Efforts for Human resource development and safety
: Strengthening safety operation by using a training plant

Masahiko Sawa
Idemitsu Kosan Co., Ltd.

Contents

1. Introduction of Idemitsu group, Manufacturing and Technology Division
2. Training using the training plant
   (1) Training of foreman
   (Video footage)
   (2) Training of panel operator
3. Training of experiencing the dangers and utilize the previous example
4. Future action plan

1-(1).Outline of Idemitsu Group

Head office: Tokyo, Japan

Founded: 1911

CEO: Takashi Tsukioka

Employees: 9,139(As of March 31,2017)

(Consolidated, Not including Temporary Employees)

Annual Sales: US$ 29 billion (FY2016)

Refineries: 3 (500KBSD)

Petrochemical Plant: 2 (1MM t/yr-ethylene)

Number of Service Station: around 4,000

Business Portfolio

Idemitsu Group

Petroleum & Lube oil	Chemicals	Resources	Electronic Materials	Agri-bio	Others
Refining Delivery Sales	Olefin, Xylene AO, BPA Engineering Plastic	Crude Oil Coal Uranium	OEL Organic Electro-Luminescence	Agricultural Chemicals Battery	Renewable energy Engineering Tanker









1-(2) Manufacturing & Technology Division

2017 Nov.

Representative Director & Chief Executive Officer
T. Tsukioka

Executive Vice President & Director
S. Kito

Manufacturing & Technology Division,
Senior Executive Officer
I. Matsuhiro

IDEMITSU ENGINEERING CO., LTD.,
Chief Executive Officer
Y. Kawano

Technology & Engineering Center,
General Manager
M. Sawa

Manufacturing & Technology Dept.,
General Manager
I. Matsuhiro

Hokkaido Refinery

Chiba Complex

Aichi Refinery

Tokuyama Complex

2. Training using the training plant

(1) Training of foreman

In order to perform technology transfer from veteran to young foreman efficiently and effectively, the training of initial countermeasure in the case of accident of the plant

(2) Training of panel operator

The training of new panel operators to perform start-up operation

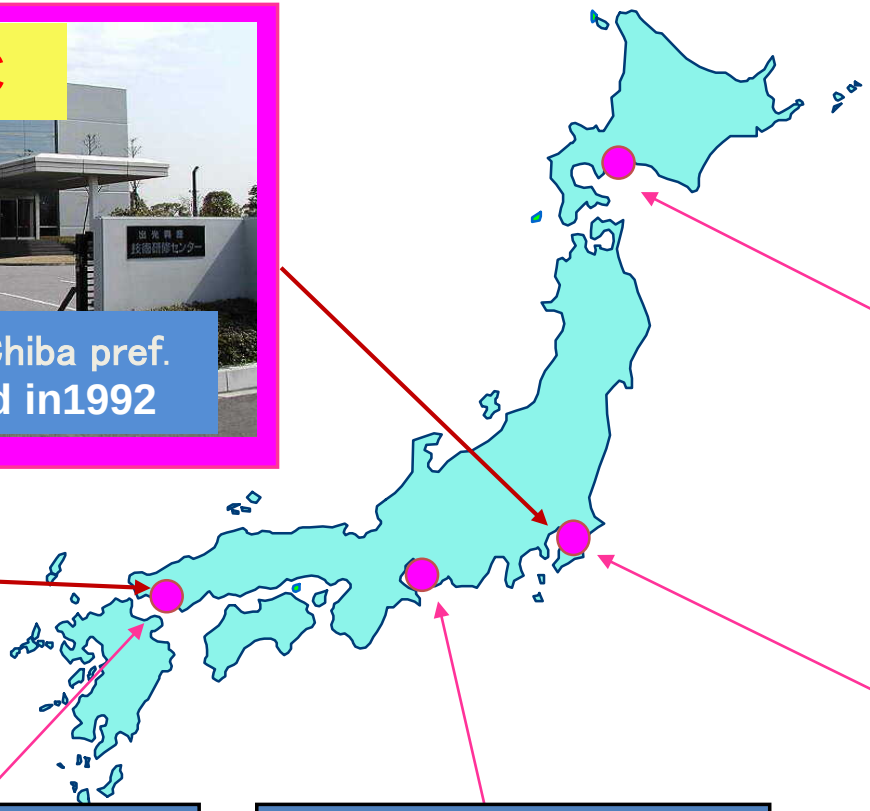
Refineries, Petrochemical Plant and Idemitsu Technical Training Center

ITTC

Ichihara city, Chiba pref.
Established in1992

Training Plant

Shunan city



Hokkaido Refinery

Tomakomai city, Hokkaido
Started in 1973

Chiba Refinery • Plant

Refinery (Started in 1963)
Petrochemical Plant
(Started in 1975)

Tokuyama Complex

Shunan city, Yamaguchi pref.
Refinery (Started in 1957)
Petrochemical Plant
(Started in 1964)

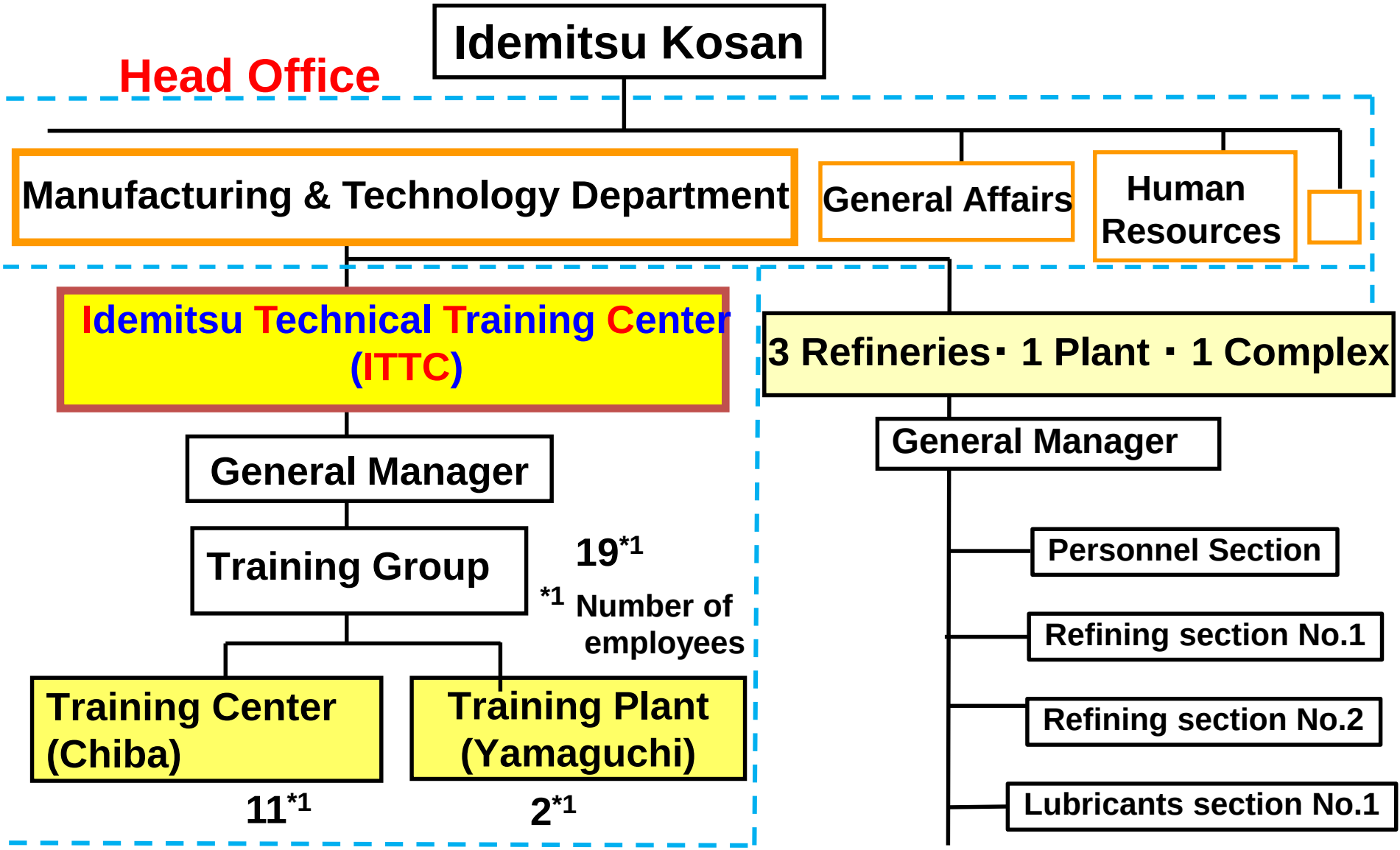
Aichi Refinery

Chita city, Aichi pref.
Started in 1975

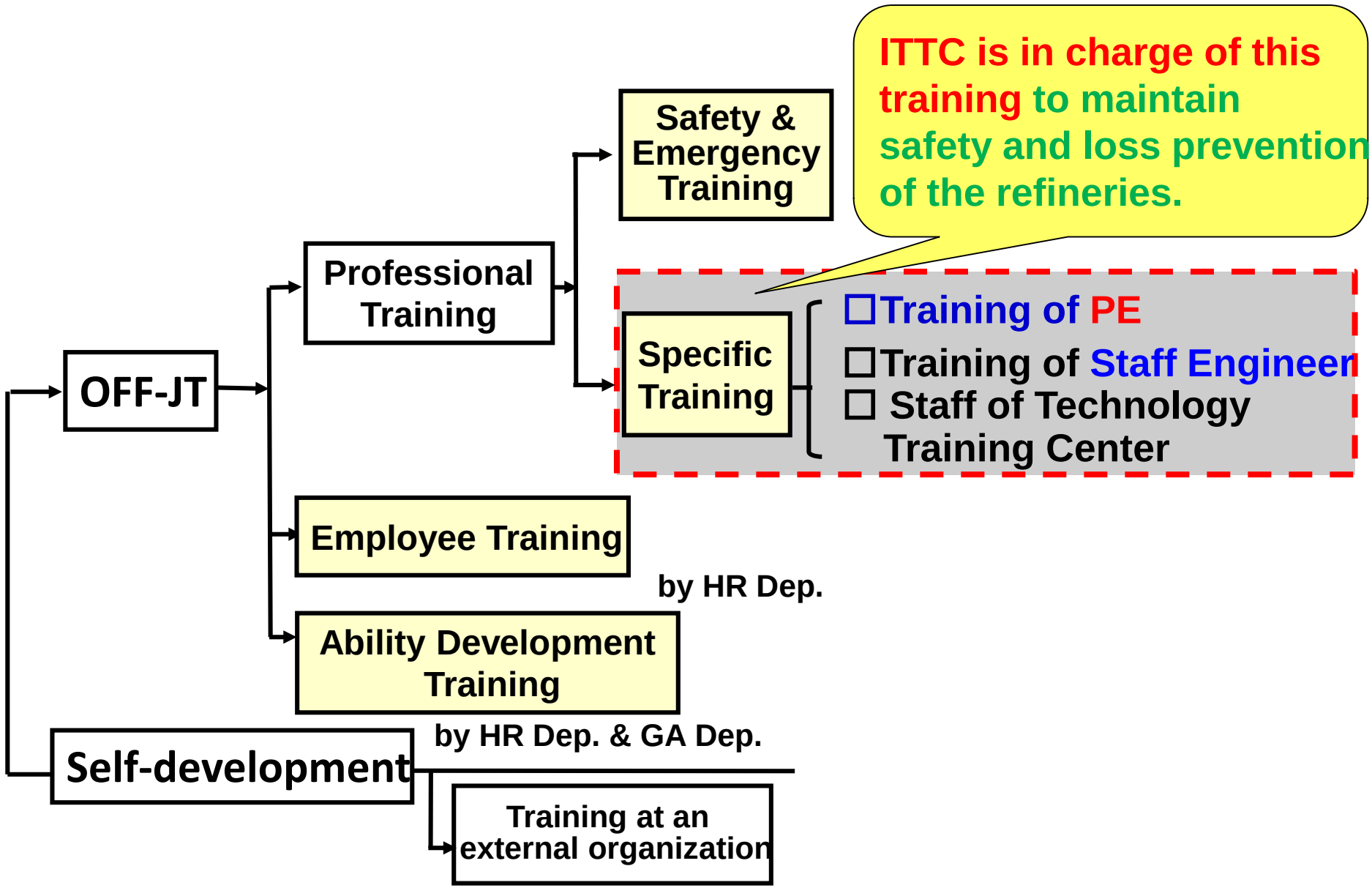
Technology & Engineering Center

Chiba city, Chiba pref.
Established in 2011

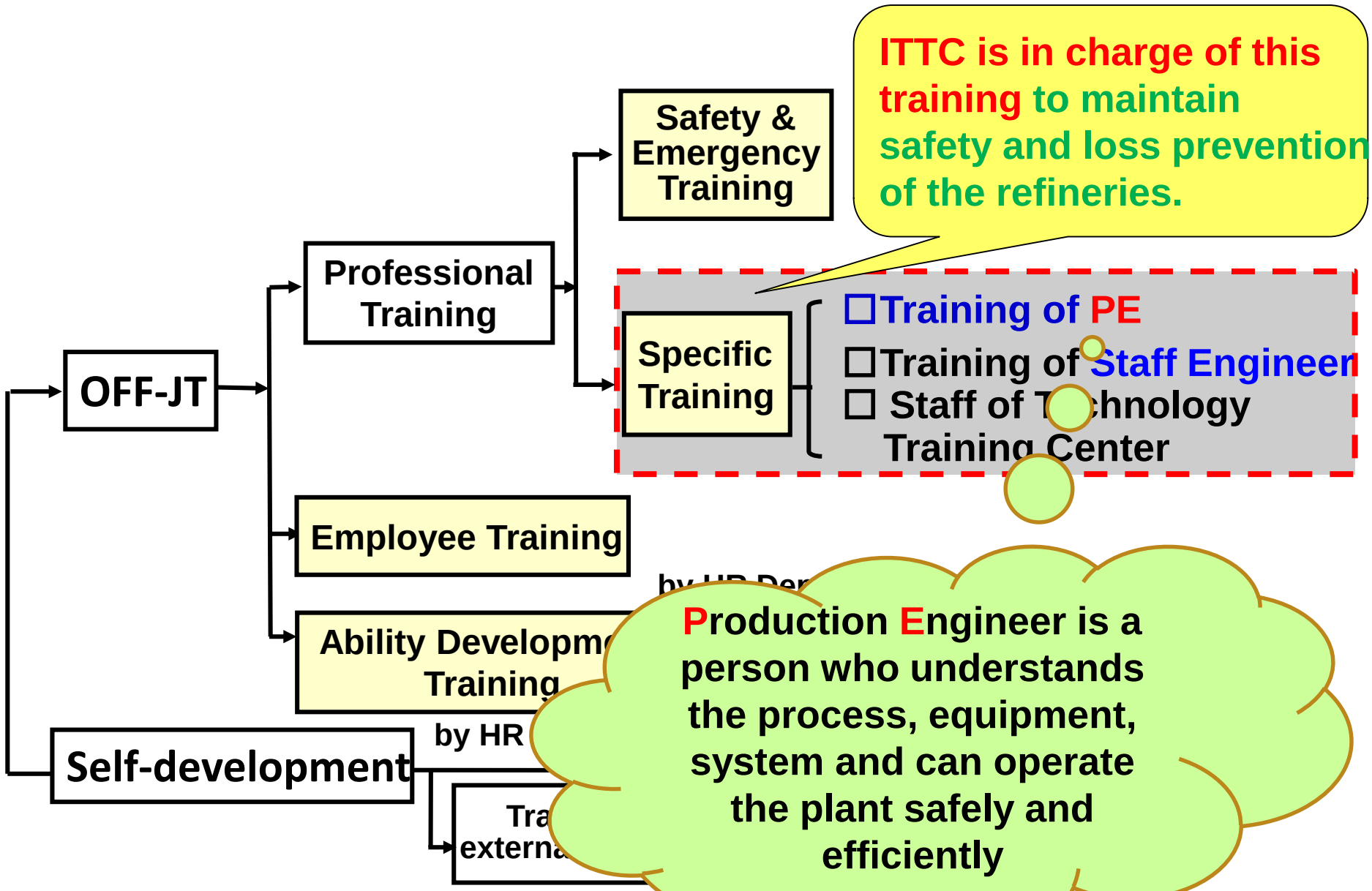
Introduction of Idemitsu Technical Training Center



Education and Training system in Idemitsu group



Education and Training system in Idemitsu group



Education and Training system in Idemitsu group

- Idemitsu has three kinds of technical training
  1) Technical Training Center(ITTC)
  2) Refineries & Petrochemical plant
  3) Production section
- ITTC is in charge of following trainings

Participants: New employee to manager

Manager, Assistant Manager

- Newly assigned assistant manager
- Safety Management System

Foreman, Assistant Foreman

- Training of foreman

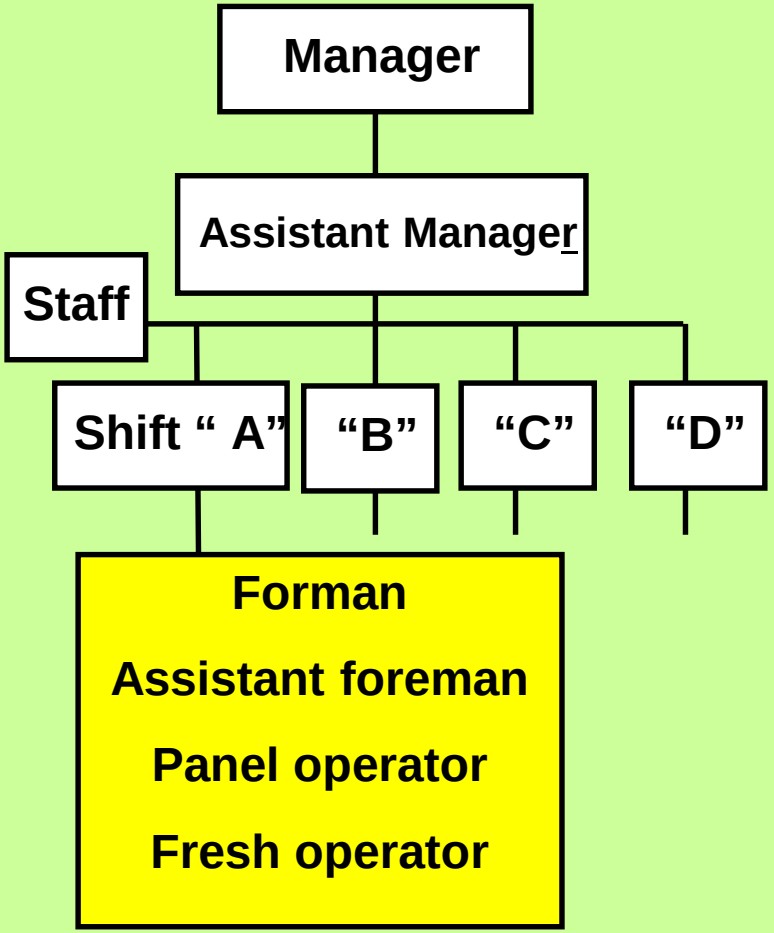
Panel operator

- Training to improve basic behavior
- Training to improve abnormality responding ability

Fresh operator

- Introduction education,
- Second education of PE

Organization of production section



(Required Knowledge and Training as a foreman)

Classroom education

Educational Tool

Confirmation Test

Chemical engineering laboratory equipment

Distillation Column

Heat Exchanger

Simulator

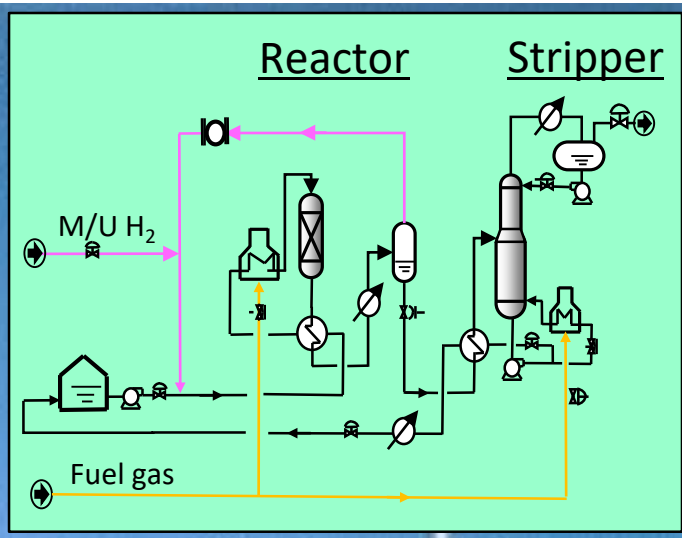
Performance Analysis

Tokuyama Training Plant for the foreman and panel operator

Converted an idled Hydrotreating unit to conduct practical training under safe circumstances.

Fluids of the training plant

Oil	⇒	Water
Fuel Gas	⇒	Air
Hydrogen	⇒	Nitrogen



2-(1) Introduction of the training using the training plant for foreman

- One of mission of the foreman is to **minimize disasters in case of emergencies and abnormal situation** of the plant.
- Almost all of new foreman have enough knowledge and the mission.
- However **they feel anxiety due to lack of experience** for the trouble of the plant.

- **ITTC developed a new program to improve their capabilities against the emergency and abnormal conditions of the plant**
- Through practical training, make confidence by wiping out uneasiness of emergency response capability

The current training of the foreman

- **Corresponding training situation of emergency and unsteady operation for the foreman**

Instructions to panel operator

Correspondence at the command place

Confirm the situation of the equipment

The current training of the foreman

(1) The training duration

30 to 40 minutes is assumed that the foreman takes an initial activity in the night and holidays.

（until the manager arrived at the plant and delegated the command.）

(2) Examples of training assumptions

- Assumption-①: Expand a gas leak, Trouble of ESD Sequence
- Assumption-②: Assumption-① + a fire broke out + injury

(3) Evaluation of the training

① Check the performance of trainees

The instructors check whether the foreman responded appropriately or not.

② Review of the training

A review meeting of the training is performed using video recording equipment and the check results written above.

The current training of the foreman

- **Following abilities are improved in the case of emergency and abnormal operation of the plant**

① Measure judgment ability

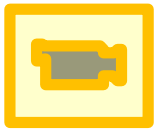
- **Recognize the current situation of the plant and judge the emergency shutdown of the plant as trouble expands and progresses**

②Ability to command

- **Appropriate instructions to shift members to perform an emergency shutdown of the plant**
- **Report to relevant departments according to law**

Achievement of the training

出光



- Actual training takes 40 minutes, but I will introduce the video footage edited in 5 minutes
- Troubles that occurred at night are assumed for the foreman's training

① The trainees grasped their behavioral characteristics at an emergency.

② As they felt that the training was performed using an actual plant, they improved their confidence for safe operation.

③ This training has been reflected to the disaster prevention drills at each section of the refineries.

2-(2). Introduction of the training using the training plant for panel operator

- 5 – 6 years is required to become a panel operator after joining Idemitsu.
- The PE who have 3 - 4 years experience as field operator are trained in this course.

Before implementation of this course	After implementation of this course
On the Job Training(OJT)	⇒
Learning basic operating skills of the plant (Chemical engineering)	⇒
Off JT (Training of countermeasure at abnormal operation of the facilities) • Dynamic simulators are used	⇒
	Started a new training course to learn basic operating procedure using the training plant

Startup training for panel operator

出光

Training contents through startup and shutdown of the training plant

1) Basic action of communication between field operator and panel operator (Instruction, contact, repetition restoration)

2) Improvement of basic countermeasure ability when malfunction of the facilities happen

3) Review meeting of the training is held

Startup training

Finger point and calling

Review meeting of startup

3. Training of experiencing the dangers and utilize the previous example

◆ Enrichment of sensitivity and physical education

Conventional training was a simulated experience of prohibited items (22)

Remove the sediment of the clogged drain valve using a wire

Experience the deflection of a small size pipeline

Steam explosion

3. Training of experiencing the dangers and utilize the previous example

出光

◆ Enrichment of sensitivity and physical education

The following new trainings are added to conventional training in order to perceive danger.

① Experience of near-miss

② Training to experience the fear of fire

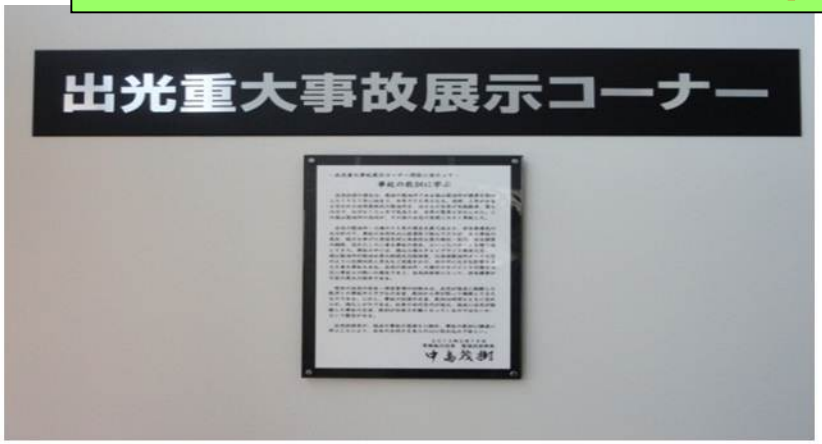
valve seat leakage

Water hammer experiment

Experience of oil fires and extinguish

Utilize previous accidents in Idemitsu

ITTC opened an exhibition corner showing serious accidents that occurred in Idemitsu's past 60 years operation



- Prevent forgettable of serious accidents in Idemitsu
- Improve the training effect by seeing the exhibits.

4. Future action plan

出光

1) Review of OFF JT

① Expanding experienced and practical training

⇒ PE was sent temporarily to another refineries during their turnaround

② Training by using IT

⇒ Adoption of distance learning, two-way communication

2) Train young PE who can work actively in overseas

3) Contribute to strengthening the safety capability of the entire manufacturing industry

① Accept the request for public training from government agencies, universities and other companies

② Cooperation with human resource development organizations in each region

JCCP training name using training plant in 2017

Training name	Days	Training content
Improvement of Operation Instructor's Skill	10	Place: Tokuyama Training Plant Trainee:Operation Instructors and Educational Lectures under PVN Contents: To make skill up for Instruction by having experience of basic and unit operations
Fresh Operators Training	15	Place: Tokuyama Training Plant Trainee: Young Operators Contents: To make skill up for plant operation by drilling basic operation, unit operation, plant start-up & shut-down operation as well as studying chemical engineering basics.
Improvement of Safety Management Activities	9	Place : Technical Training Center Trainee: Staffs in charge of Safety Management in Refinery or Petrochemical factory Contents: To raise up safety conscious by experience of safety awareness & lecture, and to make actual plan to solve the safety issue(s) through discussion after having lecture on problem solving method like as 4M analysis.
Shift Supervisor Training	22	Place: Tokuyama Training Plant Trainee: Shift Supervisors, Assistant Shift Supervisors Contents: To raise up the ability of direction and order under emergencies, & of operational management by experience of various kinds of operatiion phenomena.
Safety Training for Plant Operators	10	Place: Idemitsu Technical Training Center Trainee: Staffs in charge of safety management in refinery Contents: To raise up safety conscious by experience of safety awareness & lecture, and to make actual plan to solve the safety issue(s) through discussion after having lecture on problem solving method like as 4M analysis.

Thank you for your attention !