Safety

Message on Safety

The premises for a Corporation that is trusted by the community include paying sufficient attention to safety.

We are confident that our efforts and initiatives, time and expenses to respect human life must take precedence over all other things. Loss of valuable human life must absolutely be prevented in the process of Toyo and its group Companies' business evolution, such as plant construction.

With the recognition that "safety takes precedence over all other things," Toyo will continuously implement safety education programs for all its employees to spread awareness of the Safety Culture.

"Safety" is the prime brand of Toyo. In order to boost the brand value by all group companies in the world, we are strongly promoting many safety measures and actively strive to consolidate a firm Safety Culture.

Clients' Commendations for Safety

Our mission is to hand over superior facilities to our Clients through construction work completed without any accidents or injuries. For this purpose, the Head Office and construction site members, together with Clients and Partners, conduct safety management activities in a planned and positive manner, with an established Health, Safety, Security, Environment (HSSE) management system.

In September 2009, Toyo achieved a record of 35 million man-hours without lost time incidents at the Singapore site, which was highly appreciated by the Client, Shell Eastern Petroleum (Pte) Ltd.

In October 2009, Toyo received high commendations from (old) Nippon Petroleum Refining Company, Ltd. (new : JX Nippon Oil & Energy Corporation), for completing construction without lost time incidents.


感謝状

東洋エンジニアリング株式会社殿

貴社は弊社根岸製油所FCC製造装置の建設工事にあたり卓越した技術と豊富な経験をもって計画どおりかつ無災害にこれを完成されました

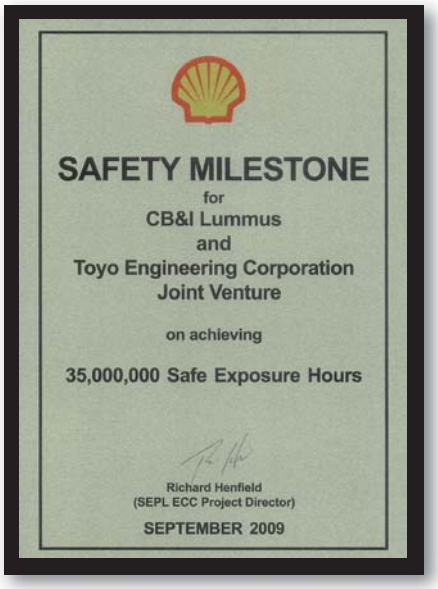
本日竣工式を迎えるにあたり貴社の御努力に深甚なる感謝の意を表します

平成二十一年十月二十六日

新日本石油精製株式会社

代表取締役社長 大野 博

Letter of appreciation from (old) Nippon Petroleum Refining Company, Ltd.



Plaque from Shell Eastern Petroleum (Pte) Ltd.

Toyo has received letters of appreciation from the Clients listed below in addition.

Commendations for Safety (January, 2009 – March, 2010)

Year and month	Reason for commendation	Client	Description
Mar. 2010	No lost time incidents	Qatar Shell GTL Ltd.	15 million hours without lost time incidents during the 4th quarter (October ~ December) of 2009 at QGTL Project, Qatar
Mar. 2010	No lost time incidents	Dow Corning (Zhangjiagang) Co., Ltd.	20 million hours continuous operation without lost time incidents at Silane Project, China
Aug. 2009	No lost time incidents	Petroleo Brasileiro S.A. (PETROBRAS)	6 million hours continuous operation without lost time incidents at CGPEX Project, Brazil
Aug. 2009	Less than 1.0 of TRI rate	Qatar Shell GTL Ltd.	Achieve less than 1.0 of Total Recordable Incidence (TRI) rate at QGTL Project, Qatar
Jun. 2009	No lost time incidents	Indian Oil Co., Ltd.	30 million hours continuous operation without lost time incidents at IPNC Project, India
May 2009	No lost time incidents	Dow Corning (Zhangjiagang) Co., Ltd.	10 million hours continuous operation without lost time incidents at Silane Project, China

• • • Efforts for Safety • • •

Safety Record

Toyo's safety record 2007 – 2009 (2010 partially included) is as follows.

Safety record over the past 4 years

Year	Employee Worked (Man-Day)	Employee Hours (A)	Number of Incident					LTI Rate*1	Total Recordable Incidence Rate*2
			Fatalities	Lost Time Incident	Medical Treatment (No Lost Time)	LTI Total (B)	Recordable (C)		
2007	9,012,650	89,334,017	1	16	326	17	343	0.19	3.84
2008	9,685,066	96,925,454	3	14	236	17	253	0.18	2.61
2009	10,524,345	104,229,724	0	8	131	8	139	0.08	1.33
2010*3	2,502,758	24,622,474	0	2	20	2	22	0.08	0.89

*1 Lost time incidence (LTI) rate =(B) x 1,000,000 / (A)
*2 Total recordable incidence (TRI) rate =(C) x 1,000,000 / (A)
*3 Figures for 2010 are up to the end of April.

Both LTI rate and TRI rate in 2009 show a downward trend compared to those in 2007 & 2008.

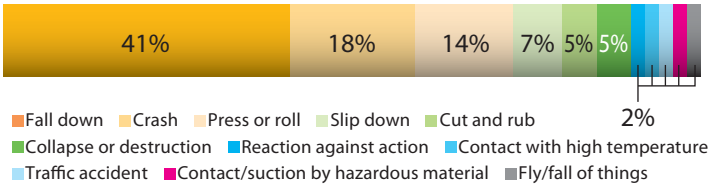
As of the end of September 2009, the total non - lost time incidents (non-LTI) hours of the ongoing projects*4 exceeded 120 million man-hours. This record is equal to employee hours when about 40,000 site members worked without LTI for one year. It is the first great safety record since Toyo's inception.

*4 The total non-LTI of ongoing projects is the latest sum of non-LTI hours of ongoing projects (excluding completed projects). Non-LTI of a project in which an accident occurred returns to zero and the count starts again.

● Number of injuries according to categories of incidents

When the number of injuries during 2007 - 2010 (figures for 2010 are up to the end of April, 4 fatalities and 40 injured with lost time incidents, total 44) are divided in accident categories, 41% of the injuries were due to fall down accidents. Therefore, the implementation of safety management and preventive measures for elevated work places is essential.

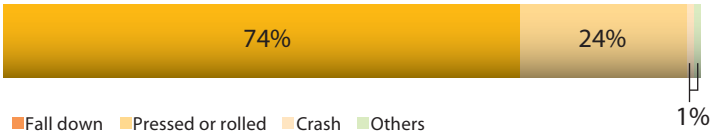
Injuries by category of incidents (2007 - 2010*)



* Figures for 2010 are up to the end of April

When the incidents are analyzed on loss day basis, 74% of loss days was due to fall down and 24% of loss days due to press or roll, sum of which amounts to 98% of total loss days. Loss days due to fall down are more and have a large effect on total loss.

Loss days by category of incidents (2007 - 2010*)



* Figures for 2010 are up to the end of April

Safety

Safety in Construction: GTL Project in Qatar

This project, awarded by Qatar Shell GTL Ltd., is to construct Liquid Processing Unit (LPU) as a part of world's largest Gas to Liquids (GTL) plant.

The project is implemented by a consortium of Toyo and Hyundai Eng'g. & Const. Co., Ltd.

The plant site is located in Ras Laffan industrial city, about 100 km to the north of Doha. Approximately 4,600 workers are working at the site.

Under the firm commitment of the Client and Toyo's top management - "Safety takes precedence over all other things, "Toyo has been working at the site without any accidents or injuries, achieving a high-level safety standard.

Incident and Injury Free (IIF) Management Meeting

Aiming at the realization of IIF at the construction site, Toyo reconfirms actions for achieving the goal through the IIF Management Meeting, held jointly with

- Client's representatives,
- Persons responsible for safety of individual work areas,
- Persons responsible for safety of all the Subcontractors.

IIF Management Meeting

12 Life Saving Rules

Aiming to let all the workers return safe and sound to their home, Toyo applies Client's "12 Life Saving Rules" (12 rules that shall be followed at site).

12 Life Saving Rules

Total Safety Task Instruction (TSTI)

TSTI, is KYK* activity implemented by the supervisor together with members of each work group at workplace before starting any construction work. This safety activity, including checking of ever changing risks, greatly contributes to the realization of safe working atmosphere.

*KYK (Kiken Yochi Katsudo) refers to Risk Prediction Activity to foresee any risk before work.

TSTI activity

Safety in Construction: Ethylene Project in Thailand

This project, awarded by PTT Polyethylene Co., Ltd., is to construct a world-class complex producing ethylene and related products. The project is implemented by a consortium of Toyo and Toyo-Thai.

At the plant site, located in Padaeng Industrial Estate, Map Tha Phut, Rayong, about 200 km to the Southeast from Bangkok, the construction work by Toyo-Thai is in its final stage, and safety activities are in place to cope with new risks that may emerge in commissioning.

Tool Box Meeting (TBM)

TBM refers to the short time meeting held every day morning, before start of work, by Supervisor to emphasize

- Work to be done,
- Procedure to be followed,
- Preparations to be done,
- Risk involved and Safety Precautions to be taken,
- Any major activities at site.

During this time general check on essential PPE (Personal Protection Equipment) worn by everybody is carried out.

Tool Box Meeting

Safety Training

Toyo implements the following training to all its employees and those of Subcontractors

- Safety Training (Preliminary, Working at Height, Confined Space etc.),
- Firefighting Training,
- First Aid Training,
- Evacuation Drill,
- Training to improve Safety Skills.

All the visitors and the Vendor Supervisors are given a safety instruction before entering the work area.

Safety Training (Firefighting Training)

Silent Steam Blowing

To clean the inside of piping with steam, the Silent Steam Blowing method* is employed to reduce noise for minimizing environmental impact.

* Silent Steam Blowing is a method to reduce steam blowing sound with a silencer installed.

Silent Steam Blowing

Safety in Construction: Monosilane Project in Japan (Yokkaichi)

Evonik Monosilane Japan Co., Ltd., awarded this Project, to construct Japan's largest monosilane gas producing plant. Monosilane gas is used to form silicon films for thin-film silicon solar cells and silicon films for a variety of electronic devices. At the construction site in Yokkaichi, Mie Prefecture, piling has been done successfully and full-swing foundation construction is about to begin. At the peak of the construction, more than 400 workers will be at the site.

Construction is scheduled with utmost priority always placed on safety, and risk assessment is carried out for operations including high-place scaffolding work, with awareness that everyone is the Safety Manager.

Special safety patrol by Site Managers of individual companies

Toyo's and Subcontractors' Site Managers patrol their work areas every day in the morning and in the afternoon to observe and correct unsafe work or unsafe conditions.

Safety patrol by Site Managers

Principle of wearing full-harness safety belt*

Practical training is given to inexperienced workers for wearing full-harness safety belts all the time in dangerous working places.

* Full-harness safety belt is the safety belt to be worn around the body to soften shock like a parachute, different from conventional belt to be worn only around the waist.

Training for wearing full-harness safety belt

Operation of Hiyari-Hatto system

Hiyari-Hatto (near loss) experience data is utilized as live information to establish minute safety measures. For this purpose, a software for touch screen has been developed, and a personal computer furnished with the software is installed at the entrance of workers' saloon to enable them to enter reports easily at any time.

Entering data into the Hiyari-Hatto system

Global Toyo HSSE Activities

Toyo and its group Companies have established Global Toyo HSSE Standard to ensure that safety management is conducted at the same level in all countries and regions. We promote Global Toyo HSSE activities in order to thoroughly follow these standards.

To promote Global Toyo HSSE activities, the persons in charge of HSSE from Toyo and its group Companies keep close communication through internet and video conferencing. They gather twice a year to exchange views and address the improvement of safety management activities.

The Hiyari-Hatto system, used at each of Toyo's domestic project sites, has been introduced and operated at Toyo group Companies since January 2010. We collect Hiyari-Hatto data from our group Companies, make analysis and develop feedback of information. This information is shared with its group Companies in order to reduce accidents in entire Toyo and its group Companies.

Global Toyo HSSE Meeting

Toyo and its group Companies participating in the meeting
- Toyo-Japan
- Toyo-China
- Toyo-Malaysia
- Toyo-Korea
- Toyo-India

Continuous Effort toward Improving Safety Culture

●In-house safety education

From 2006 to 2008, Toyo has been conducting safety education programs for all Corporate members, including directors, to enhance the safety awareness at Corporate level.
Toyo also provides construction site workers with safety education continuously.
Materials used for safety education are revised and supplemented, and revised materials are distributed to ex-trainees in a timely manner as a follow-up to firmly establish Safety Culture.
Based on the information collected over the years on safety from all construction sites and analysis results, Toyo is revising the safety education materials. These materials will be formally launched during the second in-house safety education to be conducted in 2011.

In-house safety education materials

●HSSE Manager training session

Toyo strives to develop "HSSE Manager" to respond to changes in Clients' requirements as well as to increase both in scale and intensity of public concern about Health, Safety, Security & Environment (HSSE), and also to requirement for intensification of Project Management of complex systems. HSSE Manager is to integrate and control HSSE activities throughout the projects.
A procedure has been developed for HSSE Manager's responsibilities, and training sessions for senior staff of related Divisions and Departments is being carried out.


HSSE Manager training session

●Office risk assessment

Toyo carried out risk assessment of the Engineering Center in accordance with the established procedure in order to reduce unsafe or hazardous points. Persons in charge from related Departments and from HSSE Management Dept. participated in the activity to carry out risk assessment of cleaning operation, security guard operation, dining room and restaurant operation as well as of building facilities. Based on the assessment, corrective action was taken to remove all unsafe conditions.

●In-house safety commendation

Commendations are given to projects larger than a certain scale that have been completed without accidents and injuries, and to projects that have achieved a certain continuous time period without lost time incidents. In 2009, a total of seven projects were recognized by the President.
In addition, another 7 projects were recognized by the Chairperson of the SQE Promotion Committee.


President's commendation in August 2009

●Care for Health

At present, the number of young Japanese people is declining, a social phenomenon. This resulted in the increase of working class people, of age 50 or over, in the domestic construction site.
With such personnel organization, it is important for securing measures that all workers take care of their own health and continue to be healthy, physically and mentally.
All the domestic construction sites are obliged to carry out medical examinations of all the workers in compliance with the Industrial Safety and Health Act, the Ordinance on Prevention of Asbestos Poisoning, and other applicable regulations, and also to submit personal survey sheets (health check) on new site workers.
In order to enable all the workers to work actively every day in healthy shape, Toyo carries out medical examinations, including face-to-face check at morning assembly and blood-pressure check, and suggests proper job placement, taking into consideration of individuals' physical conditions.
Toyo's persons in charge of safety at the site, together with those of Subcontractors, check and make efforts to keep everyone's good health, encouraging them to follow everyday's "say something to each other" activity.


Blood-pressure and other health check at construction site

●Operating "*Hiyari-Hatto*" System

Hiyari-hatto (near loss) is an incident that was prevented just in time before it occurred. At construction sites, people sometimes experience potentially dangerous *Hiyari-hatto* . Repeated *Hiyari-hatto* may lead to a serious accident. The *Hiyari-hatto* data management system, developed by Toyo, has been employed since January 2008 at domestic construction sites.
Hiyari-hatto data at construction sites is collected and analyzed at the Head Office, then fed back to the group Companies and construction sites. In the following report, 217 incidents from November, 2008 to October, 2009 are analyzed.

(1) Summary of *Hiyari-Hatto* System analysis results (indicating the top five items)

Items \ Order		No.1	(%)	No.2	(%)	No.3	(%)	No.4	(%)	No.5	(%)
Time of occurrence		In the morning	54.8	In the afternoon	41.9	Before noon	1.8	Night	0.9	Evening	0.5
Cause	Material	Fly or drop	44.4	Fire	18.5	Explosion or rupture	9.3	Leakage	3.7	Mudslide	1.9
	Person	Stumble or slip down	29.4	Tumble or fall down	17.6	Crushed	15.7	Press or roll	6.9	Forein object in the eye	4.9
Reason for occurrence	Person	Inability to respond	23.4	Confirmation not made	17.0	Hurry for the work	10.0	Neglect of rules	8.2	Cut corners	7.0
	Work	Incompletion of training	37.5	Insufficient KYK*1	31.3	Work by one person	8.3	Default of KYK	6.1	Other	34.5
	Material	Personal protective equipment or tool insufficient or not used	25.8	Malfunction of machinery /tool	22.6	Lack of safety protection	19.4	No regular check	3.2	Other	25.8
								Insufficient safety equipment	3.2		

(2) Countermeasures based on analysis

Yellow marking in list means remarkable data comparing to previous analysis in March 2009.
The following measures are taken to prevent the recurrence of *Hiyari-hatto*.

1) Countermeasure in view of frequent occurrence in the morning.
- Thoroughly implement the morning meeting, KYK*1 and TBM*2 and confirm work procedures before morning work.
- Let all workers look around the workplace to identify conditions before the work is started.

2) Countermeasure in view of frequent incompletion of training.
- Review and improve training documents at the site and carry out refresh training.
- Carry out thorough meeting / confirmation of the work procedures and enforcement of KYK before a work is started.

3) Countermeasure in view of frequent Malfunction of machinery / tool.
- Check the function before use according to the check list of machinery / tool.
- Confirm the check results by the supervisor.

*1 "KYK" stands for *Kiken Yochi Katsudou* (risk prediction activities), which are activities for predicting work-related risks before work is started.
*2 "TBM" stands for "Tool Box Meeting", which is an activity to briefly discuss the contents, methods, arrangements, safety risks, and problems of the work of the day before starting work at the workplace.

Lessons learned

Collision

Situation

To allow a crane to move from a pipe rack area to a road, wooden boards were placed on the ground so as to disperse the load on the side ditch concrete cover. However, when a tire of the crane passed on the boards, one of the boards jumped up to hit directly the right leg of a worker who was 2.5 meter apart. The worker's leg bone was fractured.

Causes

- Although the procedure requires steel plates be used to disperse load, the workers placed thin wooden boards, neglecting the requirements because the step of side ditch was small.
- The worker was standing beside the moving heavy machine.
- KYK (Risk Prediction Activity) had not been done.

Crane passed over wooden boards

Countermeasures

(1) To be carried out at the construction site

- At a general meeting, it was explained and reconfirmed that steel plates should be used to disperse the load of a passing heavy machine, and unevenness under the steel plates should be filled with sand.
- Special safety education was given to Equipment operation supervisors and related workers.
- A temporary fence with barricade was installed to prevent workers to come closer to a moving heavy machine.

(2) To be carried out by the Head Office

- The accident was immediately reported to all construction sites and group Companies to prevent similar accidents from occurring and to promote safety awareness.
- Construction sites were instructed to strictly follow the procedure and to thoroughly implement "KYK."

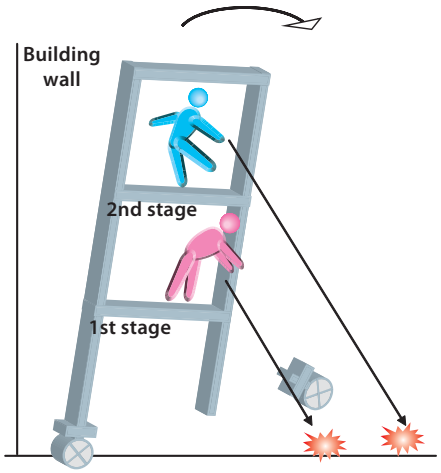
Drop and Fall Down Accidents

Situation

While two workers were dismantling a mobile scaffold (2 m wide, 5 m long, and 7 m high), the weld of one of the root of four wheels cracked and the entire scaffold turned over. As a result, two workers fell down from 3 m height of the first stage and from 5 m height of the second stage, respectively. Both the workers did not wear a safety belt.
The worker who dropped from 3 m height (42 years of age) broke his right leg bone at one point while the other worker who dropped from 5 m height (38 years of age) broke his right leg bone at two points.

Causes

- Mechanical strength was insufficient because of the reduced wall thickness caused by corrosion.
- Pre-operation check tags specified by the procedure had not been attached. (After pre-operation check, green tags should have been attached to scaffolds permitted for use and red tags to scaffolds not permitted for use.)



Countermeasures

(1) To be carried out at the construction site

- All scaffolds are checked and tags were attached in accordance with the procedure.
- Prohibited use of red-tagged scaffolds and tag-less scaffolds was re-confirmed at Tool Box Meeting (TBM).

(2) To be carried out by Head Office

- The accident was reported to all the construction sites immediately to promote safety awareness.
- Special safety audit of the accident site was conducted to give instructions about the accident point and general safety instructions.
- The procedure was revised to limit the mobile scaffolding operating height and to add requirement for providing outriggers to prevent scaffolds from turning over. The revision was communicated to all the construction sites.