

미국 상위 30개 연구 중심 대학들의 실험실 환경보건안전 담당 부서 - MIT 사례를 중심으로

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Environment, Health and Safety Offices of the Top 30 Research Universities in the U.S.A. - Focused on the Case of Massachusetts Institute of Technology(MIT)

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Objectives: The objectives of this research are to examine the missions, organization, and programs of the environmental, health and safety(EHS) offices of the major research universities in the U.S.A., particularly the case of Massachusetts Institute of Technology(MIT) EHS Office, and to suggest ways to address the EHS issues of the universities and research institutes in South Korea.

Methods: The top 30 research universities in the U.S.A. were selected by the total amounts of research funds they annually received. The web sites of the 30 universities were searched to identify the names of the departments that address environment, health, and/or safety related issues, the missions of those departments, the major programs of those departments, and the

number of staff in those departments. Also, a case study was conducted for the Environment Health and Safety Management System and the Environment, Health and Safety Office of the MIT, using literature and web searches and a meeting with the Director of the MIT Environment, Health and Safety Office.

Results: All the top 30 research universities in the U.S.A. had designated departments that dealt with EHS issues. Most of them were by the name of or similar to environmental, health and safety. The mission statements of those departments were mostly about improving the safety and health of their community members, improving the environment, and complying to EHS regulations. Most of those departments had an environmental management program, industrial hygiene

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program, radiation protection program, safety program, and biosafety program as their major programs. The components of the environment, health and safety management system(EHS-MS) of the MIT were examined in detail. In contrast, not many universities in South Korea had designated departments that dealt specifically with EHS issues. Also, the number of full-time staff for EHS was only 1-2 in most of the Korean universities and their work duties included only general safety, while neglecting other health/environment related issues.

Conclusions: Well organized and functioning environmental, health and safety offices were present in all of the top 30 research universities in the U.S.A., whereas similar organizations of the universities in South Korea were virtually

non-existent and/or had very limited EHS activities. Therefore, in order to reduce potential risks of accidents and health problems in the Korean universities and research institutions, well established and functioning EHS-MSs and EHS offices are warranted. The case of the EHS-MS and EHS Office in the MIT demonstrate a successful case to follow.

Key Words : environment, health and safety(EHS); environment, health and safety office; environment; health and safety management system(EHS-MS); occupational health and safety management; environmental management system(EMS)

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II. 연구방법

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Massachusetts Institute of

Technology (MIT)

MIT

MIT Environmental Health and Safety Office Director

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1998 5 (Environmental Protection Agency; EPA) MIT (inspection) MIT (hazardous waste laws and regulations)

(hazardous chemicals)

2,200 . MIT

EPA (the US Department of

Justice)

(regulatory

training and auditing)

(Environment, Health and Safety Management System; EHS-MS) (Safety Office) (Environmental Medical Service)

(Environment, Health and Safety

Office; EHS Office)

III. 결과 및 고찰

1. 미국 상위 30개 연구 중심 대학들내의 실험실 환경보건안전 담당 부서

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65%

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Table 3

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60% 가 , 가 .
 (environmental stewardship) 가 ,
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Table 1. Top 30 research universities in the U.S.A. and their total amounts of research funds

University	Fund (x 1000 US \$)
Johns Hopkins University	1,244,132
University of California - Los Angeles	849,357
University of Michigan - Ann Arbor	780,054
University of Wisconsin - Madison	721,248
University of Washington - Seattle	684,814
University of California - San Francisco	671,443
University of California - San Diego	646,508
Stanford University	603,227
University of Pennsylvania	564,716
Duke University	520,191
University of Minnesota - Twin Cities	508,557
University of California - Berkeley	507,186
Ohio State University - Columbus	496,438
University of Illinois - Urbana-Champaign	493,581
Massachusetts Institute of Technology	485,764
University of California - Davis	482,145
Pennsylvania State University - University Park	480,084
Washington University in St. Louis	474,328
Baylor College of Medicine	461,763
Texas A&M University	456,235
University of Arizona	454,941
Columbia University	437,669
University of Florida	429,734
University of Southern California	414,099
University of Pittsburgh - Pittsburgh	409,684
Harvard University	408,707
University of North Carolina - Chapel Hill	390,542
Yale University	387,644
Georgia Institute of Technology	364,190
Cornell University	356,049

Source: The Center at the University of Florida, 2005

5 가 1-2 (, 2004).

Table 2. Environment, health and safety related offices/departments of the top 30 research universities in the U.S.A.

Name of Offices/Departments	Number of Universities
Department/office of environmental, health & safety	24
Office of environmental health and radiation safety	2
Safety department	1
Department of risk management & safety	1
Office of environmental safety	1
Division of safety & compliance; Division of research safety	1

Table 3. Mission statements of the environment, health and safety related offices/departments of the top 30 research universities in the U.S.A.

Mission Statements	Number of Universities
To provide safety/to prevent injuries	26
To promote health	25
Compliance with regulations	18
To protect the environment	17
Environmental stewardship/environmental sustainability	5
To promote the productivity/insurance	2
Radiation protection	1

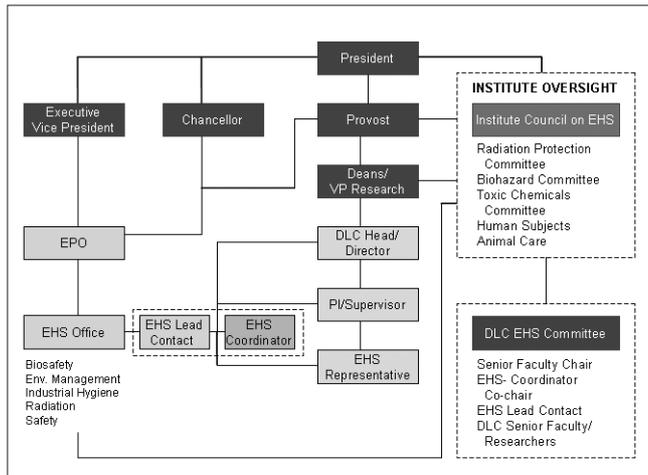
Table 4. Major programs in the environment, health and safety related offices/departments of the top 30 research universities in the U.S.A.

Major Programs	Number of Universities
Environmental/hazardous materials	27
Occupational Health/industrial hygiene/lab safety/chemical safety	26
Radiation safety	25
Biological safety	19
General safety	19
Fire safety	14
EHS management/risk management	4
Worker's compensation/insurance	4

Table 5. Range of staff numbers for the environment, health and safety related offices/departments of the top 30 research universities in the U.S.A.

Range of Staff Number	Number of Universities
11-20	3
21-30	3
31-40	3
41-50	3
51-60	5
61-70	6
71-80	2

Figure 1. MIT EHS-MS overview



Source: MIT, 2006

2. Massachusetts Institute of Technology(MIT)의 사례연구 – MIT 실험실 환경보건안전 담당 부서의 규정, 조직, 업무, 활동 등

1) MIT

MIT 10,000 , 1,000 , 1,000
 가 , 3,000 600-700
 (: machine shops)가
 1,100,000m²
 12 , 가 18 .

2) MIT (Environment, Health and Safety Management System; EHS-MS)
 MIT MIT (Academic Council)

(MIT EHS Office, 2005).

MIT

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Figure 1 MIT (MIT, 2006). (Departments, Laboratories, and Centers; DLCs) (the Environment, Health and Safety (EHS) Office), (the Environmental Programs Office: EPO) (MIT's senior officers: the President, Provost, Chancellor, Executive Vice President, Vice Presidents, Deans)

(The Institute Council on Environment, Health and Safety) (the Institute Committees) 가

(Committee on Animal Care), 가 (Committee on Assessment of Biohazards), (Committee on Radiation Exposure to Human Subjects), (Committee on Radiation Protection), (Committee on Reactor Safeguard), (Committee on Toxic Chemicals), (Committee on the Use of Humans as Experimental Subjects)

가 MIT

(Principal Investigator (PI)/Supervisor)

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(EHS Representative)

member),

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(Lead Contact) /

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MIT

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(EHS Committee)

(Co-Chair)

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3) MIT (EHS Office)
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(MIT, 2006).
 (Biosafety Program),
 (Environmental Management Program),
 (Industrial Hygiene Program),
 (Radiation Protection Program)
 (Safety Program) (MIT EHS Office, 2006a).
 , rDNA
 OSHA (Bloodborne Pathogen Program)
 (hazardous waste management)

(RF), (Microwave),
 (Magnetic energy)

(MIT EHS Office, 2005).
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 (Deputy Director)
 Senior officer, Officer, Assistant Officer technician
 Officer Certified
 Industrial Hygienist (CIH), Certified Safety Professional (CSP),
 Certified Health Physicist (CHP), Certified Biological Safety
 Professional (CBSP), Certified Hazardous Materials Manager
 (CHMM), Certified Fire Protection Specialist (CFPS), Certified
 Professional Environmental Auditor (CPEA), Professional Engineer
 (P.E.) 가 /가 가

(Organization Service Team), / (Inspection/Audit Team),
 (Training and Development Service Team),
 (Emergency Response Service Team),

(Laboratory and Facility Design and Construction Review Services Team),
 (Technology Service Team), (Communications Service Team)

(Laboratory and Facility Design and Construction Review Services Team)

가 (Department of Facilities) , 가 가

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(job title)

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(Regulated Activity)
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MIT
(General EHS), (General Safety),
(Biosafety), (Chemical Hazards),
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MIT (Audit Division) / 가
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(MIT, 2006).
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MIT
(EHS-MS Leadership Committee)

(Satellite Accumulation Areas; SAA)
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MIT
6) (Chemical Hygiene Plan)
MIT
OSHA “ (Laboratory
Standard) ” MIT
(Chemical Hygiene Plan)
(Standard
Operating Procedure: SOPs)
(Chemical Hygiene Plan Template)

MIT

(Location),
(Description),
action),

(Contacts),
(Corrective action),
(Verification of implementation)

(Reporter),
(Preventive
action)

(MIT EHS Office, 2006b).

(SOGs: Standard Operating Guideline),
(Fact Sheets)

(MIT EHS Office 2006b).

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OSHA

(Biohazard Waste), /
(Bio/Chemical Mixed waste), /
(Bio/Radioactive Mixed Waste),
(Chemical Waste), (Radioactive Waste), /
(Radioactive/Chemical Mixed Waste)

(MIT, 2006).

EHS Office, 2006b).

(MIT

MIT

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(waste identification)

3. 우리나라 대학과 연구기관의 실험실에서의 효과적인 안전보건환경관리를 위한 제안

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MIT
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(Supervisors' Report of
Occupational Injury/Illness)

(After Action Review)가
(Incident information (including non-compliance or
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Massachusetts Institute of
Technology(MIT)
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Massachusetts Institute of Technology (MIT)

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Mr. Louis DiBerardinis (Director of MIT Environmental Health and Safety Office)

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(Environment, Health and Safety

Management System; EHS-MS)

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REFERENCES

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IV. 결론

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