

국외출장 결과보고 요약문

1. 출장 개요

- 목적 : 한국의 석면금지 관련 경험을 공유하여 라오스의 석면사용 금지 법안 수립활동을 지원하기 위함
- 출장기간 : 2018.11.26(월) ~ 30(금) [3박 5일]
- 출 장 지 : 라오스 (비엔티엔)
- 출 장 자 : 경기지사 직업건강부 이우찬 차장대우

2. 수행 사항

- 한국의 석면금지 관련 경험 발표(11.28)
 - 한국의 석면사용 역사, 석면 사용금지 입법화 과정, 석면관련 이슈 및 석면해체·제거방법 등 관련 주제발표
- 석면관련 노동사회복지부 및 보건부 기술자문 및 컨설팅(11.27)
 - 라오스 석면 사용실태 및 금지 계획에 따른 기술자문 실시
 - 법제화 과정, 장애 극복 사례 공유 등

한-IL0 협력사업 라오스 산업안전보건 기술자문 출장 결과보고

1 목 적

- 한-IL0 협력사업의 일환으로 라오스 노동사회복지부, 보건부 및 노총 등 관계자를 대상으로 한국의 석면사용 역사, 석면관련 이슈, 석면금지를 위한 접근 방법 등 한국의 석면금지 관련 경험 공유를 통해 라오스의 석면관련 질병 근절을 위한 실행계획(NAP ARDs 2018-2022) 및 국가환경보건 전략(2018-2030) 수립을 지원하기 위함

2 출장 개요

- 출장기간 : 2018.11.26(월) ~ 11.30(금) [3박 5일]
- 출 장 지 : 라오스 비엔티엔
- 전문분야 : 산업보건(석면관리)
- 출 장 자 : 경기도지사 직업건강부 전문직 4급 이우찬

3 추진일정

일 정	내 용
○ '18. 11. 26(월)	○ 출국 (인천 → 비엔티엔)
○ '18. 11. 27(화)	○ 석면분야 기술자문 및 컨설팅 - 라오스 노동사회복지부 및 보건부 등
○ '18. 11. 28(수)	○ 한국의 석면금지 관련 경험 발표
○ '18. 11. 29(목) ~ 11. 30(금)	○ 귀국 (비엔티엔 → 인천)

※ 세부 프로그램 : 【덧붙임1】

4 주요 추진사항

○ Session 1 주요프로그램 내용 : '18. 11.27(화)

- ☞ 석면관련 질병 근절을 위한 실행계획(NAP ARDs) 완성을 위한 Half day meeting
 - 라오스 석면사용 금지 실행계획 및 실천 장애물 등에 대한 토의
 - 지속적이고 효과적인 협력방안 등에 대한 토의(라오스 정부, WHO, ILO, KOSHA, 호주, APHEDA 등)
 - 라오스 석면 금지를 위한 KOSHA 지원 요청사항 접수 : 석면해체·제거 방법, 석면분석방법, 석면관련 질병 연구 결과 등 세부 사항 지원 요청
- ※ 참고자료 : 【붙임2】

○ Session 2 주요프로그램 내용 : '18. 11.28(수)

- 한국의 석면금지 관련 경험 주제 발표 : '18. 11.28(수)
 - 한국의 석면사용 역사, 석면관련 법령(고용부, 환경부, 국토교통부 등), 한국 석면 사용금지 입법화 과정 및 석면해체·제거 관련 세부기준 등 관련 주제발표
- ※ 발표자료 : 【덧붙임2】
- 국제기구의 전략방향과 호주의 석면금지에 관한 권고 및 경험
 - WHO 글로벌 전략 - WHO 대표(Dr Oyuntogos)
 - 국가환경보건전략(NEHSP) - 라오스 보건부
 - 석면관련질병 근절계획(NAP ARDs) - 라오스 보건부
 - 백석면 금지 WHO 전략 방향 - WHO 컨설턴트(Ken Takahashi)
 - ILO 협약 및 안전보건이슈 - ILO(Francis Santos)
 - 아시아 백석면 금지 전략 - APHEDA(Phillip)
 - 호주 백석면 금지 경험 - ASEA Australian Government(Justine Ross)

5 향후 추진방안

- 관계기관 간의 상호 지원방안 및 실행 계획 점검을 위해 정기적인 Meeting 필요성 확인(6개월 단위)
- ILO를 통해서 공식적으로 KOSHA의 세부 지원 프로그램(석면분석, 석면해체·제거교육 등) 요청 예정



Asbestos Management In Korea

Woo-chan Lee
KOSHA

2018. 11. 28.

Introduction of KOSHA (www.kosha.or.kr)

KOSHA (Korea Occupational Safety and Health Agency)

Established in 1987 to protect workers' lives and to improve workers' safety and health

May 30, 1987	Announcement of KOSHA Act
Dec. 9, 1987	Establishment of KOSHA
Dec. 12, 1987	Establishment of OSH Training Institute
Jul. 19, 1989	Establishment of OSHRI
1988 ~ Now	Headquarters, 6 Regional Offices and 21 Area Offices

✓ OSHRI : Occupational Safety & Health Research Institute

Content

- I Production & Use of Asbestos In Korea
- II Asbestos Management System
- III Laws & Rules regarding dismantling & removal

I. Production & Use of Asbestos In Korea

- 1930s**
 - Asbestos mining had started to **produce** military supplies, closed in 1983
- 1970s**
 - Slates** were **heavily used as a roofing material** for remodeling of old traditional houses
- 1980s ~ 1990s**
 - Widely used as industrial and building materials** in times of economic development

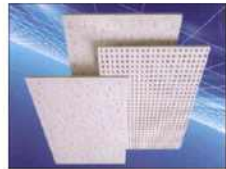




Asbestos Use in Korea



Roofing



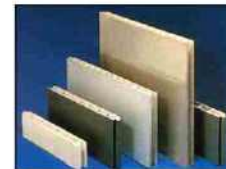
Ceiling tile



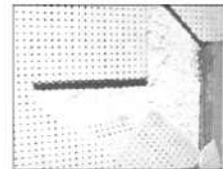
Floor



Partition



Wall



Sound-absorbing material

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Asbestos Use in Korea



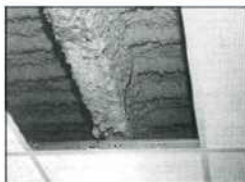
Asbestos textile products



Asbestos gasket products

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Asbestos Use in Korea



Refractory material



Lagging material



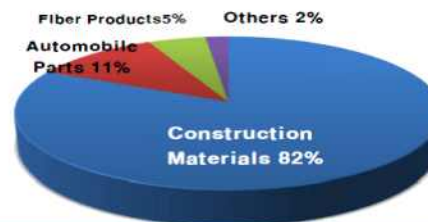
Linings (friction material for motor vehicles)



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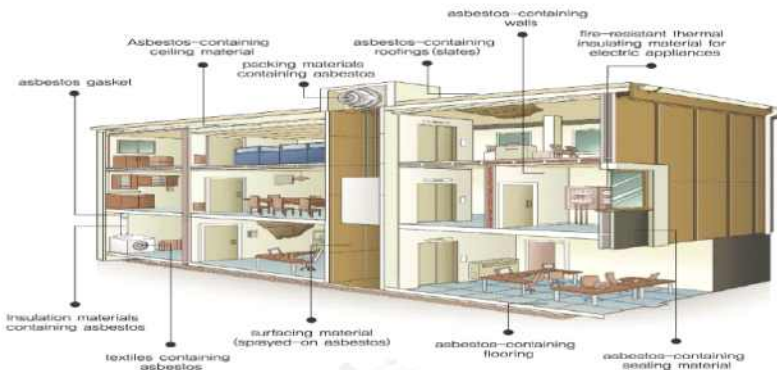
Purposes

- Construction Materials [82%]
- Automobile Parts [11%]
- Fiber Products [5%]
- Others [2%]



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Location of Asbestos-Containing Materials in a Building



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Ban of manufacturing, importing & using

2000

- Production, Import, Use, Transfer, and Supply of **crocidolite & amosite**

2003

- **Actinolite, anthophyllite, and tremolite**

2007

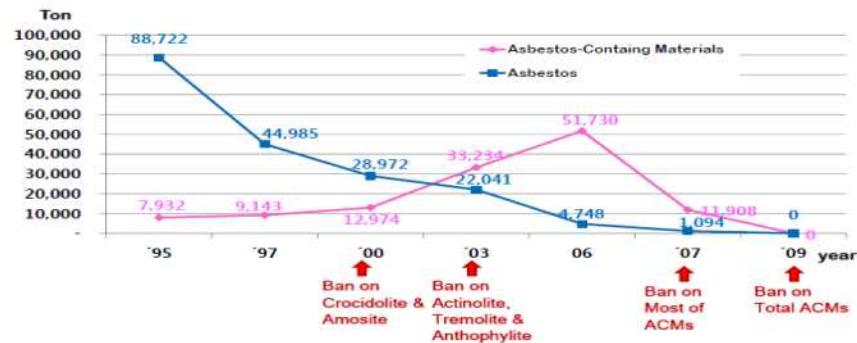
- A phase-out ban program of asbestos-containing products

2009

- All types of asbestos-containing products

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Import of Asbestos & ACMs



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Occupational diseases

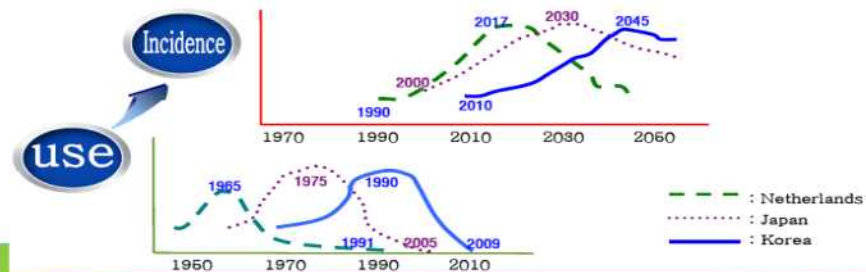
- 337 asbestos-related disease cases since 1999 (182 death)
- 124 Lung cancer, 121 malignant mesothelioma, 92 asbestosis
- Considering the large import from the 70' s to 80' s and its latency, a dramatic rise in the diseases is expected in near future.

Year	total	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Total	337	4	5	3	3	6	8	13	10	21	21	31	17	23	19	22	35	20	27	49
Patients	155	1	3	1	1	3	5	4	3	10	11	19	7	10	4	7	16	8	12	30
Deaths	182	3	2	2	2	3	3	9	7	11	10	12	10	13	15	15	19	12	15	19

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Future prediction of Mesothelioma Incidence

nation	Industry Expansion	Peak	MM rising	Asbestos ban	MM peak
Netherlands	1950	1965	1990	1991	2017
Japan	1960	1975	2000	2005	2030
Korea	1970	1990	2010	2009	2045(?)



The Representative Asbestos Disaster in Korea

J-chemistry (1970')



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J-chemistry (1970's), asbestos factory

❖ Established in 1969 (Busan city of Korea)

- main products : asbestos rope, textile, gasket
- raw material : all kinds of asbestos
- workers : 109 persons (mainly women)
- production process :



❖ The worst problem?

- heavy exposure of asbestos
 - ✓ no Protective measures (ventilation, enclosure)
 - ✓ no PPE (Personal Protective Equipment)



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II. Asbestos Management System

Occupational Safety and Health Act (MOL)

1 Ban on manufacturing, Importing & using asbestos

- Ban on import and use of crocidolite & amosite from 2000
- Ban on import and use of actinolite, tremolite, anthophyllite from 2003
- Gradual ban on asbestos-containing products from 2007
- **Ban on manufacturing, importing and using all asbestos-containing products from 2009**
- Grace period for some products including military supplies until alternatives are developed
- Ban on manufacturing, importing and using all asbestos-containing products **without exception** from 2015

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Standards

- Agencies specialized in asbestos inspection & analysis with adequate workforce, facilities, and equipment are designated by MOL
- **Standards**
 - [1] **Workforce:** 2 or over who completed the course of asbestos inspection (18 hr)
 - 1 or over with the certificates of industrial hygiene or atmosphere
 - 1 or over with B.S in industrial health or chemical
 - [2] **Facilities:** Analysis & inspection labs
 - [3] **Equipment**
 - area sampling pumps, polarization microscope, phase contrast microscope
- The agencies should pass the test on analysis & quality control (solidification & air control) administered by KOSHA



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2

Inspection system

- When buildings or facilities of certain sizes are dismantled, the agencies designated by MOL conduct inspection

Content

- Types, amount, locations, and scopes of asbestos

Target

- ① Buildings : Building with the gross area of 50m² and areas expected to be dismantled are over 50m²
- ② Residential buildings and annex buildings: Building with the gross area of 200m² and areas expected to be dismantled are over 200m²
- ③ Materials for insulation, sprayers, fire-proof conductors, gaskets, packing, and ceilings: Dismantled area of over 15m² or volume of over 1m³
- ④ Insulation pipes: pipes with the length of over 80 meters

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3

Registration System

- If the amount and scope of asbestos are over the certain levels according to the results submitted by the inspection agencies, dismantlement should be conducted by the specialized agencies approved by the MOL

3,415 registered

Targets

- Materials of ceilings, walls, or roofs with over 1% of asbestos:
 - area of over 50m²
- Sprayers and fire-proof conductors with over 1 % asbestos
- Insulators, gaskets, packing, ceilings with over 1% asbestos: Area of over 15m² or volume of over 1m³
- Insulation pipes: length of over 80 meters

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Standards

- **Workforce:** 2 or more who received the course of asbestos dismantlement (18 hr)
 - One of them with a certificate in civil engineering or construction
- **Facilities :** Equipment room
- **Equipment:** Ventilators with HEPA, air-supplied respirators



Prevention of Double Commissions

- The agencies which conducted inspection should not dismantle or remove asbestos for the same clients

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5 Measurement of asbestos concentration

- To protect workers without PPEs after the asbestos dismantlement or removal, the concentration of asbestos should be below 0.01 particle/cc

Qualifications

- Certificated engineers of industrial hygiene or atmosphere environment from the designated inspection agencies



Process

- After cleaning the worksite and keeping the worksite airtight, disperse the settled particles and conduct area sampling

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4 Report system

- A report on dismantlement or removal of asbestos should be submitted to the MOL 7 days ahead of the dismantlement or removal → giving certificates

Report Items

- ① dismantlement workers
- ② Types and scope of asbestos materials
- ③ Personal information on workers
- ④ Construction contracts
- ⑤ Plan on the work including waste management
- ⑥ Results of the asbestos inspection

Document retention (30 years)

- ① Names and locations of the worksite of the dismantlement and removal
- ② Personal information of the workers (names, residence no.)
- ③ Documents on the work and period

6 Observance of Asbestos Disposal or Removal Work Standards

- Any person who demolish or dismantle structure or facilities which have been found to contain asbestos shall observe the asbestos disposal and removal work standards
 - **Work standards :** prescribed by the Ordinance of the MOL

7 Posting of MSDS

- Offering information sheet including hazards and first aid when manufacturing, importing, using, moving, and storing asbestos
- Warning on asbestos containers and packages & education for asbestos handlers

8 Work environment monitoring system

- 1 round of monitoring every 6 months (exposure standard 0.1 particle/cc)

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9 Medical test for occupational diseases

- Over 1 check-up/year for workers exposed to asbestos

10 Health management pocketbook

- Distribution of health pocketbooks for those producing and handling asbestos
[Free medical check-ups every year after retirement]

11 Special Safety Training

- Special Safety and health training should be offered by employers for workers producing and handling asbestos

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Construction Act(MOLIT)

➤ Report of building dismantlement and removal

- Report to mayors 7 days before the proposed day of dismantlement
- If ceiling, insulation and roof materials include asbestos, the mayors should be report to the heads of local labor authorities, provincial governors or heads of environment agency' s branch offices in the regions without delay.

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Waste Management Act(MOE)

➤ Designated Types of Wastes

- Wastes produced while manufacturing and processing asbestos or dismantling buildings
[Except solid types, which don' t scatter or float]
- Fragments produced while processing solid asbestos products including slates & dusts in the dust collectors at the jobsites
- Plastic sheets, masks, and working clothes used during the dismantlement operation

➤ Standards for management of wasted asbestos

- high-temperature fusing or solidification

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III. Rules regarding dismantling & removal

1 Pre-inspection on Asbestos-containing materials

- In the case of dismantlement or removal of facilities and buildings, if asbestos is included by studying the materials' history and ingredients
- Keep track of the types, locations, and scope of asbestos-containing materials and maintain the record until the completion of the dismantlement or removal

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2 Plan on dismantlement & Removal

- Processes & methods of dismantlement and removal
- Scattering prevention and elimination methods
- Protective measures (PPE, hygiene facilities and others)
- Information on the plan to workers
(Training on causes of occupational illnesses and prevention of reoccurrence)

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4 Offering & wearing PPE

The following PPEs should be provided

- Dust respirator or Air-supplied respirator [Highest quality]
- Protective goggles (only when eyes are exposed to asbestos)
- Protective clothes and shoes (non-penetrable)



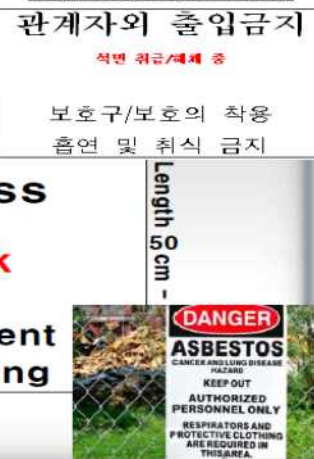
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3 Warning Sign

- Width 70cm -

Restricted access
(warn to stay out)
red→**Asbestos Work**

Protective Equipment
No smoking & eating



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5 Off-limits zone

employers shall fully understand the plan on asbestos dismantlement and removal,
No entry without wearing PPEs



6 Ban on smoking

Eating or smoking is banned at the worksite of dismantling and removing asbestos

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7 Decontamination unit

- Employers should build dress rooms, shower rooms, and locker rooms near or within worksites of asbestos dismantlement or removal
- Work cloths including PPEs are kept in airtight containers at the locker rooms
- Hot water in the shower rooms
- Installation order

Dressing room → Shower room → Locker room → Worksite



8 Measures according to work types

1) Dismantlement or removal of insulation materials or fire-proof insulators containing asbestos

- ✓ Cover windows, walls, and floors with plastics or other non-penetrable materials and keep the worksite ventilated
- ✓ Installation of asbestos dust collectors of high performance to prevent scattering
- ✓ Use water or wetting agents
- ✓ Establishment of shower rooms, changing rooms, and locker rooms near or within the worksites

2) Dismantlement or removal of walls, floors or ceilings with asbestos

- ✓ Cover windows, walls and floors with plastics or other non-penetrable materials
- ✓ Use water or wetting agents
- ✓ Keep the worksite ventilated

3) Dismantlement or removal of roof with asbestos

- ✓ Dismantled roof materials should not be thrown directly to the ground
- ✓ Use water or wetting agents except when risks exist
- ✓ Switch off and cover ventilators of air conditioners and heaters near the roof

4) Dismantlement or removal of other materials with asbestos

- ✓ Cover windows, walls, and floors with plastics or other non-penetrable materials
- ✓ Operate dust collectors to prevent scattering
- ✓ Use water or wetting agents



REMOVING CEILING TILES

• containment



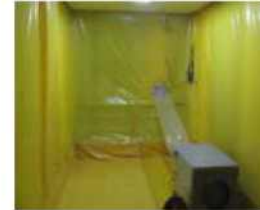
• decon unit



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REMOVING CEILING TILES

Negative pressure unit



manometer



Wetting surface



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REMOVING CEILING TILES

Wrapping ceiling tiles



bagging dust



transportation and disposal



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REMOVING ROOFING SLATE

Cover floor



Decon unit



Safety rope



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REMOVING ROOFING SLATE

Wetting agent



Removal



Wrapping, disposal



9 Byproduct Management

Byproducts created during the dismantlement or removal should be contained in bags made of plastics or similar materials with the label and handled with the act on waste management

[선명보안거래에 관한 규정 제240조에 따른 표시]

석면 함유

선호어: 명명성물면



유해위험성: 폐기, 연소, 중독, 석면 등

예방조치: 분구: 취급 또는 폐기 시 석면보편에

발생하지 않도록 할 것

취급 근로자는 방진 마스크 등 계

면보호구를 착용할 것

공급자 정보: 성명, 주소, 연락처



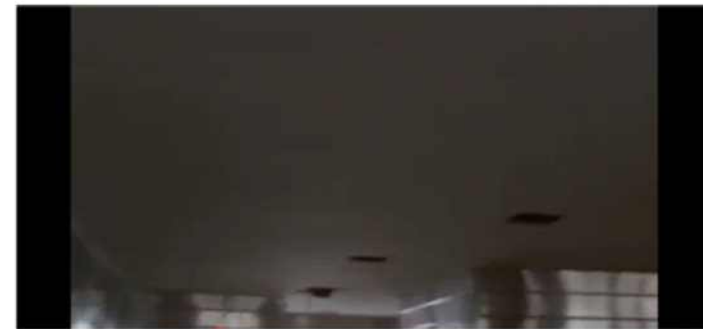
10 Scattering prevention

Clean byproducts containing asbestos with wetting agents or water, or use vacuum cleaners with high-performance filters

(Do not use compressed air cleaners)



EXAMPLE VIDEO





Thank you



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일자별 세부 프로그램

일 자	시 간	프 로 그 램	비 고
11.27.(화)	08:40 ~ 09:10	개 회	
Session 1 : 국가환경보건전략계획(2018-2030) 및 석면관련질병 근절 실행계획(2018-2022)			
	09:10 ~ 09:30	석면관련질병 및 온석면 노출 통제전략	WHO
	09:30 ~ 09:50	온석면 노출 관련 ILO 협약 및 안전보건이슈	ILO
	09:50 ~ 10:10	온석면에 관한 호주의 경험 등	ASEA
	10:10 ~ 10:30	질의응답	"
	10:30 ~ 10:45	Coffee Break	
	10:45 ~ 11:00	2017년 석면현황 발표	노총
	11:00 ~ 11:20	석면관련질병 근절 실행계획(2018-2022)	보건부
	11:20 ~ 11:30	질의응답	
	11:30 ~ 13:00	중식	
	13:00 ~ 13:20	석면 전면금지 관련 한국의 경험	KOSHA
	13:20 ~ 13:40	전세계 석면금지국 및 온석면 거래 실태	ABAN
	13:40 ~ 14:00	아시아에서 석면금지를 막는 장애물	APHEDA
	14:00 ~ 14:15	질의응답	
	14:15 ~ 14:30	Coffee Break	
	14:30 ~ 14:50	국가환경보건전략계획 및 석면관련질병 근절 실행 계획 이행을 위한 로드맵	
	14:50 ~ 15:10	세션관련 질의응답, 토론 및 요약	
	15:10 ~ 16:00	결론 및 폐회	

일 자	시 간	프 로 그 램	비 고
11.28.(수)	08:40 ~ 09:30	개 회	
Session 1 : 계속			
	09:30 ~ 10:00	서태평양지역 보건 및 환경 체계 개관	WHO
	10:00 ~ 10:30	국가환경보건전략 계획	보건부
	10:30 ~ 10:40	Coffee Break, 단체사진 촬영	
	10:40 ~ 11:10	석면관련 질병 근절을 위한 실행계획	보건부
	11:10 ~ 11:30	국가환경보건전략계획 및 석면관련질병 근절 실행 계획 이행을 위한 로드맵	
	11:30 ~ 12:00	세션관련 질의응답, 토론 및 요약	
	12:00 ~ 13:00	중식	
	11:20 ~ 11:30	질의응답	
	11:30 ~ 13:00	중식	
Session 2 : 국제기구의 전략방향과 한국 및 호주의 석면금지에 관한 권고 및 경험			
	13:00 ~ 13:30	석면관련질병 및 온석면 노출 통제전략	WHO
	13:40 ~ 14:00	온석면 노출 관련 ILO 협약 및 안전보건이슈	ILO
	14:00 ~ 14:30	온석면 금지 및 석면관련 질병 감소	APHEDA
	14:30 ~ 15:00	온석면 금지의 중요성	ASEA
	15:00 ~ 15:30	석면 전면금지 관련 한국의 경험	KOSHA
	15:30 ~ 15:40	Coffee Break	
	15:40 ~ 16:00	세션관련 질의응답, 토론 및 요약	
	16:00 ~ 16:10	동영상 시청 (APHEDA 제작)	
	16:10 ~ 16:20	세계보건기구 지역사무소장 서한 대독	
	16:20 ~ 17:00	석면금지관련 법규 제정을 위한 다음 단계 확인 및 토론	
	17:00 ~ 17:30	폐 회	