives; and IHR 2005.

The Chem HelpDesk® is accessible at:
<http://www.ChemHelpDesk.org>

Expected Outputs

- Identify / prioritize chemical safety issues
- Access information on other chemical safety programmes and best practices.
- Access available funding opportunities.
- Provide opportunities for synergies with Multilateral Environmental Agreements.
- Provide tools and entry points
- Capacity of countries to deal with chemical safety is enhanced – chemical emergencies (recent examples)

How Chem HelpDesk operates

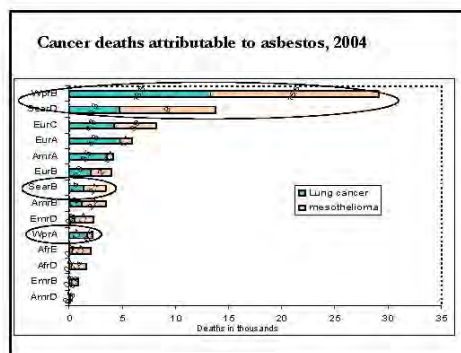
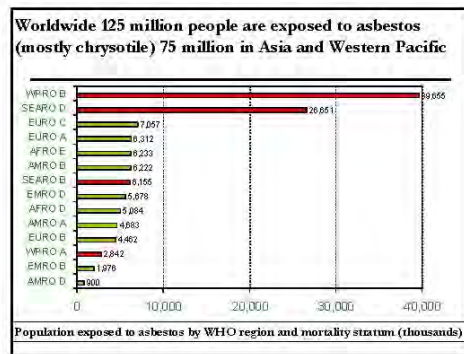
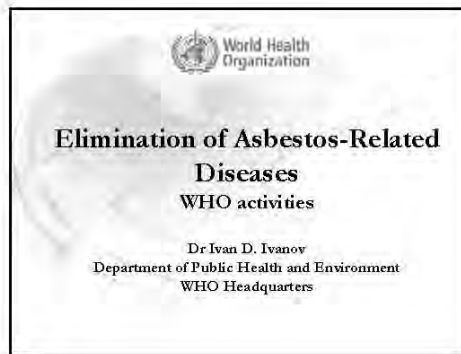
1. Registered members submit questions to the Chem HelpDesk
2. A Moderator collects questions from members, then sort, edit and submit questions to experts in the field related to each question
3. Experts submit answers to Chem HelpDesk
4. The Moderator verifies and publishes questions and answers (experts' identity is removed)
5. Users submit suggestions related to particular questions or issues

Challenges in Chemical Safety programmes

- Lack of accessible forms of information and evidence
- Which products contain asbestos?
- Limited capacity and expertise
- Asbestos is banned – some types of asbestos are banned
- Strong pro-asbestos lobby
- Cost of substitutes
- Limited resources and competing priorities
- Is asbestos the tip of the iceberg?

What is needed

- Information, case studies of success, what did the others do?
- Information to be made more accessible – user friendly
- Training, capacity building, information,
- Training for testing,
- Training for detecting, setting up cancer registers
- Research on substitutes
- Focus on quick wins
- Support for mobilizing resources – QSP, GEF, UNITAR
- Technical guidance



Asbestos is the most important occupational carcinogen

Global burden of disease from occupational cancer, 2000

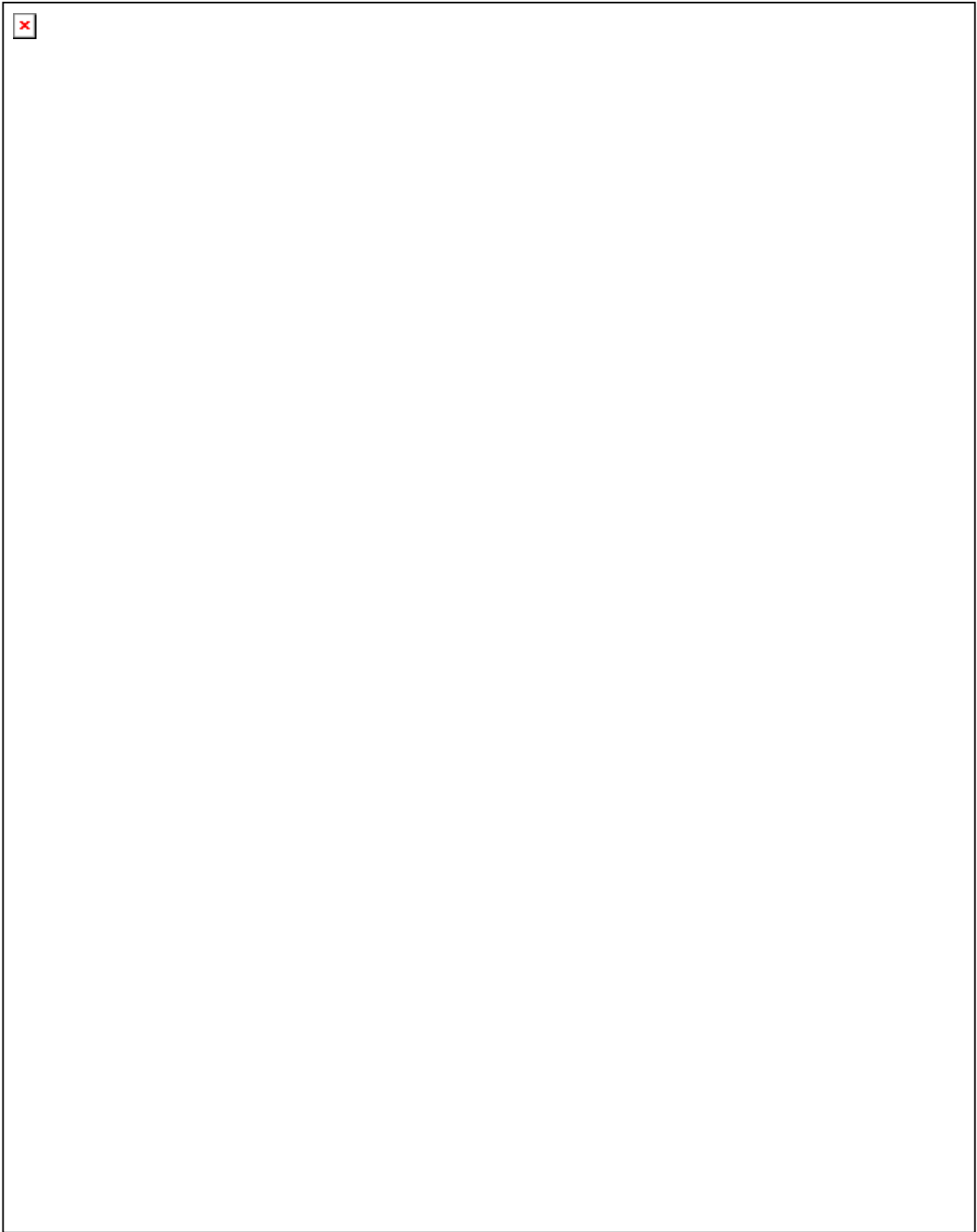
Cancer type	Attributable deaths	Attributable DALYs
Lung cancer	191,000	1,315,000
Leukaemia	7,000	101,000
Mesothelioma	43,000	564,000
Total	241,000	1,980,000

Global burden of asbestos-related cancer, 2000

Cancer type	Attributable deaths	Attributable DALYs
Lung cancer	39,000	360,000
Mesothelioma	43,000	564,000
Total	82,000	925,000

- Every year at least 107,000 people die from asbestos-related diseases**
- Annual deaths attributable to asbestos
 - at least 107,000 from lung cancer, mesothelioma and asbestosis due to occupational exposure (2010 estimates)
 - Additionally at least several thousands deaths can be attributed to other asbestos-related cancers and to non-occupational exposure
 - Asbestos is the single most important occupational carcinogen causing one third of all estimated deaths from occupational cancer

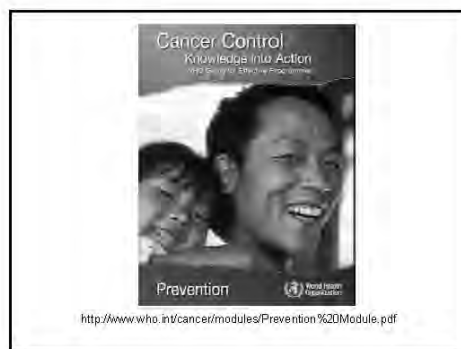
- Economic costs of asbestos-related cancer exceed the economic value of international trade in asbestos**
- Direct economic costs of asbestos-related cancer (medical, non-medical, loss of productivity) – \$2.4 billion in 2008
 - Lung cancer (48,000 cases) = US\$ 1.2 billion⁽¹⁾
 - Mesothelioma (59,000 cases)⁽²⁾ = at least same US\$
 - Economic value of international trade in asbestos in 2008 – US\$ 802 million ⁽³⁾
- ⁽¹⁾ own calculations based on EIU/LiveLong study and WHO estimates, 2009; ⁽²⁾ WHO estimates, 2010; ⁽³⁾ UN Comtrade, 2008





National programmes for elimination of asbestos-related diseases - WHO/ILO outline

- Introduction and purpose
- Political and legal background
- Strategy for elimination of asbestos-related diseases
- Knowledge management
- Implementation
- Monitoring and evaluation
- National asbestos profile



Stepwise approach to prevention of cancer

CORE	EXPANDED	DESIRABLE
<ul style="list-style-type: none"> • Stop using all forms of asbestos • Develop regulatory standards and enforce control of the use of known carcinogens in the workplace • Avoid introducing known carcinogens into the workplace • Include occupational cancer in the national list of occupational diseases • Identify workers, workplaces, and worksites with exposure to carcinogens 	<ul style="list-style-type: none"> • Assess occupational cancer risks • Introduce integrated management of carcinogenic chemicals • Train workers and managers in controlling occupational carcinogens • Substitute carcinogens with less hazardous substances 	<ul style="list-style-type: none"> • Develop programmes for cancer prevention and control in the workplace • Organize registries of occupational exposures to carcinogens and exposed workers • Conduct assessments for carcinogenic risk of industrial and agricultural chemicals • Estimate the national occupational burden of disease from carcinogens

WHO projects – 2010-2012

- Sound management of priority industrial carcinogens in Thailand, Indonesia and Sri Lanka (SAICM):
 - Priority setting
 - Preventive interventions – technical, regulatory, economic
 - National programmes
- Sound management of industrial chemicals with focus on asbestos in the Asia Pacific Region (Rotterdam Convention Secretariat)
 - Raise awareness among governments about chrysotile asbestos
 - National programmes in two countries
 - Risk assessment and risk management toolkit
 - Advocacy materials
- Regional Asbestos Atlas of the Americas (PAHO)
 - National asbestos profiles
- National programme on elimination of asbestos-related diseases in Vietnam (Japan Government)

WHO portal on asbestos-related diseases



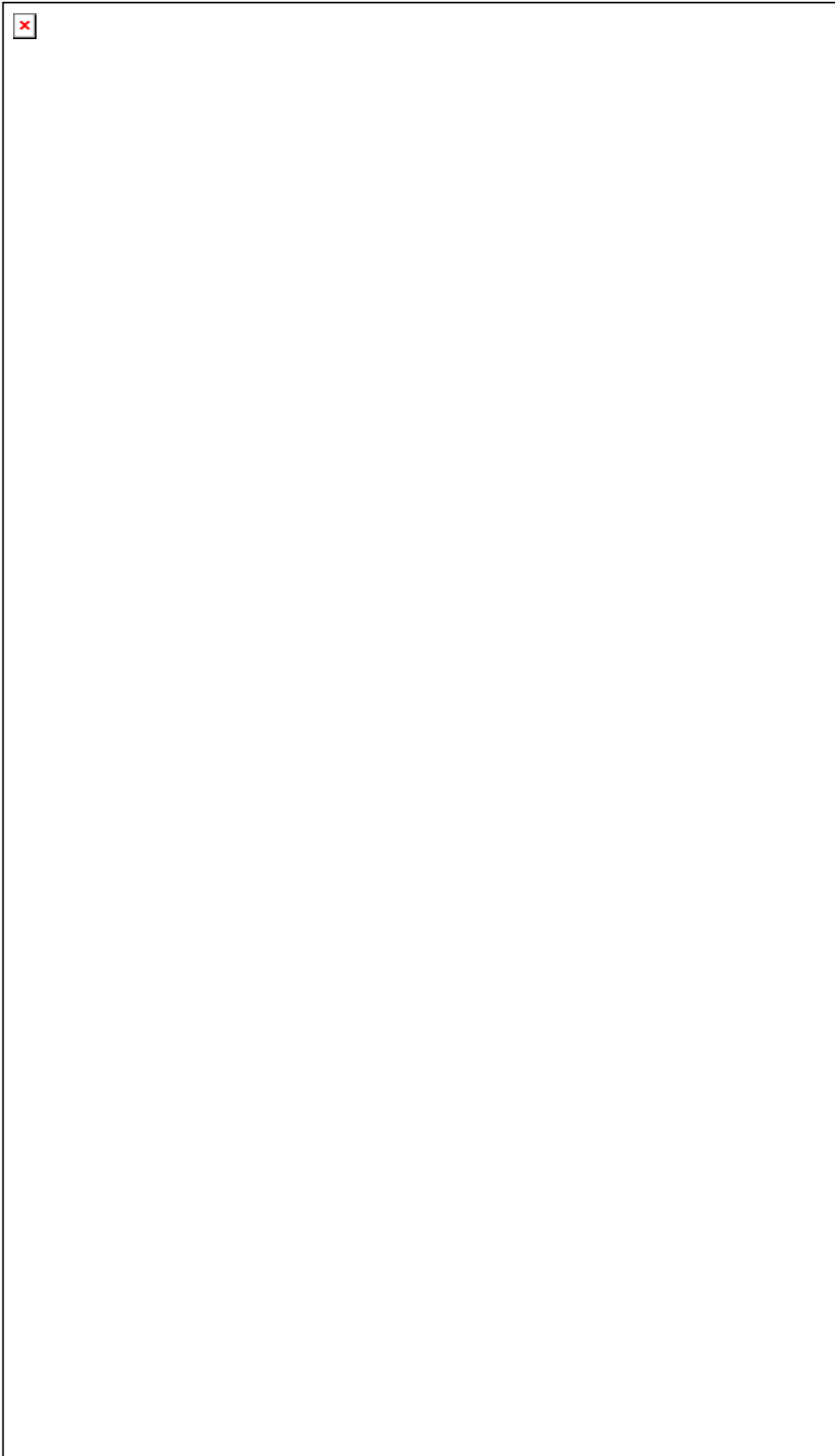
Asbestos toolkit for Asia



- Prepared by UOEH, Japan, in collaboration with KOSHA and UN University
- Content:
 - Exposure assessment, hazard identification and substitutes
 - Legislation and regulations
 - Diagnostic tools for asbestos-related diseases
 - Economic impacts
 - Risk communication
- Media: Internet and CD
- Launch: summer 2011

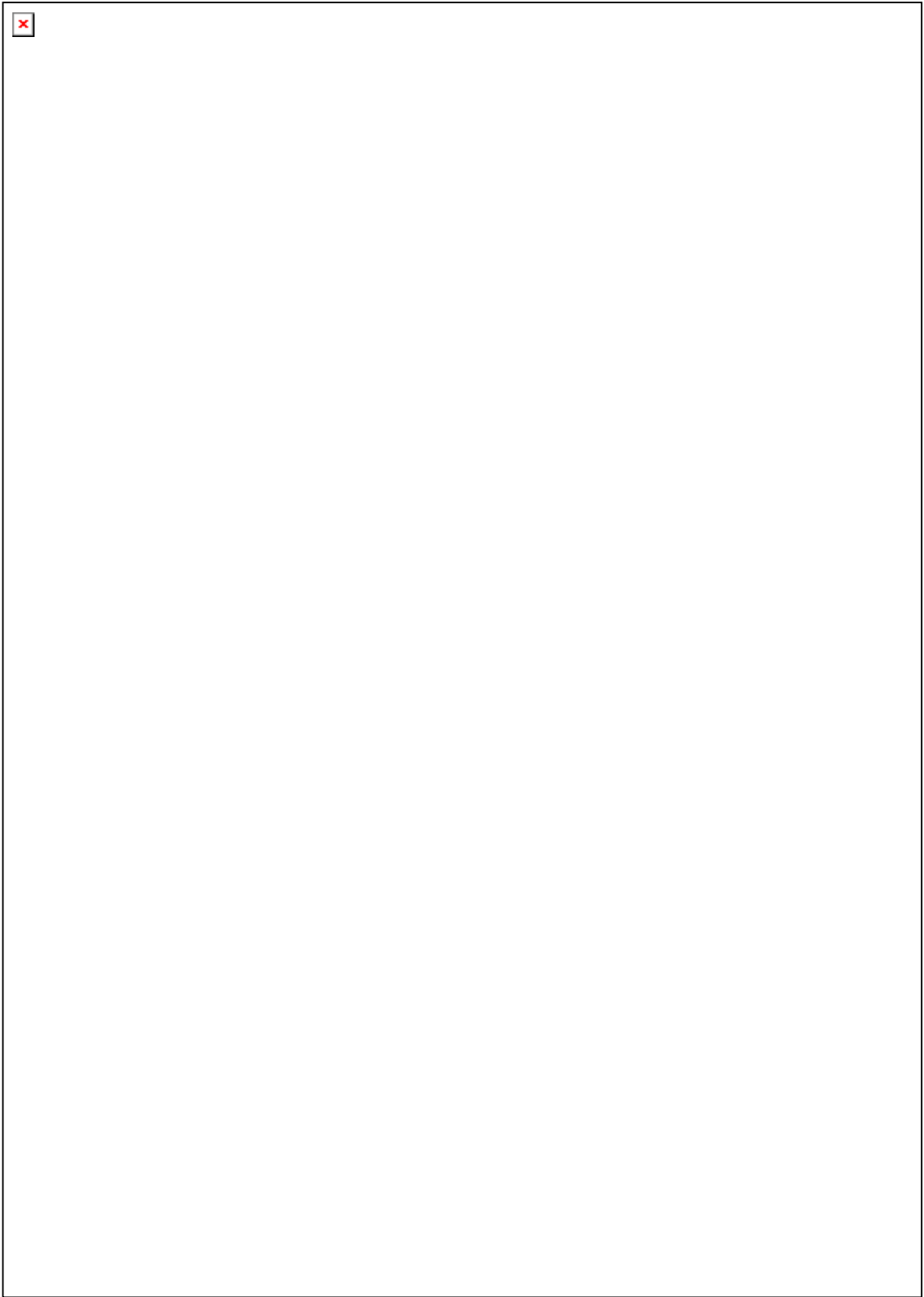
Projects of WHO collaborating centres for occupational health

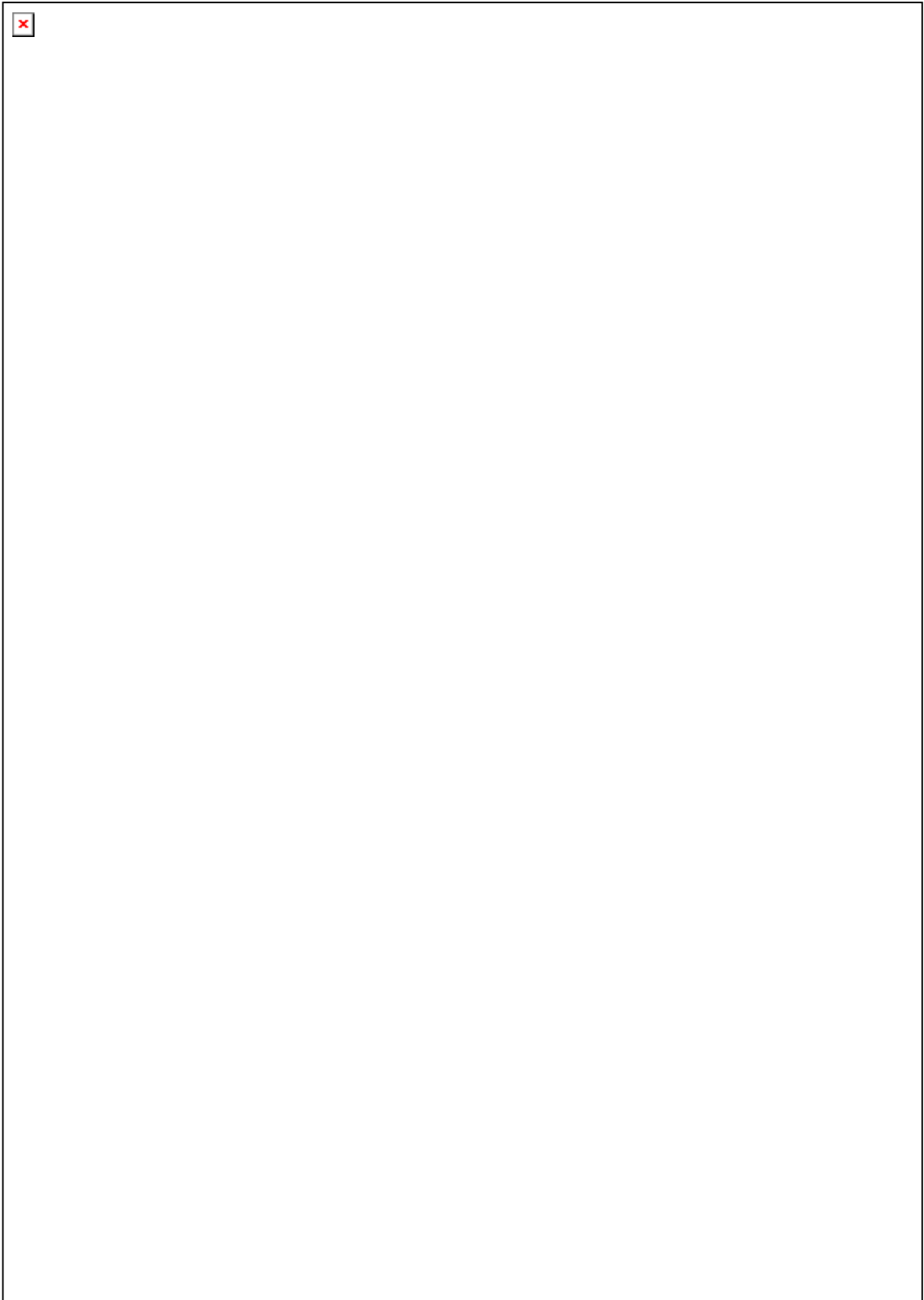
- Surveillance of mesothelioma - R Korea
- National strategic plan on asbestos-related diseases - Thailand
- Asian Asbestos Initiative - Japan
- Lung function - Germany, Czech Republic, Brazil
- Infrastructure for risk assessment – R Korea
- Exposure assessment and lab analysis – United Kingdom
- Training on identification and removal - South Africa, Chile

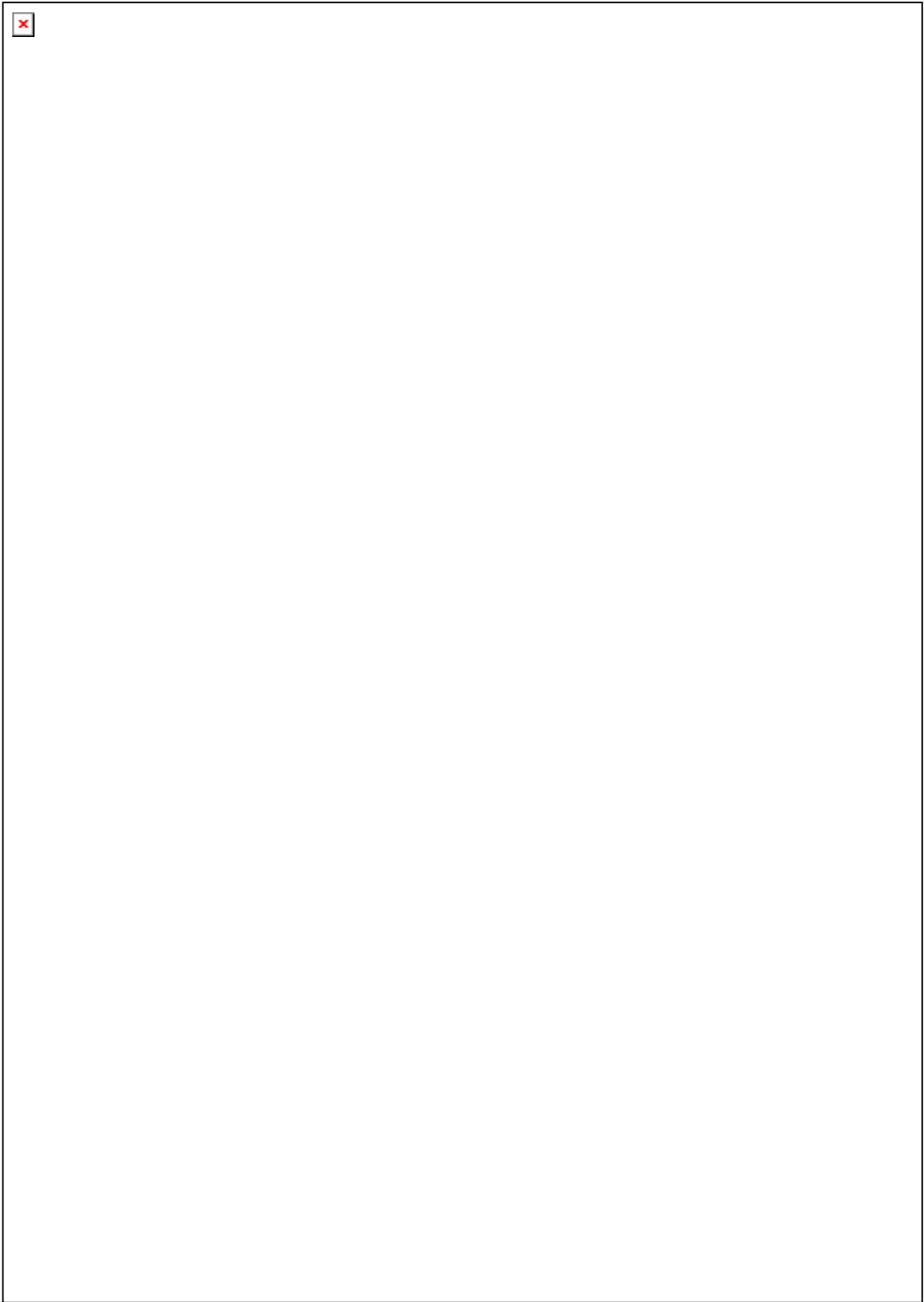


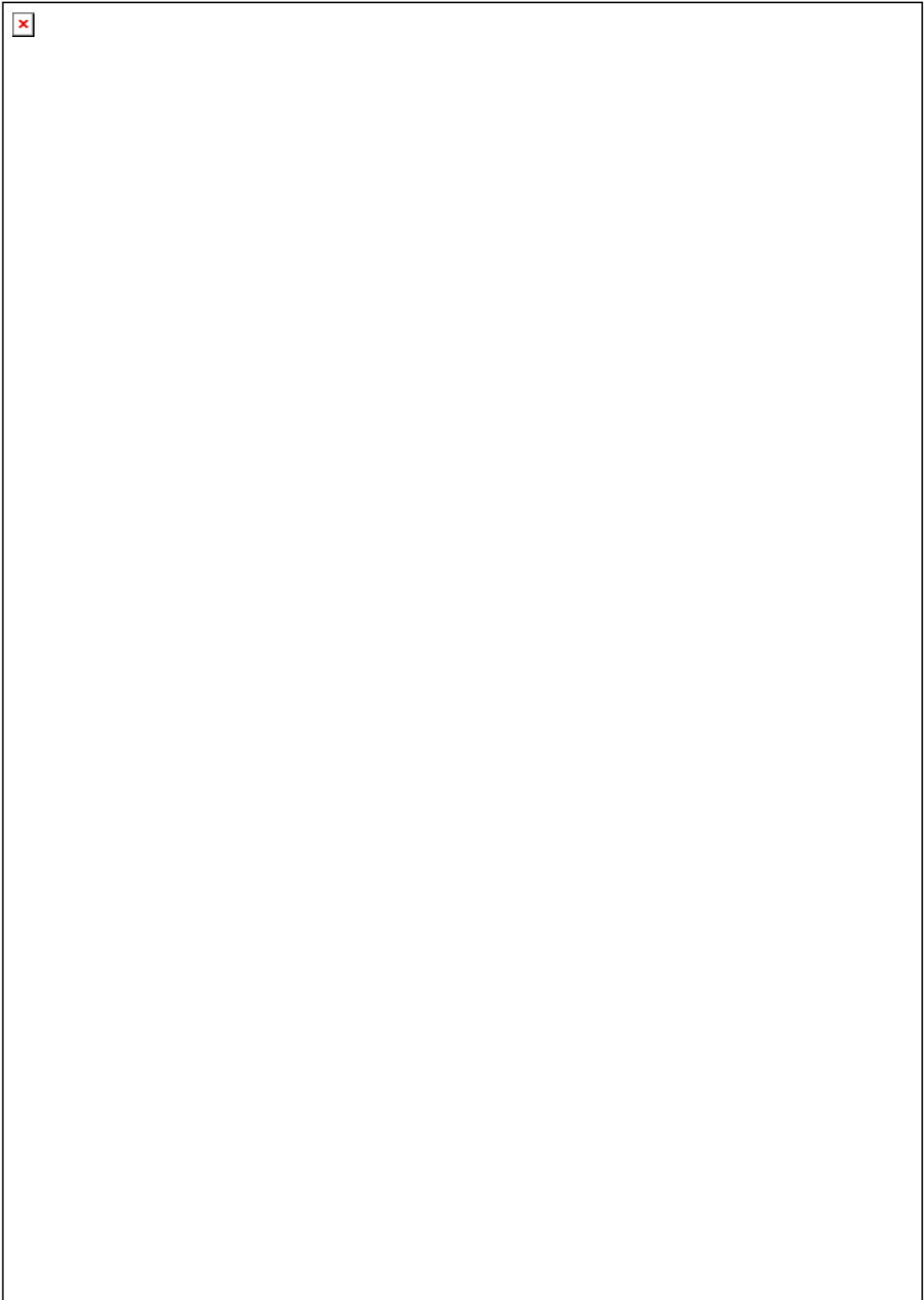


Basel and Rotterdam Conventions presentations:
Chrysotile DGD

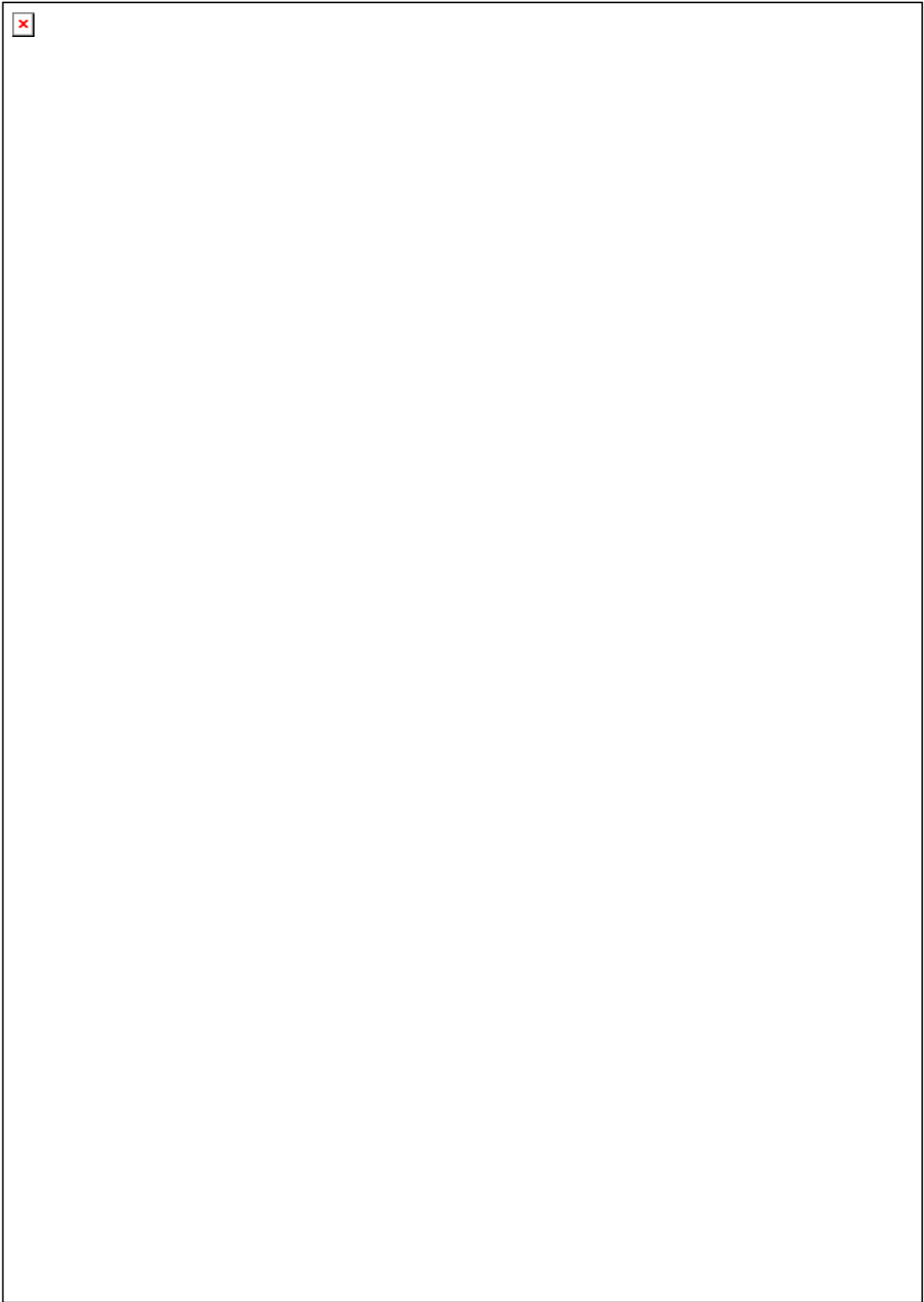


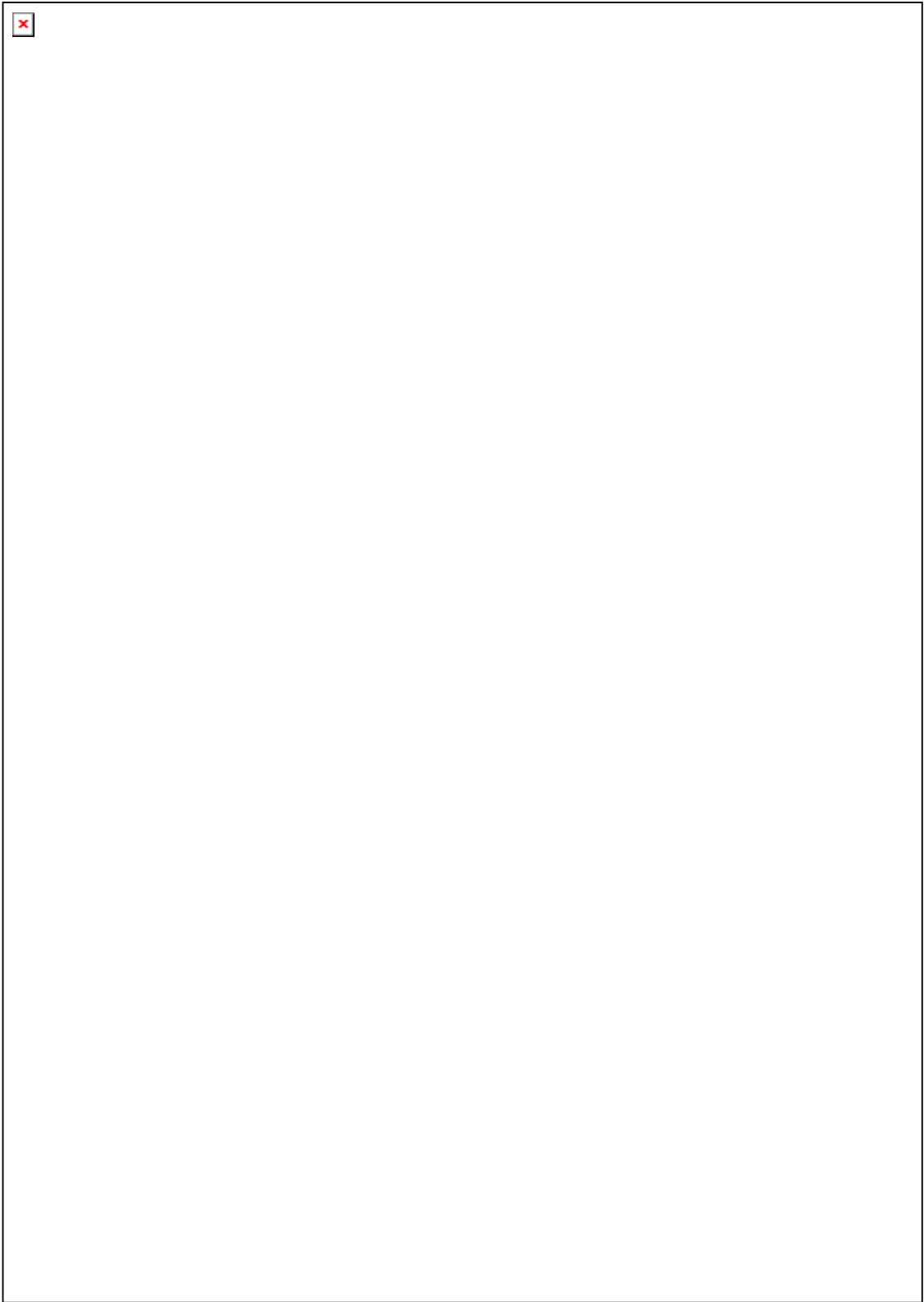


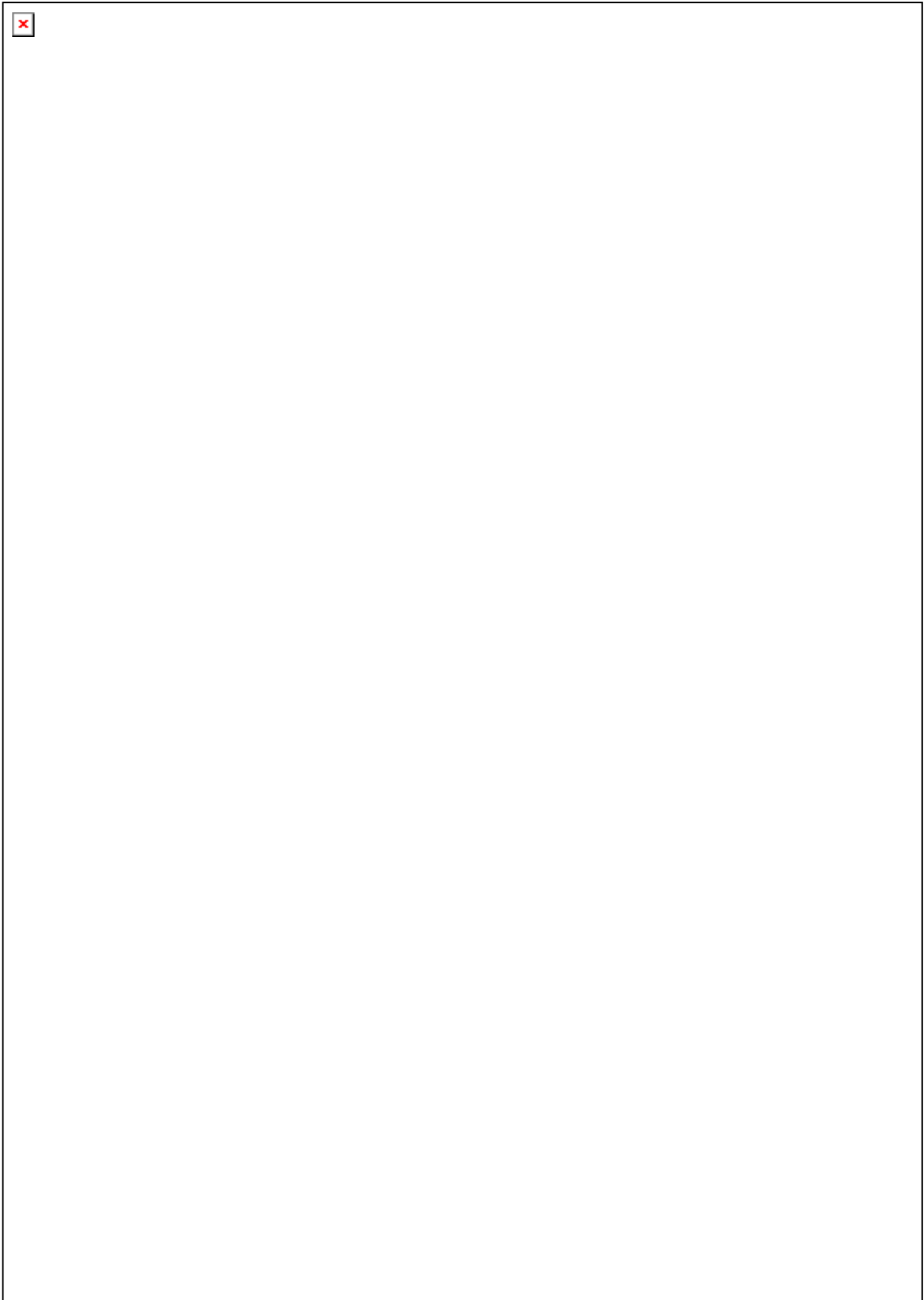




BCRC - China







BCRC - SEA

BCRC-SEA's Roles on Asbestos Waste

Tina Ayuni
Executive Officer



Basel Convention

- The most comprehensive global environmental agreement on hazardous and other wastes
- Created to reduce the movements of hazardous wastes (HW) between nations
- Ratified by 174 parties
- The Secretariat (SBC), in Geneva, Switzerland, is administered by United Nations Environment Programme (UNEP)

(Refer to www.basel.int for more information)

Central Goal of BC

Environmentally Sound Management (ESM)

- Taking all practical steps to minimize the generation of HW
- Strong Control
 - Storage
 - Transport
 - Treatment
 - Reuse, Recycling, Recovery and
 - Final Disposal

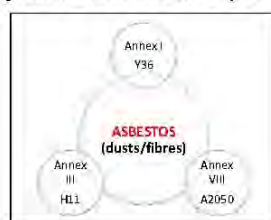
ESM of Hazardous Wastes

Environmentally Sound Management to protect human health and the environment by:

- Minimizing the generation of Hazardous Waste (HW)
- Treating the HW as close as possible to where they were generated
- Reducing international movements of HW

Asbestos Waste

One of the specific wastes to be covered by the Convention

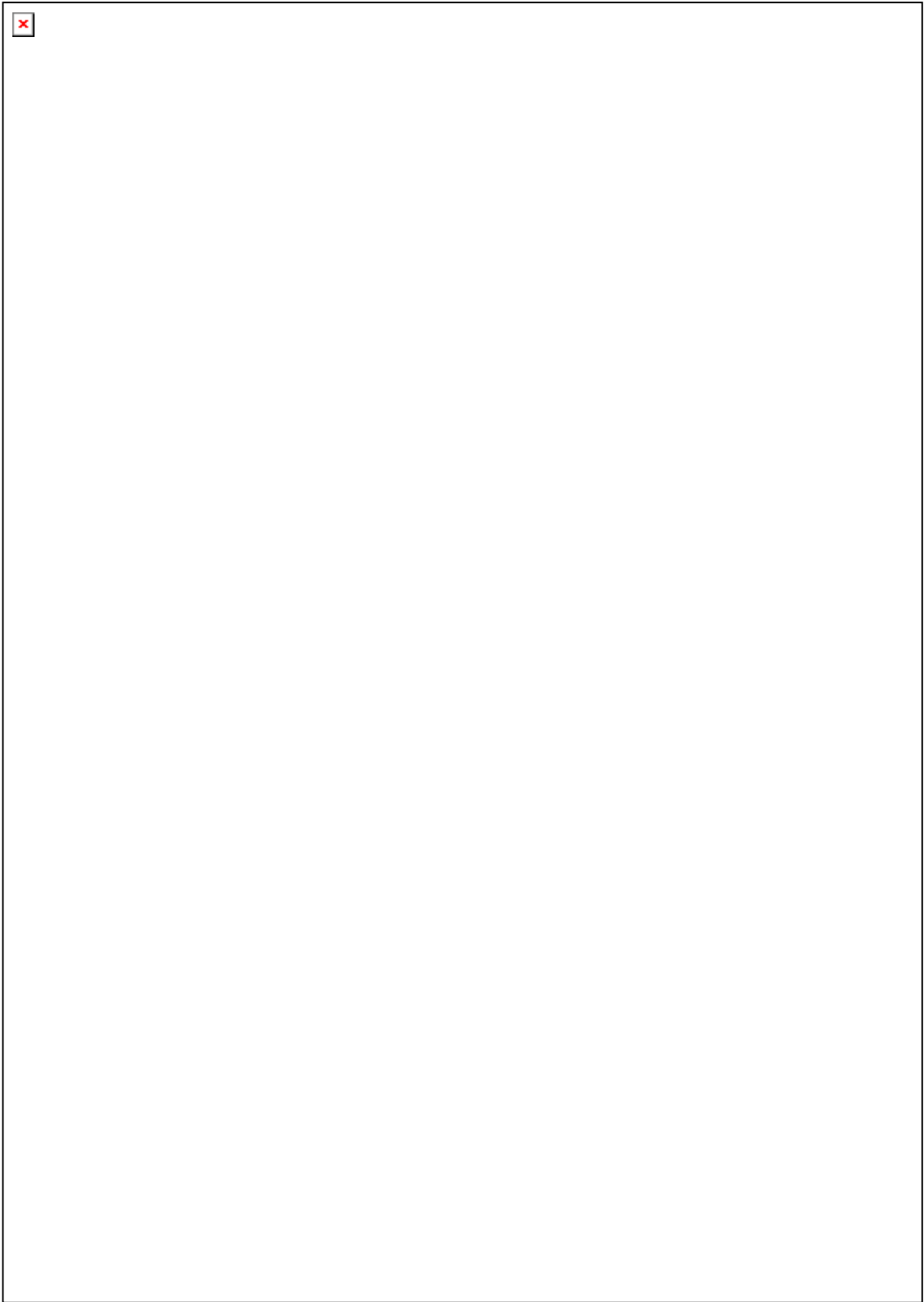


Asbestos Waste

- Annex I – Categories of Wastes to be Controlled
 - Wastes having as constituents:
 - Y36 – Asbestos (dust and fibres)



Picture Source: www.environmental.gov.au; www.rehabilitation.co.uk



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