1. Forward
2. Products manufacturing (Monodzukuri) and cleaning technology
3. Management of chemical substances
4. Policies for environmental management
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Cleaning technology is utilized widely in many processes to treat, assemble, and finish various materials such as metal and plastic. It is an essential technology to support other core manufacturing technologies in the background.

**Position of “Cleaning technology” in “Core manufacturing technologies”**

Cleaning technology is related to designing, fabrication, processing, testing, and finishing. It is a core technology that supports other manufacturing technologies.

**Voluntary Management of VOC Emission Control at Monodzukuri Cleaning Process**

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**Increase of Chemical Substances**

<table>
<thead>
<tr>
<th>Year</th>
<th>Numbers of chemical substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>&lt;1,000,000</td>
</tr>
<tr>
<td>1980</td>
<td>&gt;5,000,000</td>
</tr>
<tr>
<td>1990</td>
<td>&gt;10,000,000</td>
</tr>
<tr>
<td>2009.8.13</td>
<td>≒ 50,000,000</td>
</tr>
<tr>
<td>2011.9</td>
<td>?</td>
</tr>
</tbody>
</table>

**Hazard of Chemical Substances**

Disasters: Explosive, Flammable, Corrosive
Global environmental effect: Ozone layer depletion, Global warming, Marine disasters
Direct exposure to worker: Dermal absorption, Inhalation
Ecological effect: Aquatic Life, Terrestrial life, Ecological System in specific area
Human health effect: Acute toxicity, chronic toxicity

**From Hazard Management to Risk Management**

Risk = Hazard (Toxicity) × Exposure dose (Emission)

Risk reduction by substitution
Risk reduction by emission control

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**Techniques of Environmental Policies (1)**

1. Direct Legislation
   - To make clear by law and regulation about certain goals that must be achieved by the whole society and the minimum level of compliance that should be followed.

2. Framework Legislation
   - To try to achieve goals according to objective, order and requirement.
   - Not to forbid or restrain the specific practices directly.

3. Economic Approach
   - Taxes and subsidies to activate market mechanism.

4. Voluntary Management
   - For manager, certain goals shall be set for their behaviors in implementation of voluntary environmental protection measures.

5. Informative Approach
   - They do not directly forbid or restrain the specific practices, but try to achieve goals according to objectives, orders and requirements through their obligations.

6. Method through Procedure
   - Technique of a measure to accelerate their own environmental activities through establishing a standard of environmental judgment.

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**Amendment of the Law to Prevent Air Pollution**

- 2003 Investigation to amend the law
  - Law: Air Pollution Control Law
  - Meeting: Atmospheric Environment Conference (Central Environment Council in Ministry of Environment)

- 2004 The interim report by the conference to the Council.

- 2005 Promulgation of the amended law

- 2006 Enforcement of the amended law

**Techniques of Environmental Policies (2)**

1. Method by Direct Legislation
   - To make clear by law and regulation about certain goals, that must be achieved by the whole society and the minimum level of compliance that should be followed.

2. Method by Framework Legislation
   - To try to achieve goals according to objective, order and requirement.
   - Not to forbid or restrain the specific practices directly.

3. Method by Economic Approach
   - Taxes and subsidies to activate market mechanism.

**Techniques of Environmental Policies (3)**

4. Method by Voluntary Management
   - For manager, certain goals shall be set for their behaviors in implementation of voluntary environmental protection measures.

5. Method by Information Approach
   - They do not directly forbid or restrain the specific practices, but, try to achieve goals according to objectives, orders and requirements through their obligations.

6. Method through Procedure
   - Technique of a measure to accelerate their own environmental activities through establishing a standard of environmental judgment.

**Industrial organizations which declared to do voluntary management as a group (1)**

- Japan Gas Association (JGA)
- Japan Textile Finishers Association (JTFA)
- Japan Paper Association (JPA)
- Japan Iron and Steel Federation (JISF)
- Four groups of electrical and electronic organizations
  - Japan Electronics and Information Technology Industries Association (JEITA)
  - Communications and Information Network Association of Japan (CIAJ)
- Japan Business Machine and Information System Industries Association (JBMTIA)
- Japan Electrical Manufacturers Association (JEMA)
- Japan Paint Manufacturers Association (JPM)
- Japan Auto Parts Industries Association (JAPIA)
- Japan Automobile Manufacturers Association, Inc. (JAMA)
- Japan Wire Products Association (JWMA)
- Japan Copper and Brass Association (JCBA)
**Industrial organizations which declared to do voluntary management as a group (2)**
- Federation of Electro Plating industry Association (FEPIA)
- Japanese Electric Wire & Cable Makers’ Association (JCMA)
- Japanese fused Zinc Plating Association (JFZP)
- Japan Aluminum Association (JAA)
- Japan Construction Material & Housing Equipment Industries Federation (J-CMIF)
- Japan Natural Gas Association (JNGA)
- Petroleum Association of Japan (PAJ)
- Japan Federation of Printing Industries (JFPI)
- Japan Chemical Industry Association (JCIA)
- Japan Steel Drum Association (JSDA)
- Aluminum Products Association (APA)
- Japan Plastics Industry Federation (JPIF)
- Japan Office Institutional Furniture Association (JPIFA)
- Japan Plating Suppliers Association (JPSA)

**Industrial organizations which declared to do voluntary management as a group (3)**
- Japan Auto-Body Industries Association Inc. (JABIA)
- Japan Adhesive Industry Association (JAGIA)
- Japanese Dyeing Trade Union Federation
- Prefabricated Building Association
- Japan Printing Ink Makers Association (JPIMA)
- Industrial Painting Cooperative Federation of Japan
- Japan Rubber Manufacturers Association (JRMA)
- Japan Auto-Body Repair Association (JABRA)
- Japan Adhesive Tape Manufacturers Association (JATMA)
- All-Japan Musical Instruments Association
- Japan Fishing Tackle Manufacturers Association (JFTMA)
- Japan Association of Metal Household Items
- Japan Western Tableware Industry Association
- BS President Business Cooperative Association
- Japan Industrial Association of Gas and Kerosene Appliances (JGKA)

**Supporting Organizations for VOC Voluntary Management**
Trans-industrial voluntary management has been dealt by two organizations as follows: These organizations are not the group of enterprises who emit VOC, but have experience to advise how to control VOC emission.

1. **Japan Environmental Management Association for Industry (JEMAI)**
   - Supporting board for VOC voluntary management
   - Editing of manual and handbook for VOC emission control

2. **Japan Industrial Conference on Cleaning (JICC)**
   - Editing of manual and handbook for VOC emission control
   - Field guidance to cleaning site of SME
   - Development of EVABAT system

**JEMAI : Supporting Board for VOC Voluntary Management**
- Supporting board for VOC voluntary management

**JICC : Manuals of VOC Emission Control for Voluntary Management**
- Editing: Ministry of the Environment
- JEMAI (Japan Environmental Management Association for Industry)
- Asahi Research Center Co., Ltd.

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Economically Viable Application of Best Available Technology

- 4. Environmental management system requirements,
- 4.3.3 Objectives, targets and programme(s)
- Annex A (informative) Guidance on the use of this International Standard
- A.3.3 Objectives, targets and programme(s)

... When considering its technological options, an organization should consider the use of best-available techniques where economically viable, cost-effective and judged appropriate.

1. How to choose the most suitable technology
   - "Economically viable"
   - "Best" and "available"
2. Factors for the selection
   - Conditions of management
   - Scale of business
   - Policy of management,
   - Geographical condition
   - Condition of production
     - Restriction from Existing facilities
     - Process schedule of production
     - Characteristics of final product
     - Quality, Originality
3. Tool to promote voluntary management

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Example of Cleaning Process

Evaluation of EVABAT
(1) Evaluation of cleaning performance
- Harmless to parts to be cleaned
- To achieve expected cleanliness
- Close linkage between previous process and following process can be designed easily

(2) Evaluation of environmental Effect
- Risk management of the cleaning agent is achievable
- Safety to Human body and eco-system
- Pollution-free to water, air, soil etc
- Consideration about global environment
**Evaluation of EVABAT**

(3) Evaluation of profitability

- Price of cleaning agent
- Initial cost for cleaning facilities
- Heating and lighting expenses
- Maintenance fee
- Waste water and sewage treatment fee
- Discarded equipments handling fee

(4) Evaluation of operation for cleaning

- Cooling water: Adjustment of temperature
- Parts: Configuration of parts to be cleaned
- Drying: Drying after vapor degreasing
- Wind speed: Adjustment around cleaning facilities
- Exhauster: Design and operation
- Vapor: Recovery of solvent vapor
- Heat source: Gas or electricity

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**Example of Input Screen**

- Facility conditions
- Process conditions
- Investment conditions

**Data of the Conditions of Cleaning**

- Equipment: Size of cleaning facilities
- Cleaning agent: Type and its consumption.
- Process conditions: Environmental information during operation
- Investment conditions: Purchase price of cleaning agent

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**Example of Output Screen**

- Emission factors
- Economical evaluation

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**Demonstration of the EVABAT System**

At “Cleaning Expo 2011”
Application by E-mail

- Enterprise operating cleaning process
- E-mail address: evabat@jicc@codao.cn.ne.jp
- Site visit by JICC adviser
- 1st interview: Diagnosis by computer tool
  - Operation change
- 2nd interview: Confirmation of the result

Thank you very much for your kind attention

고맙습니다

謝 謝

ご静聴有り難うございました