ICETT NEWS

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INTERNATIONAL CENTER FOR ENVIRONMENTAL TECHNOLOGY TRANSFER

Environmental Information Network System Construction Project

Project Supported by Mie Prefecture, Yokkaichi City and
New Energy and Industrial Technology Development Organization (NEDO)

URL:http://www.icett.or.jp

ICETT English Web Site

What's New!!
ICETT has launched
"ICETT Bulletin Board"

1. Outline

The International Center for Environmental Technology Transfer (ICETT), is exchanging between Japanese and overseas organizations an increasing amount of information. Since the ICETT's objectives are to transfer Japan's advanced environmental technology to other countries, especially developing countries, and to contribute to their environmental improvement, its activities concern not only Asia, but much larger areas, including Latin America and Eastern Europe, which it provides with accurate, low-cost information on the environment.

At the same time, Mie Prefecture industries planning to expand operations overseas, and residents interested in environmental issues are strongly demanding information gathered by the ICETT, such as environmental standards and issues from overseas.

In meeting such demands, the ICETT constructed databases of domestic and international environmental information already in its possession, to which new environmental information is continually added. It also developed the hardware and software required for opening a site on the Internet where anyone could access the information at any time, and from anywhere in the world. It was impossible for the ICETT alone to implement such a major project, which required extensive funding. Accordingly, assistance was obtained from Mie Prefecture, Yokkaichi City and the New Energy and Industrial Technology Development Organization (NEDO); a plan was drawn up for constructing Japan's pioneer environmental information network, and the project commenced in fiscal 1996.

The ICETT web site, opened on a trial basis in November 1996, commenced full-scale operation in April 1997. There are now almost six times as many hits to the web site as at the beginning. The LAN (Local Area Network) established within the ICETT is smoothly handling the increase in domestic and international information exchange, while achieving greater work efficiency and quality. The network system is used to collect environment-related information, exchange e-mail and upgrade training contents.

The ICETT has also established the foundation for its service as a principal organization in the APEC (Asia-Pacific Economic Cooperation) Virtual Center for Environmental Technology Exchange, which commenced operation at the same time as this project, in order to promote environmental and technological exchange among countries involved in the APEC ministerial meeting.

2. Project Objectives

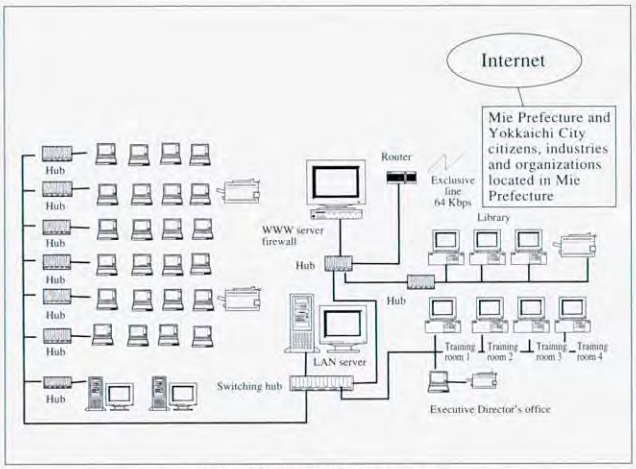
The ICETT is required to transfer Japan's environmental technology to other countries, especially developing countries, so as to contribute to their environmental improvement, and to continually provide accurate information on the environment. The ICETT is also required to respond to demand for environment-related information collected by Mie Prefecture, Yokkaichi City and the ICETT, demand believed to exist among companies planning overseas expansion, as well as among Mie Prefecture and Yokkaichi City residents interested in environmental issues. This project was implemented to construct an environmental information network system that would facilitate fulfillment of these requirements by the ICETT.

3. Project Specifics

Following observation visits to universities and private organizations to examine actual examples of Internet and LAN usage, the basic design was drawn up for a system best suited to the ICETT. Detailed design was then entrusted to an outside system development company, which constructed a system that facilitates information transmission and exchange. At the moment, the ICETT is carrying out its daily operations and information collection to compile and make active use of information using a computer network. In this project, (1) Internet system introduction, (2) construction

of environmental information databases for businesses and organizations, (3) production of web pages introducing the ICETT's activities and information on environmental technology and the production of links to other web sites pertinent to environment and development assistance, (4) information exchange among ICETT staff and participants, (5) use of the Internet in training programs, etc. have been conducted.

Through its web site the ICETT has internationally advertised its activities, to raise awareness of environmental issues in and outside Japan and promote general recognition of the importance of technological transfer related to global environmental preservation. The web site not only introduces ICETT activities, but also provides several environmental databases to fulfill the task of worldwide information transmission. The system is constructed in such a way as to enable network users, such as environmental researchers, as well as industries, organizations and citizens of Mie Prefecture and Yokkaichi City, to collect and transmit information.



ICETT Network Composition

Within the ICETT a LAN is formed, each staff member having one personal computer for easy access to the Internet, and to information from both Japanese and international sources. This also gives staff direct e-mail communication with ICETT participants, and with governmental and organizational representatives in many different countries, greatly enhancing the efficiency of various projects.

ICETT information in the LAN server is now much easier to retrieve, greatly enhancing work efficiency and interpersonal communication.

Contents of Environmental Information Databases

No.26-1 Classification of Technology: Air Pollution Control (Cleaner Technology) Industry: Electric Power

Subject ; Dry Type Flue Gas Desulfurization - Denitration Technology (Electron Beam Method)

1. Purpose
This method simultaneously removes sulfur oxides (SOx) and nitrogen oxides (NOx) contained in flue gas by irradiating electron beam on the gas. This is a dry type desulfurization and denitration technology (electron beam method) for recovering valuable by-products (ammonium sulfate, ammonium nitrate).

2. History of the Technology Development
12,000 Nm³ /h pilot plant test using flue gas from actual equipment was conducted jointly by Chubu Electric power Co., Japan Atomic Energy Research Institute and Ebara Corporation and completed at the end of 1993.
There is no record so far of the introduction of the technology into large scale power plant in Japan. At present, a plant (for treating 300,000 Nm³/h of flue gas) is under construction by Ebara Cooperation in a coal fired power plant in China (Shisen Province, Seito).
(Estimated commissioning time - 1997)

3. Principle and Structure
Process flow and reaction mechanism are as follows.
* Desulfurization rate : Improve with lower reactor outlet temperature or with increase in absorption dose. (Absorption dose : Energy absorbed by exhaust gas)
* Denitration rate : Improve with lower NOx concentration at inlet or with higher absorption dose.
* Utilization efficiency of energy : Improvement of the utilization efficiency of electron beam is possible by the optimum reactor design considering the beam distribution in the reactor.
* By-product dust collecting performance : Dust collecting performance of over 99% is confirmed by combining an electric dust collector and bag filter. Even without the bag filter, a dust concentration of about 5mg/Nm³ is possible.
* Quality of the by-product : Products that are not inferior to nitrogenous fertilizer on the market can be obtained.

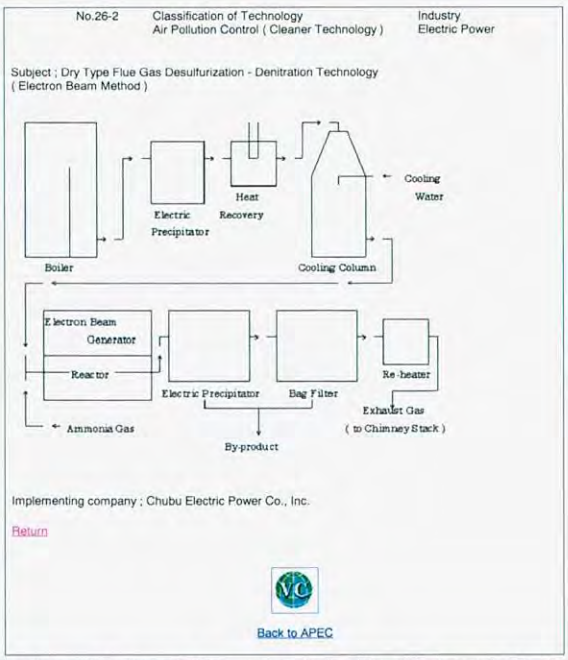
4. Effect and Achievement

Desulfurization rate	Over 94% (Inlet SOx concentration 800ppm, outlet SOx concentration under 50ppm)
Denitration rate	Over 80% (Inlet NOx concentration 225ppm, outlet NOx concentration under 45ppm)

Dust content at inlet of stack : under 10mg/mN³,
Residual ammonia concentration : under 10ppm.
Features of the electron beam method.
(1) Drain treatment is unnecessary since this is a dry method.
(2) System structure is simple, space required is small and operation is simple.
(3) Expensive catalyst is not required.
(4) By-products (ammonium sulfate, ammonium nitrate) can be used effectively as nitrogenous fertilizer.
Although the electron beam method differs depending on the flue gas treating condition, the construction cost is cheaper compared with the wet limestone method and the economy including the operating cost is excellent.
Since it can also cope with high concentration SOx, it is suitable for treating flue gas from the low quality fuel such as residual oil or high sulfur content coal.

5. Situation of Development
In the current test, the continuous operation of about 2,000 hours is being confirmed with a 12,000 mN³/h gas treating equipment.

Given Company's Environmental Preservation Technology



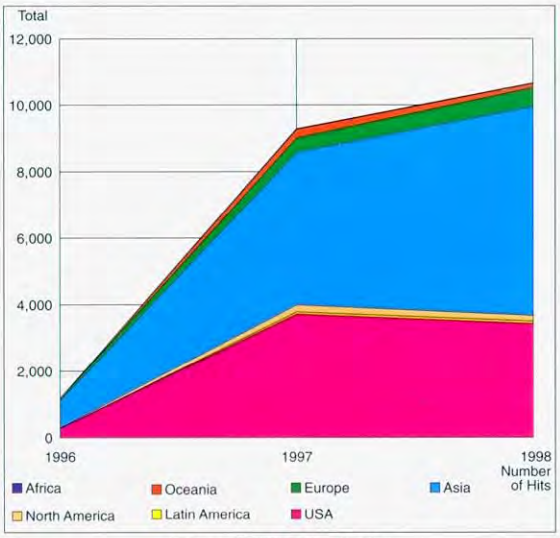
Given Company's Environmental Preservation Technology Measure Implementation Flowchart

The ICETT's network system is intended for use by ICETT staff and participants, as well as personnel in administrative organizations, environment-related organizations, personnel exchange organizations, economic organizations, corporations, universities and research institutions. Therefore, in view of the worldwide Internet situation, system hardware and software have been developed for smooth operation in both Japanese and English-language environments. For easy access by participants in developing countries, the ICETT site has few graphics, and is mostly text (characters) and linear diagrams (figures). To keep citizens of Mie Prefecture and Yokkaichi City up to date, the site provides the latest news on the ICETT and events involving the community.

ICETT Executive Staff Office

4. Internet Access

Internet users continue to increase rapidly; most well-known organizations and individuals are connected to the Internet, which is now essential to information activities. Since the Internet has developed mainly on the strength of its ease of use, and since its introduction is easy, users in developing countries are expected to increase steadily. Since the ICETT environmental information network began, hits to its web site have been increasing steadily, from an initial monthly average of 2,900 to 16,000 hits per month in 1998. By region, Asia, the United States and Europe have the most hits, in that order.



Access Statistics by Region

However, hits from Asia and Latin America (excluding China and some parts of South Korea) have not reached sufficiently levels, owing to lack of well-developed communication infrastructure in those regions, though the situation is expected to improve. Meanwhile, although there are discrepancies among regions, the actual number of hits has already surpassed the original projections.

5. Future Prospects

Environmental databases must be reviewed and optimized to meet the needs of organizations and participants in developing countries, as well as environment-related organizations in and outside Japan. Data must be updated from time to time, in databases easily accessed by users in Japan and overseas. Database content and format should also be able to accommodate future multimedia advances.

Furthermore, local network formation in accordance with the Mie High-Tech Planet 21 Project, linking the ICETT with Mie Prefectural Science and Technology Promotion Center, Institute of Public Health, Mie Suzuka-sanroku Research Park Center, Mie Software Center Co., Ltd. and International Standards Certification Center Co., Ltd. in Suzuka-sanroku Research Park, will enable environmental technology training and education via this network, greatly expanding training, research and development potential.

Seminar on Environmental Management Towards Philippines 2000

Project supported by the Japan Fund for Global Environment

July 28 - 29, 1998, EDSA Shangri-La, Manila, Mandaluyong City, Philippines

1. Background and Objectives

In recent years, the Philippines has seen rapid industrial development, thanks to modern industrial promotion measures. At the same time, however, lack of technical experts, delayed modernization of industrial facilities, inadequate pollution control measures due to insufficient funds, and other factors, have allowed environmental pollution to develop and expand.

Since 1993, the ICETT has already had 186 participants from the Philippines participate in its training programs, thereby maintaining contact and dialogues with those concerned with environmental administration in the Philippines, through joint and collaborative projects including training programs, environmental investigations and symposiums.

Recently, with the cooperation of a counterpart comprised of former ICETT participants, the ICETT organized a seminar concerning support for environmental improvement from the standpoint of both economic development and environmental preservation. For the seminar, entitled "For Environmental Improvement in the Philippines" and held with the cooperation of the Japan Fund for Global Environment, Japan External Trade Organization (JETRO) Manila Office, the Department of Environmental and Natural Resources (DENR) and the Environment Management Bureau (EMB) of the Philippines, technical experts were dispatched from Japan to give lectures.

2. Contents

In the opening ceremony, Ms. Ella S. Decadiz, Manager of the DENR-EMB, and Mr. Koshin Kura, Executive Director of the ICETT, delivered speeches.

Philippine Project 21

Ms. Ofelia M. Templo, Deputy Manager of Planning Division of the National Economic Development Agency (NEDA), talked about the national project "Philippine Vision 5D's,"which the Philippine government was currently promoting, stating that the country was ready to carry out stable policies.

Ms. Ofelia M. Templo

5D's are:
1) Deregulation
2) Democratization
3) Decentralization
4) Devolution
5) Development

Philippine Agenda 21

Ms. Elenida R. Basug, Manager of the Environmental Education Service Division of the Environment Management Bureau, the Department of Environmental and Natural Resources (DENR-EMN-EES), delivered a lecture on "Philippine Agenda 21," which was formulated following the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in 1992, and cites elements important for the implementation of Agenda 21.

Ms. Elenida R. Basug

Measures concerning climate change in Japan

Professor Yoshitaka Nitta of the Faculty of Environmental & Information Sciences, Yokkaichi University, talked about policy measures adopted by Japan following the Third Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) held in Kyoto in 1997, stating that carbon dioxide reduction is essential to achieve the country's goal of 6% reduction in greenhouse gas emissions by the year 2010. Professor Nitta also spoke of greenhouse gas reduction measures concerning developed and developing countries, and explained that soil improvement in China and Southeast Asia would help environmental measures and food production increase measures.

Professor Yoshitaka Nitta

Measures concerning climate change in the Philippines

Ms. Amelia Dulce D. Supetran

Ms. Amelia Dulce D. Supetran, Manager of the Environmental Education and Information Division of the Environment Management Bureau, the Department of Environmental and Natural Resources, spoke of the Philippines' historical background of the climate change issue, indicating the necessity for technical assistance, recycling of resources and energy conservation.

Environment management system/ ISO 14001

Mr. Hirohisa Shima, Managing Director of Mie Prefecture Environmental Corporation (MEC), talked about the environment management system, which would be a key to the Philippines' future environmental measures. He spoke

about the organizational mechanism of the International Organization for Standardization (ISO), comprised of 120 organizations, and referred to the guidelines of environmental monitoring, environmental labels, life cycle assessment and ISO 14001 (environment management system).

Mr. Hirohisa Shima

Industrial waste management in the Philippines

Mr. Wifrido Nava

Mr. Wifrido Nava, Vice President of the Philippine Pollution Control Association, discussed waste materials produced in manufacturing processes and points of note in connection with the implementation of environmental preservation measures, using Wyeth Philippines (The US-invested pharmaceutical company) as an example.

Air pollution control technology

Mr. Junichi Nishi

Mr. Junichi Nishi, Sub-chief of the Planning and Administration Group, Environmental Affairs Division, Chubu Electric Power Co., Inc., discussed air pollution control technology in Japan, citing his company's cases as examples. He also reported on some changes in Japan, including agreements by which local governments directly instruct private enterprises, growing consciousness of environmental conservation on the part of community residents and advancing information disclosure by the public and private sectors.

Water contamination control technology

Mr. Masahisa Nakamura

Mr. Masahisa Nakamura, Director of the Lake Biwa Research Institute (LBRI), talked about water contamination control measures in Japan, citing examples of Lake Biwa and introducing the history of water quality deterioration and ordinances, policy measures and regulations introduced for environmental preservation.

3. Plant Observation Tours

Sucat Thermal Plant

Mr. Vicente V. De Guzman, Action Group Manager of Sucat Thermal Plant, greeted the observation group and presented an outline of the Thermal Plant. In response to complaints from nearby factories and advice from Mr. Shima, a Seminar lecturer and Managing Director of MEC, and others, the Thermal Plant will be closed down in three years.

Se-lecta Dairy Products Inc. Food Plant

Ms. Marites C. Blanco (Seminar participant), presented an outline of the Company and the background of water contamination. She described how the Company, once called "the dirtiest company," came to receive "The Most Improved Company" award after revolutionary improvements.

4. Observations

This two-day Seminar was closed after participants who had attended the Seminar on both days were presented with certificates of seminar completion by the ICETT. It is urgently necessary that both the parties responsible for environmental preservation and regulation and the parties subject to regulation understand the need for environmental measures. The Seminar was therefore conducted exclusively for those concerned with environment-related areas, so that it might lead to greater understanding of the need for global environmental preservation and local environmental improvement, and of environmental measures and regulatory systems in the Philippines, resulting, hopefully, in the implementation of concrete actions for the environment. To make this Seminar more meaningful and optimally effective, subsequent seminars and follow-ups on related programs are expected.

FY 1998 Group Training Course in Industrial Pollution Control for the Arab Republic of Egypt

Project commissioned to Japan International Cooperation Agency (JICA)

November 14 - December 12, 1998, ICETT, Yokkaichi City, Japan

1. Background and Objectives

The ICETT recently received five participants from Egypt, to conduct, with cooperation from Japan International Cooperation Agency (JICA), the "Group Training Course in Industrial Pollution Control for the Arab Republic of Egypt" from the standpoint of both economic development and environmental preservation.

2. Content

At the outset of this Training Course, the participants visited Yokkaichi City Hall and learned from Deputy Mayor Yasuo Tamaoki about the City's administration and environmental preservation measures, which are being promoted by the public and private sectors. The participants visited Isozu District and the Suzuka River vicinity to better understand the historical background of Yokkaichi asthma, and the geological conditions of Yokkaichi petrochemical complexes, industrial parks and residential areas.

In connection with The Sub-Themes, "Environmental Administration by the National Government," "Environmental Administration by the Local Government," "Environmental Pollution Control Technology" and "Environmental Pollution Monitoring System," the training also presented how environmental administration functions in Japan and how the Japanese national and local governments have dealt with cases of environmental pollution in the past. The participants were particularly interested in the measures and solutions adopted by Japan to deal with environmental problems, including air pollution, water contamination and pollution by industrial waste, which are currently the main environmental problems in Egypt.

General Information on Egypt

Official name:	Arab Republic of Egypt
Capital:	Cairo
Area:	1,001,450 km^2
Population:	62,966,000 (1996)
GDP:	US$47,050 million
Per-capita GDP:	US$1,200

The Yokkaichi International Association and ICETT Participants

The Yokkaichi International Association promotes a wide range of international exchange programs with citizen involvement, to deepen friendly relationship between the people of Yokkaichi and other countries, and to make Yokkaichi more open to the rest of the world and more comfortable to live in for all, including people coming from overseas.

As part of its activities, the Yokkaichi International Association provides useful information to the public and supports grass-roots international exchange. ICETT participants are known to visit the Association to spend their free time or weekends, or simply to gather sightseeing tips and information on local scenic and historic spots. Five Egyptian participants who came to Yokkaichi to participate in the Group Training Course in Industrial Pollution Control for the Arab Republic of Egypt, conducted in collaboration with JICA in November 1998, visited the Association to collect tourist information and met Mr. Kitaru Kozuka, its Director-General, to learn about the Association's activities.

General Information on the Yokkaichi International Association

Date of establishment: June 18, 1991

Chairperson of the Board of Directors:
Mr. Tetsuo Inoue, Mayor of Yokkaichi City

Facilities: Office, library, reading room, lounge, information counter, meeting room

Information services: provision to citizens of information on international exchange; provision to people from overseas of information on daily life; exchange of information between local residents and people from overseas; issuance of international exchange information journals "Salvia" and "YIA News"; Yokkaichi City's PR, etc.

(Information based on Yokkaichi International Association brochure)

CTI Energy Efficiency Workshop
Working Together to Reduce Global Greenhouse Gas Emissions

October 5-10, 1998, ICETT, Yokkaichi City, Japan

The Capacity Building Working Group of the Climate Technology Initiative (CTI), which is comprised of OECD member countries and the European Commission, convened the first in a series of Energy Efficiency Workshops, October 5-10, 1998, at the ICETT, Mie Prefecture, Japan. Supported by NEDO and co-sponsored by the Governments of Japan, Germany, and the United States, ICETT implemented and hosted the workshop at their training facility in Yokkaichi City. Fourteen industry and government participants from five countries with developing economies, including China, Indonesia, Malaysia, Philippines, and Thailand, attended. In addition, energy efficiency experts from Japan, Germany, and the United States participated as lecturers.

The mission of CTI is "to promote the objectives of the United Nations Framework Convention on Climate Change (U.N. FCCC) by fostering international cooperation for accelerated development and diffusion of climate-friendly technologies and practices for all activities and greenhouse gases." In support of this mission, the objectives of this CTI workshop were to: 1)transfer information about energy efficiency technologies to and among developing countries; 2)identify and overcome barriers to climate friendly technology implementation; 3)identify future directions and activities for energy efficiency technology transfer; 4)receive participant feedback in order to improve the content and effectiveness of future workshops; and 5)share workshop conclusions with delegates to the U.N. FCCC Fourth Conference of Parties (COP4), Buenos Aires, Argentina.

Workshop activities included lectures, interactive discussions, country study reports, and an industrial site visit to Mitsubishi Chemical Corporation in Yokkaichi City. The lectures focused on energy efficiency technologies, approaches, and policies that are being developed and implemented in Japan, Germany, and the United States. Specifically, the lectures addressed such topics as existing and emerging efficient energy technologies, renewable energy sources, management tools such as material flow mapping and life cycle assessment, beneficial reuse and recycling of materials, the importance of low cost good maintenance practices and human resource development, existing financial and information sources, and national energy efficiency program elements and strategies. In addition, the participants shared their own expertise and presented reports on their nations' energy use and energy efficiency activities.

The workshop accomplished a great deal. A wide range of energy efficiency technologies and practices were explained and discussed. Technology transfer barriers, such as accessing information, evaluating the reliability of information and technologies, financing capital investments, overcoming disincentives of existing energy pricing structures, and the practice of transferring older more inefficient technologies to developing nations, were discussed. Participants and lecturers worked together to identify steps that could help overcome these barriers.

It was agreed that the leadership of local, national, and international government organizations plays a key role in providing an institutional framework for effective information systems. Commitment to local action, involvement of industrial trade associations and non-government organizations, linkage of financial resources to good projects, and the development of market incentives were also viewed as key activities. Participants and lecturers worked together to outline next steps that support energy efficiency objectives at the organizational, national, and international levels.

Five major conclusions were reached by the workshop participants: They are:

1. Energy efficiency is a critical component in achieving national and global environmental objectives. Tackling barriers to energy efficiency is a necessary step in achieving sustainable development.
2. Governments can be a technology transfer catalyst. Their continued leadership regarding energy efficiency issues is valued and important.
3. National and international energy efficiency information sharing and networking is an essential first step in technology transfer to and between developing and developed nations.
4. Building human and institutional capacity is necessary to achieve the goals of the OECD Climate Technology Initiative and the U.N. FCCC.
5. Energy efficiency promotion and the identification of concrete implementation activities in each of our organizations represent opportunities for immediate action and leadership.

The participants also concluded that workshops like this play an important role in international technology transfer. Their suggestions regarding course content and format, such as increasing the emphasis on case study analysis, will be used to improve future CTI workshops. In addition, the scope of future CTI Capacity Building Working Group workshops will also include developing and developed nations from additional regions of the world.

The energy and commitment of the participants, lecturers, and organizers are greatly appreciated by the CTI and the workshop sponsors.

Research into Carbon Dioxide Control through Production of Soil for Tree-planting

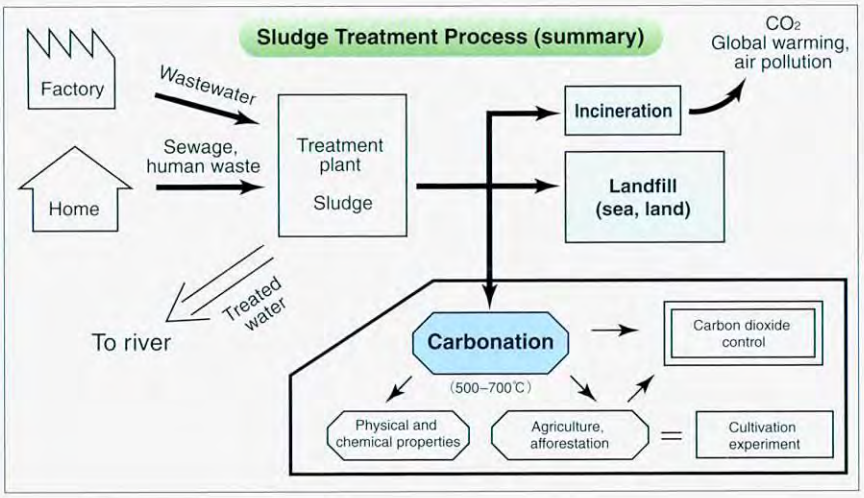
Hitachi Zosen Corporation

Period of Technological Development - Fiscal 1996 - 1997

Research and Development Objective

Recent years have seen growing international interest in environmental issues. In particular, controlling the generation of carbon dioxide, a major cause of global warming, has become an important theme for technological research.

Against such a background, this research and development project was carried out to realize effective use of organic sludge treated by carbonation as soil for tree-planting and so on, in consideration of the fact that organic sludge generated in large quantities was mostly treated by incineration, one source of carbon dioxide. By adopting carbonation, the amount of organic sludge treated by incineration can be reduced, thereby cutting down carbon dioxide generation as well. Furthermore, research was also conducted to evaluate the feasibility of mixing such sludge with desert sand or sandy earth to make carbonated soil for use as a tree-planting material in deserts, on roadside slopes and coastal landfill sites.



Research and Development Specifics

1. Carbonated soil modification experiment

In many cases, sludge contains toxic heavy metals. To realize effective use of carbonated soil made of sludge, it is useful to reduce its heavy metal content or add special functions (high added value) to expand its scope of applicability. Accordingly, in this research and development project, experiments in vapor invigoration and quality modification by acid cleansing were conducted, to examine the enhancement of added values of carbonated soil.

1) Vapor invigoration experiment

Carbonated soil activation by vapor invigoration was examined. Results showed that organic content decreased and surface area increased, but surface area-to-total weight ratio did not increase, due to a high ash content. Nevertheless, it was concluded that carbonated soil can serve sufficiently as an absorbent for wastewater treatment because of its high methylene blue absorption capacity.

2) Quality modification by acid cleansing

Acid cleansing of heavy metals contained in carbonated soil reduced Mn and Cr, but other heavy metals did not respond well to this process. It was therefore concluded that acid cleansing was not very effective in removing heavy metals other than Mn and Cr. Accordingly, to administer carbonated soil as a special fertilizer to natural soil, it is necessary to make sure that the carbonated soil to be used has a low heavy metal content already, when it is still in the original sludge form.

2. Soil improvement effects of carbonated soil

Compared to ordinary soil, carbonated soil has extremely high maximum water retention and positive ion exchange capacity, superb physical and chemical properties and sufficient basic attributes and functions required of a soil modifier. On the other hand, vegetation experiments in which carbonated soil was mixed with desert soil or sandy earth for use under simulated conditions of dry

climate or salt-caused damage revealed that the application of carbonated soil to a highly water-permeable sandhill could yield such positive results as increased agricultural output and reduced fertilizer use, since higher water retention and positive ion exchange capacity levels improved the soil's nutrient maintenance capacity. Moreover, it was learned that carbonated soil could improve the water permeability of clay soil such as red soil and yellow earth.

Basic Properties of Carbonated Soil and Charcoal

		Carbonated Soil	Charcoal
Particle diameter (mm)		2 - 3	5
True specific gravity (g/cm³)		2.49	-
Maximum water retention (g/WS100 g)		55.25	33.6
Volumic weight (g/cm³)		62.6	37.2
pH (H_2O)		6.34	7.81
pH (KCl)		6.79	7.25
EC (dS/m) 1:5		2.41	0.12
CEC (cmol(+)/kg)		10.73	6.95
Exchangeable base (cmol(+)/kg)	Ca^{2+}	1.02	2.06
	Mg^{2+}	0.81	0.37
	Na^{+}	12.76	0.95
	K^{+}	7.44	0.45
Base saturation (%)		214	55

3. Vegetation experiments

Experiments were conducted to evaluate the soil improvement effectiveness of carbonated soil mixed into simulated vegetation soil on highway roadside slopes (dry land), etc. and in coastal landfill sites (land exposed to salt-caused damage, or dry land), using "Himalayan" cherry trees and holm oaks.

1) Application to "Himalayan" cherry trees on dry land

Mixing of carbonated soil with sandy earth resulted in clear improvements such as better water retention.

2) Planting of holm oaks

The average blight rate of holm oaks planted on carbonated soil-mixed land was lower than that on non-mixed land. Carbonated soil is therefore deemed effective as a soil modifier for salt-caused damage reduction and as a dryness addition for sandy earth on coastal landfill sites.

4. Carbonated soil production system

The carbonated soil production system used for this research and development project has the following characteristics:

1) It reduces dehydrated sludge cake with an about 80% solid content to about 1/2 in quantity by carbonation following granulation and drying.

2) It is capable of producing 100 kg of carbonated soil from 1 ton of sludge, with carbon dioxide generation 30% less than treatment by incineration.

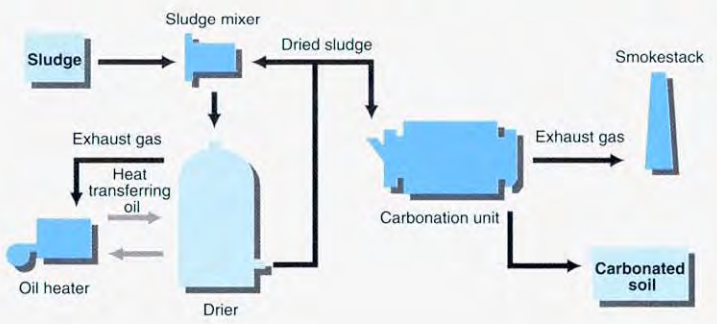
In addition, by increasing capacity above a certain level and adjusting physical distribution costs, the system can be made fully feasible economically.

(See the diagram below)

Conclusion

The effectiveness of carbonated soil made of sludge has largely been clarified in the two-year research and development project. In the future for practical application, data will be collected concerning a wide range of actual sludge, from sewage sludge and sludge found in agricultural community wastewater, to organic sludge found in wastewater from food and other industrial categories. The potential uses of carbonated soil will then be exploited, including its use as soil modifier, gardening soil, water purifier and so on. The project team also hopes that, with national and local governmental cooperation, project achievements will help resolve and mitigate global environmental problems, through desert afforestation and other approaches.

Organic Sludge (sewage sludge, human waste sludge, etc.) Carbonation System



ICETT Training Programs for Fiscal 1998

Program name	Related organization		No. of participants	Period
Technology for Industrial Exhaust Gas Treatment and Energy Saving	JICA		8	May 30 - July 2
Environmental and Safety Technology in Petrochemical Industries	JICA		10	June 29 - August 6
Industrial Air Pollution Control Technology	JICA	Eastern Europe	8	August 17 - September 22
Industrial Pollution Control Technology	JICA	China	10	October 12 - November 25
Industrial Pollution Control	JICA	Egypt	8	November 2 - December 11
Industrial Pollution Control for Arab Republic of Egypt	JICA	Egypt	2	June and November
Technology for Green House Gases Emission Mitigation	JICA		10	January 25 - February 26
Treatment and Recycle Technology for Industrial Effluent and Waste	JICA		10	January 26 - March 4
Water Pollution Control for South American Countries	JICA	South America	12	January 25 - March 24
Asian Environmental Leader's Training Program	Mie Prefecture	4 Asian countries	8	October 1 - 30
Industrial Air Pollution Control Technology	Mie Prefecture	Henan Province (China)	2	August 16 - September 14
ECPA Training Program for Municipality of Imus Philippines	Mie Prefecture	Philippines	10	September 13 - October 3
Automobile Exhaust Gas Control and Measuring Technology for Tianjin City	Yokkaichi City	Tianjin City (China)	7	November 2 - 20
Energy Saving and Environmental Conservation	NEDO	Vietnam and 3 other countries	15	December 6 - 19
Environmental Administration / Petroleum Development	Japan National Oil Corporation	Kazakhstan	1	June - November
Industrial Air Pollution Control Technology (overseas training)	AOTS	Shandong Province (China)	50	January 11 - 15
Industrial Pollution Control technology (overseas training)	AOTS	Philippines	50	February 1 - 5

Community Interaction Project for FY 1998—International Futsul Games

1. Summary

On Sunday, July 12, 1998, the International Futsul Games were held at Kasumigaura Soccer Stadium in Yokkaichi City. Blessed with good weather, 24 local football teams took part, while the ICETT was represented by eight participants visiting Japan to participate in the group training program "Environmental and Maintenance Technology in Petrochemical Industry" organized in association with Japan International Cooperation Agency (JICA).

The ICETT has always been active in promoting community-based international exchange by organizing or participating in various events in cooperation with local government, regional civic centers and other organizations, as well as Yokkaichi City residents. To further promote international exchange in Yokkaichi City, the ICETT recently participated in the International Futsul Games, playing with and cheering on other participants of various nationalities. The team representing the ICETT on that occasion was comprised of members from Brazil, the football kingdom of the world, countries seen at the World Cup and Asian preliminaries such as China, Iran, Mexico, Oman, Kazakhstan and Saudi Arabia, as well as India and Indonesia. The ICETT team played well, and placed eighth.

2. Event Specifics

Date: Sunday, July 12, 1998
Place: Kasumigaura Soccer Stadium, Yokkaichi City
Organizer: 'Rakuen' Club
With cooperation of Yokkaichi International Association
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