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### **Editorial Policy**

### **■**Purpose of the report

This report has been prepared to present information about TOYO's safety and environmental activities to stakeholders of TOYO.

#### Reference guideline

This report has been prepared based on "Environment Guideline (2007)" of Japan's Ministry of the Environment.

### Period

This report covers the activities for fiscal year 2011 (from April 1, 2011 through March 31, 2012). The overseas data cover those for calendar year 2011 (from January 1, through December 31, 2011). For some data, year 2012 activities are reflected.

#### Scope

This report covers the activities of all the Divisions and Departments and all the construction sites of TOYO.

### Next report

The next issue of such report is scheduled to be released by August 2013.

### Prepared by

Safety, Quality and Environment Management Division / HSE Management Department (Tel 81-47-454-1678, Fax 81-47-454-1833)

# Aiming to be a but also by



# Corporation trusted not only by Clients, the Local and International Communities.

On behalf of everyone at Toyo Engineering Corporation and our group companies (TOYO), I would like to express our sincere gratitude to you for your understanding and support over the years.

TOYO set our mission which is "Engineering for Sustainable Growth of the Global Community". We offer comprehensive solutions that fully meet the various requirements of our clients, based on our global first-rate engineering capabilities. In our genuine attempt, we wish to contribute to the realization of the Local and International Communities by harmonizing the supply of energy and basic materials, fulfilling the essentials of environmental protection.

In the process of engineering, we consider it our Corporate Social Responsibility (CSR) to satisfy the Quality and HSSE (Health, Safety, Security and Environmental) requirements of society.

Especially on safety, we place the highest priority, implementing a multifaceted approach. In the process of providing business solution to our valued customers, we take utmost care to prevent loss of valuable human life by all means. Our efforts, time and expenses to respect human life takes precedence over all other things. Continuing our business operation based on foundations of safety, we strive to permeate safety culture to safety management cadre. We believe that effort towards safety must be by one and all and not limited to construction site staff.

Furthermore, while providing specialized services, TOYO employs energy saving and natural resource saving designs during construction and ensures minimization of environmental impact by avoiding unreasonableness, wastage and promote recycle of waste.

TOYO completed 50 years of existence last year since its inception in 1961. As milestone of 50 years, we will continue to create the value of engineering business for next generation, unifying TOYO group minds and power. We aim to become the most trusted "Global Leading Engineering Partner" to our Clients by offering know-how for providing solutions to Client's needs.

In this report, we have summarized our safety and environment related activities. We would highly appreciate your frank opinion after reading this "Safety and Environmental Report 2012".

August 2012

Katsumoto Ishibashi

Calubahi.

President and Chief Executive Officer

Safety



An industrial establishment promises foremost to pay attention to safety to surrounding community, society.

TOYO ensures that Loss of human life must be absolutely prevented and applies all efforts and initiatives to Safety. The time and value for safety aspects are given top most priority.

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

"Safety" is the prime brand of TOYO. In order to boost this brand universally, we are strongly promoting many safety measures and shall actively strive to consolidate a firm Safety Culture.



We would like to present TOYO Safety record 2007 - 2011 as follows.

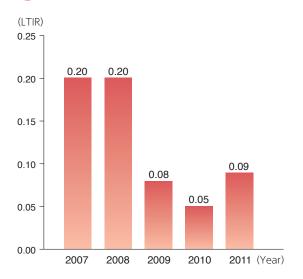
Total Recordable Incident Rate (TRIR) shows continuous downward trend and indicates decreasing of number of incidents.

### TOYO Safety record over the past 5 years (ILO base)

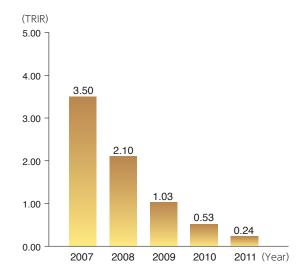
Year Works (Jan to Dec) (Man-D	Employee	Employee	Number of Incident						Total Recordable
	Worked (Man-Day) (Thousands)	Hours (A) (Thousands)	Fatalities	Lost Time Incident	Medical Treatment (No Lost Time)	LTI Total (B)	Recordable (C)	LTI Rate (*1)	Incident Rate (*2)
2007	10,559	103,424	1	20	341	21	362	0.20	3.50
2008	13,106	130,287	5	21	247	26	273	0.20	2.10
2009	16,769	164,344	4	9	156	13	169	0.08	1.03
2010	12,012	117,295	1	5	56	6	62	0.05	0.53
2011	8,521	80,783	1	6	12	7	19	0.09	0.24

<sup>\*1:</sup> Lost Time Incident Rate (LTIR) = (B)  $\times$  1,000,000 / (A)

### Lost Time Incident Rate (LTIR)



### Total Recordable Incident Rate (TRIR)



<sup>\*2:</sup> Total Recordable Incident Rate (TRIR) = (C) x 1,000,000 / (A)

### Safety

# Spreading Wings to the World, Safety Culture

### Safety Training

It is hard to impress knowledge about Safety in the mind of executives and employees without promoting adequate safety culture. TOYO, aiming to develop knowledge and awareness for safety at personal level, keeps conducting safety education programs for all executives and employees.

As a precondition, only those who qualify Corporate Safety Training Program are allowed to enter the construction site.



Safety Education in China



Safety Education in Japan

### Safety Meeting

TOYO is aiming to provide uniform level safety management irrespective of countries and regions where it operates. In order to promote safety culture within TOYO, the designated head of HSSE of TOYO Group Companies conduct periodic meetings at pre-decided location, exchange experience and ideas, maintain close communication for improvement of safety management activities.

## TOYO GROUP HSSE MEETING in China

Following TOYO Group Companies participated.

- Toyo-Japan
- Toyo-Korea
- Toyo-China
- Toyo-Malaysia
- Toyo-India



### Safety Campaign

TOYO holds "Safety Campaign" at all its group companies and construction sites for promoting safety awareness for one month starting 1st July every year that includes not only people at construction sites but also all its executives and employees in office. Various safety programs take place during this period.



Safety Campaign Opening event in TOYO group company



Rescue training at construction site during Campaign



Training of fire-extinguishing at construction site during campaign



### Major Campaign Program

- Message of CEO and top management of respective Toyo group company
- Display of Poster, Banner, FlagDisplay of Personal Protection Equipment
- Introduction of safety activities in relation with accident at construction sites
- •Lecture on prevention of heat stroke, traffic safety, electric safety
- Documentary showMorning Radio exerciseVarious Training Exercises
- Safety Award

OFFICES

**OTHER AFFILIATES** 

OVERSEAS GROUP COMPANIES /

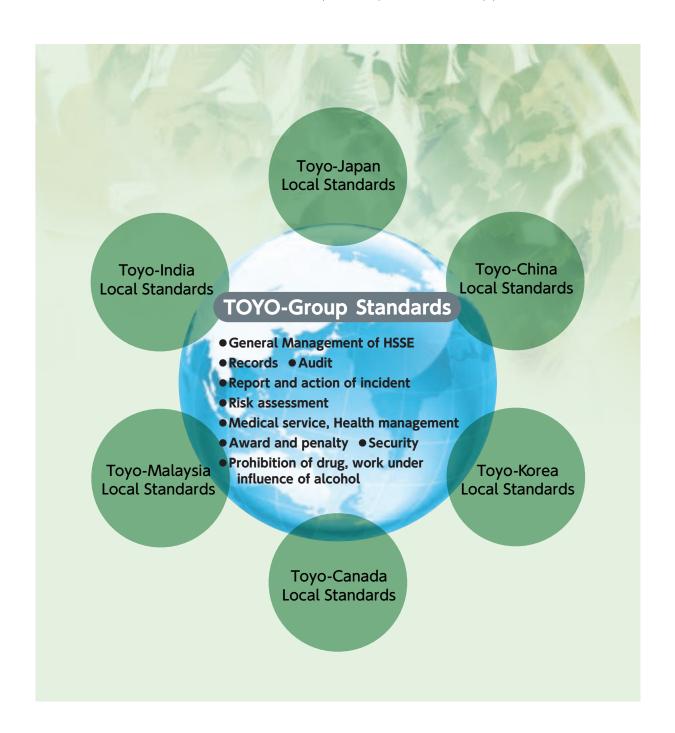
### Safety



### **■**TOYO-Group Standards

Throughout TOYO group companies, there exists TOYO-Group Standards to ensure that safety management is implemented at the same level irrespective of country and region.

TOYO-Group Standards specify minimum safety level to be followed, like minimum allocation of safety staff, requirements of safety protection and so on.



### ■ Training of HSSE Manager

In recent years, specially for mega projects, there is an increase in demand of exclusive HSSE managers. HSSE Manager has overall responsibility of HSSE matters related to the project in addition to the main contact point with client for HSSE related matters.

TOYO is promoting to cultivate HSSE Managers in cooperation with group companies.



Training session for HSSE Manager

### Safety Tips



### Bird's Domino theory

As per theory founded by Frank Bird Jr, U.S.A., work related injury or death occurs like chain reaction, called as domino. The theory states that accidents result from a chain of sequential events, metaphorically like a line of dominoes falling over. When one of the dominoes fall, it triggers next one. By cutting in at one point of chain reaction, accident is prevented. Firstly, the countermeasure for "Lack of Control", that is, enhancement of management system, is important as well as reducing "Basic Cause" and "Direct Cause." Therefore strict enforcement of risk assessment which evaluates the influence of these causes in advance becomes important.





### Personal protection equipment

In construction site, workers wear helmet, goggle, earplug, glove, safety belt, safety shoes as a safety measure. Safety belt is categorized in two types. One is simple type as body belt and the another is full harness type which is put on thigh and shoulder with belt to protect body completely. Belt type is still widely used in Japan however worldwide commonly known safety belt means harness type. TOYO standardizes the use of full harness type of safety belt throughout at its worldwide projects.





#### Confined work

Accident due to Oxygen deficiency, caused by inert gas accumulation, is one of 3 major fatal accidents in construction site, others being accidents like falling down and electrocution.

In order to work safely in confined space such as tank/vessel, concentration of Oxygen as well as toxic and flammable gas must be checked prior to entering the work area as well as during the work periodically.

Normally, Oxygen concentration in air is 21%, but when it falls to 18% or less, it leads to asphyxia. Below 16% Oxygen, depending on individual, the person suffers from headache and/or feel nausea. When Oxygen concentration reaches to 6% or less, it results in loosing consciousness and subsequently leads to stoppage of breathing, resulting into death.



# Environment



Note: Photo supplied from Sakhalin Energy Company

Since its inception, TOYO has been providing solutions to clients backed by comprehensive integrated engineering technologies and project management skills in execution of projects.

Through such execution, TOYO promotes development, introduction and improvement of technologies in a wide spectrum: Approaches to new and clean energy, CO<sub>2</sub> reduction and energy conservation, Recycle technologies applicable to effluent and waste water, Technologies for eliminating hazardous / toxic substances, Construct plants to reduce environmental impact.

TOYO's site construction work realizes following objectives: Reduce environmental impact, Prevent pollution, Proper management of construction wastes.

TOYO, as Global enterprise continues to fulfill corporate social responsibilities of domestic as well as international Clients on basis of accumulated knowledge and experience, by offering technologies that contribute towards conservation of environment.

# Earth–Friendly Environmental Technology

While presenting engineering solutions to our clients, TOYO integrates proprietary technology within TOYO as well as cutting edge technology available worldwide to fulfill client needs. Here, we would like to introduce a few of TOYO's contribution concerning environment, namely technology of CO<sub>2</sub> reduction, energy saving and that about treating hazardous substances.

### CO2 Reduction / Saving Energy

### Technology for High Efficiency Power Plant using Natural Gas

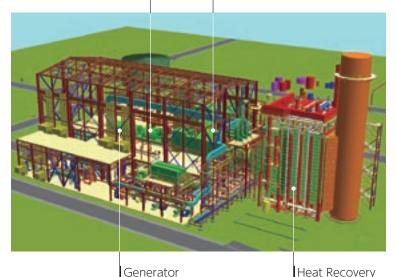
TOYO is executing power plant project in Republic of Azerbaijan, jointly with Azenco for Azerbaijan. a Joint Stock Company of Azerbaijan.

This project is to construct a 400 MW combined cycle power plant using natural gas as fuel. Construction work has commenced since September 2011 and is slated to be completed by December 2013.

Natural gas, containing less impurities than petroleum-delivered products, is source of clean energy causing less environmental load. The combined cycle power plant using natural gas is high efficiency power plant of world-class level (400 MW X 1 Block), comprises of Gas Turbine and Steam Turbine along with Heat Recovery Steam Generator and achieves 58% of efficiency (Lower Heating Value base). This is a bench mark for high efficiency power plant system the world over.

TOYO is applying eco-friendly technology in this high efficiency power plant by applying low NOx burner to reduce CO<sub>2</sub> and NOx.

Steam Turbine
Gas Turbine



Heat Recovery Steam Boiler



Graphic image of complete construction in the suburbs of Baku as the 2nd Shimal Gas Combined Cycle Power Plant in Republic of Azerbaijan

### Environment Earth-Friendly Environmental Technology

### Energy saving urea process (ACES21®)

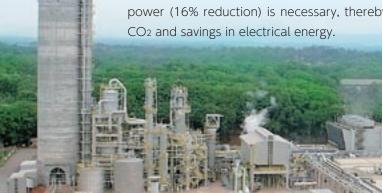
It is said that the world population will continue to increase to 9.3 billion by 2050 from 7 billion in 2011. Accordingly, food production should meet the needs of the increase in population.

As for food production, fertilizer, especially Nitrogen based fertilizer increases grain harvest dramatically.

Urea as fertilizer has high Nitrogen content and has added feature to prevent oxidization of soil.

TOYO has been a leader in licensing of Urea technology worldwide, designing, engineering, constructing and commissioning over 100 urea plants on its own process since its establishment in 1961.

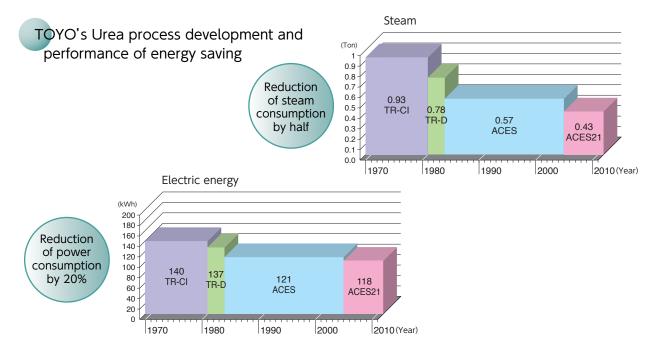
The history of development of urea plants correlates to energy consumption. In the past, production of 1 ton of Urea required 0.93 tons of steam and 140 kWh of electric power. Compared to this, TOYO's own process technology (ACES 21), to produce 1 ton of Urea, only 0.43 of steam (54% reduction) and 118 kWh of electric power (16% reduction) is necessary, thereby contributing large scale reduction of CO2 and savings in electrical energy.



View of whole plant: ACES21® P.T. Pupuk Kujang, Indonesia



Urea product



# Efforts for Eliminating MURI, MUDA and MURA

TOYO makes best efforts starting at engineering stage to ensure less environmental impact during plant operation. TOYO also strives to reduce environmental impact by eliminating 3 M's (Murioverdoing, Muda-wasting, and Mura-irregularity) in engineering.

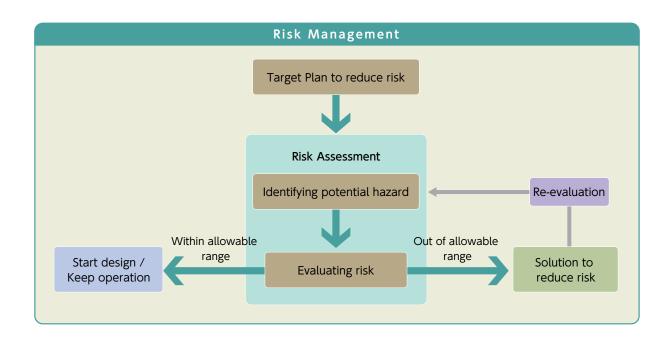
### HSE (Health, Safety, Environment) effort in design stage

Chemical plants, due to the characteristics of chemical substances it handles, posses occupational safety hazards due to fire, explosion, which may affect worker's health and cause safety and environment related risks. These risks are categorized as HSE risk depending on their impact.

TOYO implements safety design during plant design stage, incorporating local regulation, international codes/standards and design specifications (abbreviated as STD). Such safety design considers avoiding of irregularities. In the unlikely event of an accident such as leakage of

chemicals taking place even after such design considerations, measures to prevent their further spread could be taken sooner. Such countermeasures provide us an opportunity to introspect and come closer to HSE objectives.

TOYO establishes multi-faceted protection for achieving various HSE targets by implementing these measures. We keep in mind that STD need not necessarily alleviate potential risks in the system design. Thus safety design is realized by evaluating identified risk related to HSE, and considering reduced risk to acceptable level.



### Environment Efforts for Eliminating MURI, MUDA and MURA

### Information Technology contributing improvement of Engineering efficiency

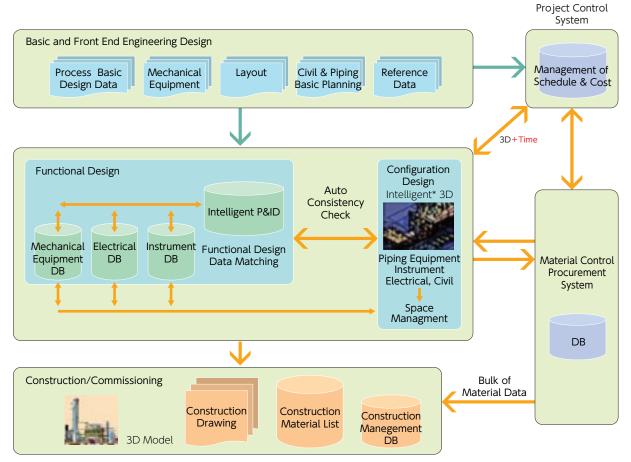
Many IT tools and systems have been employed to the engineering work to handle enormous volume of information and data. In early stage of the project, each discipline performs basic design or preliminary study independently. Later, as the design work proceeds, both functional design data and spatial design information will be accumulated in each data base.

Functional design data base, represented by Intelligent P&ID will handle functional design data, such as mechanical, electrical and instrumentation parameter related data. On the other hand, Spatial Design DB, represented by Intelligent 3D Model, will handle all the spatial and dimensional information provided by Piping design, Equipment design, Civil design, Architecture design, Electrical design, and Instrument design.

High quality engineering deliverables are assured by the consistency of the data handled by the both Functional and Spatial DBs. This

contributes to minimizing the change and re-do of field work and helps fast track project completion as well as minimizing losses due to unnecessary works. Output of drawings necessary for construction are issued from the Spatial Design DB, and necessary bill of construction material is also extracted from the DB, and linked with material procurement and delivery, and construction management system. Moreover these Engineering DBs also provide data to the Project Management System used for managing the schedule and cost of the project.

Nowadays, these IT tools and systems are shared within TOYO. For example, in an Indian Project, design information from India and Japan office, procurement information from Japan, Europe, United States, Korea and India are all shared among the offices and construction site through common material control database system.



\*Intelligent: including not only data on shape (2D or 3D), but also attributes of the object.

### Construction activities

Among TOYO's sphere activities, site construction work is the one which is likely to create the maximum environmental impact. Efforts are made to reduce the impact on environment. Also, following environmental targets are set

- (1) Appropriate treatment and disposal of construction waste
- (2) Appropriate treatment and disposal of chemicals (paint, etc.)
- (3) Use of environmentally conscious methods
- (4) Transportation using environmentally conscious methods
- (5) Water treatment for turbidity and oil-water separation



General wastes from site office are disposed at holder box in China site.



Construction wastes are collected at designated area in Venezuela site.



Construction wastes are disposed in drums / cans in Brazil site.

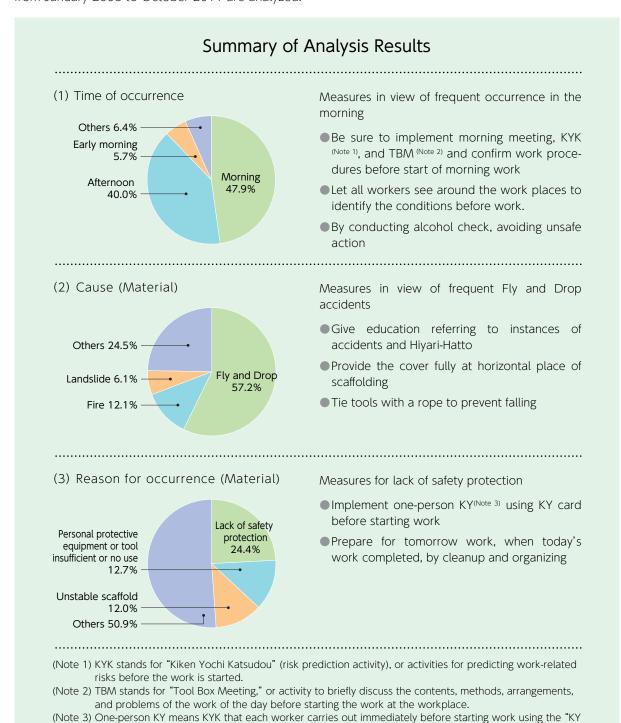
### Information of Safety and Environment

### ■ Analysis of Hiyari-Hatto

Hiyari-Hatto (near-loss) is an incident that was prevented just in time before it could have occurred.

At construction sites, repeated near-loss incidents 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, 2,270 incidents from January 2008 to October 2011 are analyzed.



cards" (self-questioning cards for risk prediction).

### Efforts in Office(\*1) to save Energy and Resources (\*1: Office means Head Office and Engineering Center.)

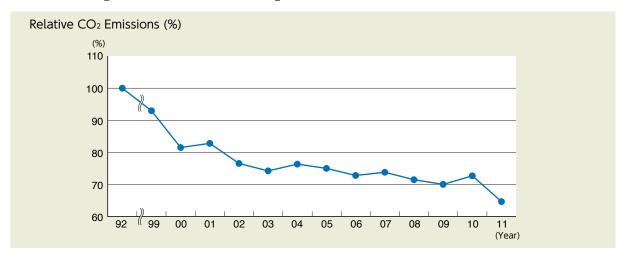
#### ■Reduction of CO₂ emissions

CO<sub>2</sub> emissions from office are calculated based on electricity consumption, fuel gas consumption (supplied by cooking gas utility company network) and consumption of fuel oil used for emergency power generation by DEG set.

Toyo Japan launched more energy-saving efforts activities from year 2000 with office lights being turned off during lunch breaks, removal of lights

deemed unnecessary and energy saving investments, such as installing lighting inverter stabilizers.

CO<sub>2</sub> emissions in 2011 were reduced by 35% from the 1992 level and by 20% from the 2000 level. Because of shortage of electric power supply following earthquake disaster in 2011, we undertook emergency measures to save electricity soon thereafter.



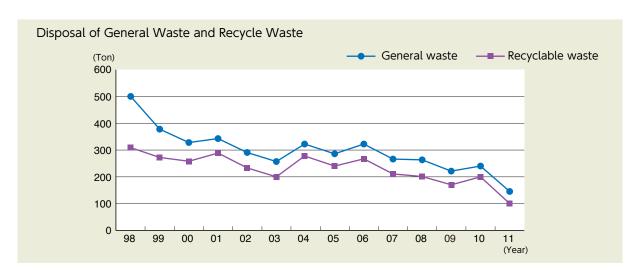
# Reduction of general waste and recyclable waste<sup>(\*2)</sup>

As office efforts in saving resources, strict separation of general waste is being conducted. Also, continuous utilizing a paper both sides for copying or printing was enforced to save resources.

Disposal of general and recyclable waste\* has been decreasing gradually over the years and each

waste is reduced to 148 ton and 105 ton respectively in 2011 and reduced by 70% from the 1998 level.

(\*2: Recyclable waste is the waste including paper output from personal computer and photo-copy machine, newspaper, glass bottle and can.)



### Information of Safety and Environment

### Construction Waste Disposal

### Project sites in Toyo-Japan

### Percentage of construction waste by category

The figure to the right shows the weight of construction waste and its categories in proportion. The weight of construction waste disposal from domestic construction sites in 2011 was 2,222 ton, about 1,376 ton more than that disposed in 2010.

Toyo-Japan undertakes various kinds of construction work and percentage of waste by category tends to be different in each year.

The four categories of waste marked with<sup>(\*)</sup> an asterisk are recyclable.

# 2. Percentage of construction waste by disposal method

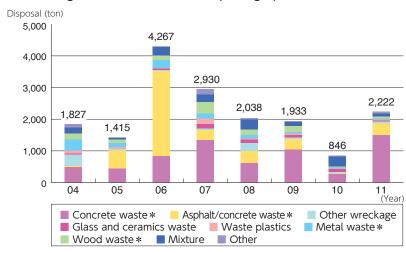
Percentage of construction waste by disposal method (recycle, landfill, and incineration) is shown in the figure to the right, that is, 93% recycled, 6% landfill and 1% incinerated in 2011. Overall, the construction waste has reduced. Recycling rate has increased from 80% (year 2010) to 93% (year 2011).

# 3. Recycling rates of four items specified by the Construction Material Recycling Act

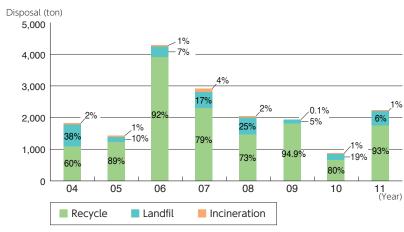
The recycling rates of four items specified by the Construction Material Recycling Act are illustrated on the right.

The recycling rates for metal waste, asphalt / concrete waste and concrete waste have been kept to 100% since year 2010.

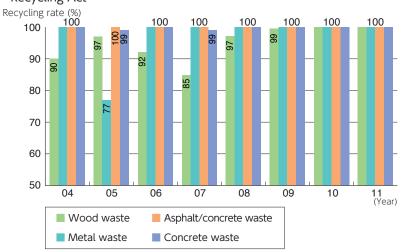
### Percentage of construction waste by category



### Percentage of construction waste by disposal method



### Recycling rates for four items specified by the Construction Material Recycling Act



### Construction Waste Disposal

### Overseas Project sites

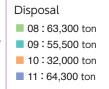
# Weight of construction waste disposal and percentage by category

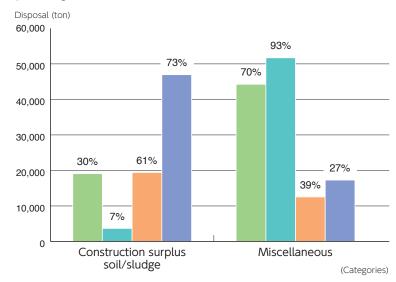
The total disposal weight in 2011 (Jan. to Dec. 2011) was 64,300 ton, 100% increase from 2010 whereas it decreased by 16% from 2009.

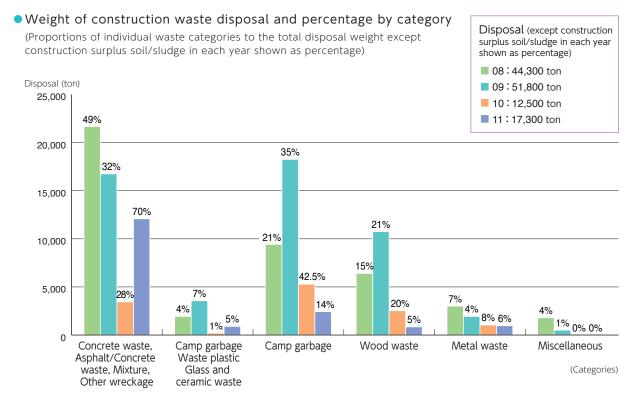
The reason of increase of construction surplus soil/sludge in 2011 was due to disposal to out of site instead of using it as backfill in 2011 for an Indian project.

 Weight of construction waste disposal and percentage by category Comparison between construction surplus soil/sludge and miscellaneous

(Proportions of individual waste categories to the total disposal weight in each year shown as percentage)





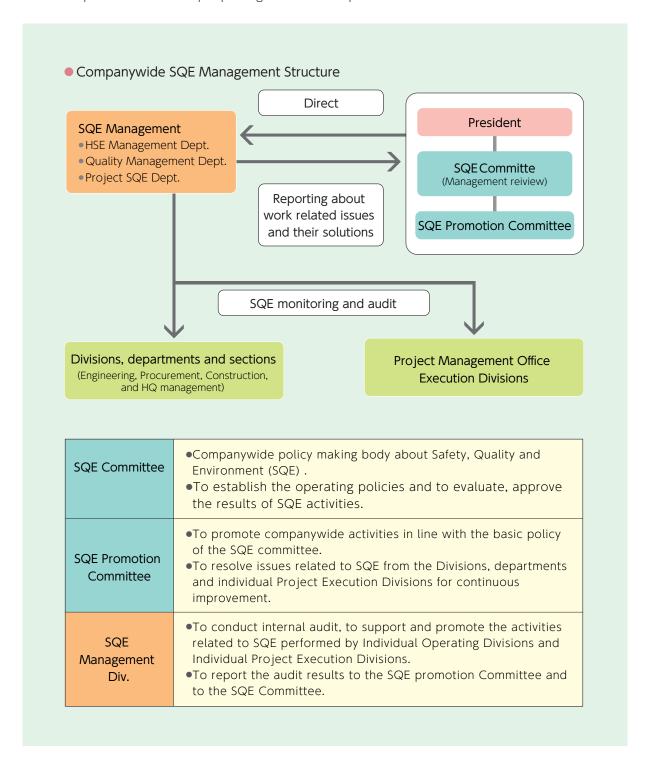


The weight of construction waste disposal in 2011, except construction surplus soil/sludge was 17,300 ton, an increase of 38% from 2010.

### **SQE Management Promotion Structure**

### Safety, Quality and Environment (SQE) Management Structure

Within TOYO, SQE Committee is axially linked to its business operations. SQE Promotion Committee and SQE Management Division cooperate with each other facilitating inter-department as well as every project related Safety, Quality and Environment monitoring audit, conducting PDCA (Plan-Do-Check-Action) cycle and in the process continuously improving the business operations.





Meeting of SQE Committee for Corporate SQE management

### ISO Certification

Toyo-Japan, in March 1994, acquired Quality Management Standard ISO 9001:1987 certification. Considering Standard upgrade, ISO 9001:2008 certification has been renewed.

In October 2004, Toyo-Japan obtained Environment Management Standard ISO14001:1996 certification. Considering Standard upgrade, ISO 14001:2004 certification has been renewed.

Similarly, in March 2006, Toyo-Japan obtained Information Security Management Standard BS7799 certification. Considering Standard upgrade, ISO/IEC27001: 2005 certification has been renewed.



ISO 9001 Certificate of Approval



ISO 14001 Certificate of Approval



ISO/IEC 27001 Certificate of Approval

### Corporate Profile

Corporate name: Toyo Engineering Corporation

Established: May 1, 1961

Representative: Katsumoto Ishibashi, President and Chief Executive Officer

Paid-in capital: 18.2 billion yen

Number of employees: 4,494 (consolidated, as of March 31, 2012)

**Business activities:** Engineering, Procurement and Construction for Industrial Facilities

 R&D support, design, engineering, procurement, construction, commissioning and technical assistance for industrial facilities: oil, gas, petrochemicals, chemicals, water treatment, transportation systems, power generation, nuclear power, advanced production systems, pharmaceutical, fine chemical, distribution systems,

biotechnology, environmental and others

• IT engineering services and system software supply

### Worldwide Network



### **(TOYO Group Companies)**

Toyo-Japan : Toyo Engineering Corporation Toyo-U.S.A. : Toyo U.S.A., Inc.

Toyo-Korea : Toyo Engineering Korea Limited : Toyo-Venezuela : Toyo Ingeniería de Venezuela, C.A.

Toyo-China : Toyo Engineering Corporation, China : Toyo-Brazil : Toyo do Brasil Consultoria e Construções
Toyo-Malaysia : Toyo Engineering & Construction Sdn. Bhd.

(Other Affiliate)

Toyo-India : Toyo Engineering India Limited
SATEC : Saudi Toyo Engineering Company
IKPT : PT. Inti Karya Persada Tehnik

Toyo-Europe : Toyo Engineering Europe, S.r.l.

Toyo-Canada : Toyo Engineering Canada Ltd.

Toyo-Thai : Toyo-Thai Corporation Public Company

Limited

# Basic Policies on Health, Safety, Security and Environmental (HSSE) and Quality

Toyo Engineering Corporation and its group companies (hereafter TOYO) recognize that satisfying the HSSE and quality requirements called for by our clients and society is an indispensable prerequisite for us to conduct business activities and to fulfill social responsibilities, and abide by the following eight basic policies.

- 1. Continuously confirm and share the consensus that "Safety takes precedence over all other considerations", and realize and maintain safe, sanitary conditions in all workplaces.
- 2. Strive to complete all jobs with no accidents and no harm to people by enforcing preventive safety measures.
- 3. Endeavor to provide our personnel with work environment and opportunities that enable them to maintain and improve their mental and physical health.
- 4. Ensure information security, and take appropriate safeguards against threats and risks to business assets.
- 5. Minimize environmental burden by saving resources and energy, detoxifying, reducing and recycling waste, and by preventing pollution during the course of our work duties.
- 6. Provide high-quality products and services that meet the HSSE requirements of our clients and society.
- 7. Comply with all relevant laws and regulations, the requirements agreed upon with the clients, and our in-house rules relating to HSSE and quality.
- 8. Establish and continuously improve the effectiveness of management systems, including objective setting, hazard identification, risk evaluation, determination of countermeasures, execution control and review, and education and training, in line with management's firm belief that the securement of HSSE and quality is a prerequisite for business continuity.

These policies shall apply to all staff members of TOYO in any region and country. TOYO will also share the spirit defined by these policies with clients, business partners, and other related parties, and cooperate with them to achieve these objectives.

July 1, 2012

Katsumoto Ishibashi

Salibahi

President and Chief Executive Officer

