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President's Message

It's New Year again! May I take this opportunity to wish our members a Prosperous New Year.



2010 begins the conclusion of the second round of RSO revalidation. There are six more months to go. The Society is actively organizing a bunch of professional talks in the coming months to satisfy the need of those who are still in want of CPD points. Details will be announced from time to time. Primarily, CPD talks will be arranged for members as a type of service to members, so up to now, members can still enjoy joining the talks for free, while non-members have to pay an administration fee. The Executive Council is actively seeking to increase the administration fee four or even six-fold in the coming talks so that members will definitely find their membership fees being paid value for money.

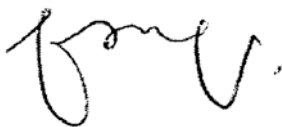
The Society encourages all members to send in their email addresses for better and more expedite communication. Nowadays, email is no more a luxury but a must for everyone who wishes to receive up-to-date information at any time.

The Executive Council is currently working closely with HKOSHA and HKRSAA to establish a Joint Federation. The benefit of having a federation is evident: Resources can be better utilized when organizing events such as CPD talks, Safety Forums and Seminars, etc. There are still a lot of technical difficulties to solve, including financing, organization of and representation in the Executive

Council of the new Federation, and other legalities such as official address, MOA etc., but it's already in the pipeline.

Despite the downturn of the economy over the past few years, it is still a bit sad to note that a number of members fail to pay their membership fees, resulting in their membership being terminated. Their membership will not be automatically reinstated upon payment of the arrears due. They have to reapply if they wish, and pay the application fee once again, without guarantee of reinstatement. The 2010 membership fee will also be due. I wish to reiterate here that those who fail to clear their outstanding membership fees and the 2010 membership fee by March 2010 the latest will have their membership terminated. Members need to realize that as a non-profit making organization without any Government subsidy or private donation, the Society survives on the membership fee income. It is also a duty of all members to pay their fee on time.

In the past months, the Society has been invited by CIC to give comments on their proposed initiatives, and to assist to sit in their new committee. The same has happened with other parties, such as the Labour Department, the OSHC and the HKQAA. This once again shows the wide recognition of the Society in the eyes of the construction industry, the Government and other notable organizations.



Leung Chiu Ming, Michael

Myths and Facts about Confined Space Safety

Leung Chiu Ming, Michael

Introduction

The topic of confined space safety appears to be rather basic to most workers, and by the same token, surely familiar to every safety practitioner as a part of the safety officer training course curriculum. In addition, most registered safety officers in Hong Kong are competent persons if they possess one year relevant confined space risk management experience. Yet, it is again surprising to find out that a lot of safety practitioners in the field are not as conversant on this topic as imagined, whether they possess a secondary-school science background or not.

Particular Concern Over Confined Space Safety

What is so special about confined space safety that demands control through requirements laid down in a specific subsidiary regulation under the Factories and Industrial Undertakings Ordinance? Well, the answer is multi-faceted. Very often, the killer is silent. A lot of toxic gases, including carbon monoxide and methane, are colorless and odorless. Even if detected, normal precautions may not work very well. Death could be slow and caused by factors other than gassing, such as heat stroke and oxygen deficiency. And accidents do not necessarily take place inside very confined areas such as manholes. At other times, accidents could happen in a sudden and violent manner, such as explosion in a gas leakage scenario, so as to cause multiple fatalities to the workers as well as to members of the public in the vicinity.

Questions that Need to be Answered

Is a secondary-school science background helpful in understanding confined space safety? The answer is yes to a certain extent, because realizing the chemical properties of different substances may help. The following are ten common questions on confined space safety. Each question may still be broken down into a series of related smaller questions. Without looking at the answers that follow in the next section, safety officers should have no problem in getting all the

answers right. If not, then a thorough risk identification and assessment process should be conducted and all preventive actions need to be taken before entry is to be permitted.

The questions are:-

1. According to the definition in the local law, which of the following can be considered as confined space:-
 - a) bore pile;
 - b) excavation;
 - c) freight container;
 - d) building void;
 - e) plant room?

In particular, does a confined space need to be enclosed on all four sides, or at the top? To qualify to be considered a confined space, does such a space need to have only one point of entry?

2. For access / egress to and from a manhole,
 - a) Must a ladder be provided for confined space egress? If there are just handholds on the walls, are they acceptable?
 - b) If a ladder is provided, should handrails be fitted onto the ladder?
 - c) Could the rungs on the ladder or handhold be round or must they be made flat?
3. A worker is going to take a water sample from a sewage manhole. He only works at the street level by opening the manhole cover and lowering a sampling bottle hung on a string. There is no need for him to enter the manhole. Does such work constitute confined space entry and does the worker need to have certified worker status? Why?
4. A competent person performs a gas testing at street level of a manhole flooded with water using a multi-gas detector. He opens the manhole cover, lowers the flexible sampling hose down until it reaches the surface of the water inside the manhole, observes the reading and then retrieves the hose. If the multi-gas detector shows no abnormality, can he consider the gas testing complete? Why? According to

the law, there should be an attendant outside the confined space. In the case of a manhole, if the attendant only stays at the street level and needs not enter the manhole, is a certificate (i.e. a Permit-to-work) still required to be issued before work is to be undertaken, & does this attendant need to be a certified worker?

5. You as a safety officer act as a confined space competent person. You have conducted a gas testing of a manhole using a multi-gas detector and find no accumulation of toxic gas, flammable gas, nor does the equipment show oxygen deficiency inside that space. You have also assessed the plant and material and the work method to be used in the confined space and observed no particular risk. Can you now issue a permit-to-work or certificate certifying safe entry and stay within a prescribed period? Why?
6. To assess the working environment in a hot summer day, a worker who is also a competent person uses a thermometer to monitor the ambient temperature inside a manhole and finds out that it is 30 degree Celsius. You are the safety officer here. He asks you whether it is safe for entry? What is your reply?
7. Which of the following gases are heavier than air: methane, ammonia, town gas, carbon monoxide, hydrogen sulfide, carbon dioxide, nitrogen dioxide, sulfur dioxide, LPG,? What is the significance of such classification? Which of these gases is our commonly known "marsh gas"?
8. To what alarm levels should a multi-gas detector be set for the hazards posed by gasoline or LPG inside a manhole: the 10% LEL (flammability) or the OEL (toxicity)?
9. Which type of multi-gas detector would you suggest to be used by the certified workers in continuous monitoring of the environment inside a manhole, an analogue-display type or a digital-display type?
10. In the summertime when working inside a sewage manhole filled with slurry human faeces, the smell is really offensive and unbearable. Should we use chemicals to mask or to remove the pungent smell to make the environment fresher: use fragrant alcoholic perfume to mask, or use activated charcoal or something else to absorb?

The Suggested Answers to the Questions

The following are my suggested answers:-

1. In fact, all of them are considered as confined space according to the Factories and Industrial Undertakings (Confined Space) Regulation and the Approved Code of Practice - Safety and Health at Work in Confined Space issued by the Labour Department, Hong Kong Special Administrative Region.

In addition, since confined space also includes a tunnel, a bore pile, a caisson, an excavation etc., it needs not be enclosed on all four sides, nor does it need to be covered at the top. There are a lot of misunderstandings here. Some supervisors, and even engineers, think that by converting the hard metal cover of a confined space to a gridded cover, the space will be naturally ventilated and would then not be considered confined. This is wrong. Again, using excavation as an example, a space can have an infinite number of entry points but yet be considered as a confined space.

2. a) The law does not require the provision of a ladder, just safe access and egress. Surely good handholds will be accepted as instruments providing safe access and egress.
- b) It all depends whether fitting of handrails is necessary. Normally, it is not necessary, as depicted in High Court Personal Injury appeal case *Wong Wing Chow v. Lee Wing Hang Patrick trading as Wing Shun Construction Co. & Aoki Corp.* HCPI 244/2002 where paragraphs 14 & 15 of the judgment read:-
14. "... The fact that a ladder with a handrail has not been used does not mean that such a ladder should not be used. However, the ditch is a confined space. The use of such a ladder would be unnecessarily obstructive to other work processes to be performed in the ditch at the same time, e.g., hoisting of excavated material from inside the ditch to the ground. The handrail could even be a potential hazard as tools carried on the body of a worker or attached to his belt may be caught by the handrail. As a result the worker would lose balance and fall. On balance, I do not consider a ladder without handrail as being unsafe..."

- c) 15. "... There is nothing to suggest that round rungs were any less suitable than flat rungs because water and mud are less likely to accumulate on round surfaces than on flat surfaces."
3. Regulation 3 of the Factories and Industrial Undertakings (Confined Space) Regulation clearly spells out that the Regulation applies to work in an industrial undertaking that either takes place inside a confined space, or takes place within the immediate vicinity of, and is associated with work occurring within, a confined space. The same is repeated in paragraph 5.3 of the approved Code of Practice - Safety and Health at Work in Confined Space. Hence, even the work is only done at the street level right above the manhole opening, it is still considered as working within the immediate vicinity of, and is associated with work occurring within, a confined space. The technician needs to be a certified worker as "entry" has been construed. In fact, in a fatality case, a technician of an environmental consultant company opened the last manhole of an underground sewer to take a water sample for examination of the O&G content, BOD, COD, heavy metal content etc. The sample was taken at street level by lowering a small bottle tied on a string without the need to go down the manhole. He was overcome by rising toxic gas when he looked down the manhole from the street to ascertain that the bottle reached beneath the water level inside the manhole and fainted, falling down the manhole to his fatality. Hence the danger is still there at street level.
4. No, because the competent person had only tested the level right above the water. He should conduct the gas testing at both the high, middle and low levels of the manhole in question. Similar to Question 3, a certificate of safe entry is still required, and the attendant needs to be a certified worker.
5. No, firstly because the confined space still needs to be vented with forced ventilation. In a manhole, most of the time, it's achieved using a blower with a flexible air ducting. Secondly, according to the law, a certificate (or permit-to-work) is only issued by the proprietor or contractor responsible for the manhole operation, so unless you have been delegated with the authority to issue this certificate, you cannot do so even though you are a confined space competent person.
6. A thermometer can only measure the ambient temperature which does not take into account the humidity. You need a heat stress monitor instead. Moreover, heat stroke is only one of the risks to be assessed. As a safety officer, we need to assess a variety of other confined space risks.

7.	From periodic table	H=1.00794	C=12.0107	N=14.0067	O=15.9994	S=32.065
	approximated to	H=1	C=12	N=14	O=16	S=32

- Since air is 78% N₂, 20.9% O₂, 0.03% CO₂, the vapour density of air is
 $78\% \times 2 \times 14 + 20.9\% \times 2 \times 16 + 0.03\% \times 44 = 28.54$
 (sometimes roughly estimated as $0.8 \times 28 + 0.2 \times 32 = 28.8$)
- Methane (CH₄): $12 + 1 \times 4 = 16$, lighter than air
- Ammonia (NH₃): $14 + 1 \times 3 = 17$, lighter than air
- Town Gas (49% H₂, 28.5% CH₄, 3% CO, 19.5% CO₂):
 $0.49 \times 2 \times 1 + 0.285 \times 16 + 0.03 \times 28 + 0.195 \times 44 = 14.96$, lighter than air
- Carbon Monoxide (CO): $12 + 16 = 28$, almost same as air
- Hydrogen Sulphide (H₂S): $2 \times 1 + 32 = 34$, heavier than air
- Carbon Dioxide (CO₂): $12 + 2 \times 16 = 44$, heavier than air
- Nitrogen Dioxide (NO₂): $14 + 2 \times 16 = 46$, heavier than air
- Sulphur Dioxide (SO₂): $32 + 2 \times 16 = 64$, heavier than air
- LPG (Propane C₃H₈ + Butane C₄H₁₀): $3 \times 16 + 8 \times 1 = 56$ to $4 \times 16 + 10 \times 1 = 74$, heavier than air

Gases heavier than air, such as CO₂, will displace O₂ at low level while gases lighter than air will rise to attack the attendant above the confined space.

There has also been some confusion over what "marsh gas" is. Surfing on the net, the answer can be very contradictory. Some say that it's lighter than air while others say it's heavier than air. Some say that it is colorless and odorless, while others say it smells like rotten egg. The former is usually used to describe the chemical properties of methane while the latter hydrogen sulfide. In fact, "marsh gas" in itself is not a chemical name, but is a common name given to the gas that occurs in marsh lands. Hence "marsh gas" should be methane.

8. We usually consider that both LPG and gasoline are highly flammable and hence the 10% LEL should be used for calibration. However the following calculation should be done before making this judgment.

A multi-gas detector should be so calibrated that the alarm will sound when:-

- a) either <19.5% or >23% oxygen, or
- b) >10% LEL of any explosive gas or vapour, or
- c) toxic gas in excess of the occupational exposure limit (OEL),

whichever is the less for (b) and (c) if the gas is both flammable & toxic.

For LPG (a mixture of butane and propane) OEL = 1,000 ppm & the flammability limits of butane and propane are 1.8%-8.4% and 2.1%-9.5% by volume respectively, meaning that the 10% LEL of butane & propane are 0.18% and 0.21% (or 1,800 ppm and 2,100 ppm) by volume respectively.

For gasoline, OEL = 300 ppm & flammability limits are 1.2%-7.1%, hence the 10% LEL is 0.12% or 1,200 ppm.

So the OEL should be used in both cases.

9. Both analogue and digital display type multi-gas detectors are not suitable for use by confined space workers, because when the alarm sounds or blinks, they would be tempted to look at the display to find out what goes wrong, instead of evacuating. Either replace the gas detector with one without display, or use duct tapes to blank off the displays, so that when

the alarm sounds or blinks for whatever reason, the workers inside the confined space will not be tempted to read the displayed information. Also train them to immediately evacuate the confined space when hearing the alarm sounding or sees the visual alarm flashing, instead of trying to find out what causes the alarm. Those equipment with displays are for the use of the investigator and / or safety officer, not the workers inside the confined space.

10. It's not only the smell, but a lot of toxic or flammable vapor could be generated by decomposition of the human faeces. The summer heat will accelerate the decomposition of the human faeces to generate an abundance of carbon dioxide, ammonia and methane. Alcoholic perfume could be flammable while dry activated carbon is a good smell absorbent, yet wet activated carbon will rapidly absorb ambient oxygen, resulting in oxygen deficiency, so both alcoholic perfume and activated carbon are not good for such purpose.

Conclusion

The above are just a few questions that I have come across with confined space operatives, but the myths and misunderstandings are so commonplace errors that even the safety professional and / or the competent persons would commit, and serious consequences would then result.

(The above article was published in the Proceedings of the 3rd Beijing Safety Forum, 24 November 2009).

Outing on 22 November 2009

於2009年11月22日星期日，本協會舉辦了一個「魔法樂園，羊羊樂園，錦田樂園，大榮華九大簋」旅行。

是日天氣和暖，很適合旅行。先於紅磡體育館停車場集合，九時半出發往「羊羊樂園」，全場祇得二隻黑羊供人觀賞餵飼，真的做了羊牯。

然後往元朗大榮華酒樓享用九大簋。美食王「滔滔」壓陣講解圍村茶之源流，十分詳盡，但團友還是鍾情於桌上之九大簋及美酒，十分豐富。臨行還購買大榮華之調味品醬油及麵條等。

飯後續往「錦田樂園」參觀園內魚池、荷花池，更可自掘番薯然後購買。

然後再往「魔法樂園」。場內有魔法表演，小朋友撈金魚，動物農莊，中藥場，錦鯉池，十二生肖場等。各人也盡興向歸，最後當然少不了大合照啦。



▲ 午餐不錯吧



▲ 筵開二大桌



▲ 避開得那麼遠，真的是安全兔？



▲ 尋寶掘番薯



▲ 找找屬於你的生肖



▲ 非賣品

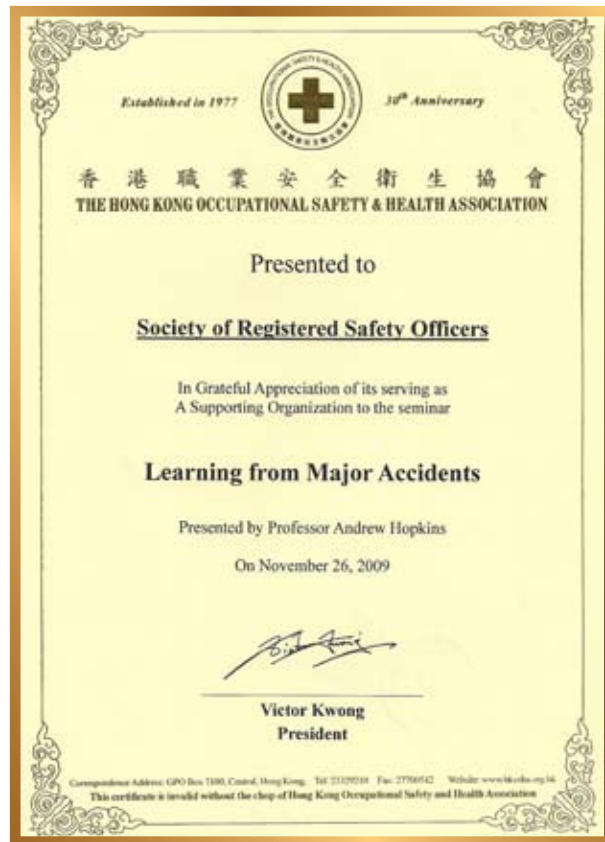


▲ 慘，暴露了年齡的秘密



▲ 山羊

Jointly Organized Seminar on 26 November 2009



Certificate of Appreciation



Occupational Safety and Health Seminar on 28 November 2009

Occupational Safety and Health Seminar held on 28 November 2009, venue at The Hong Kong Polytechnic University.



Speaker:
Mr. Michael Leung, President of SRSO.

Topic on
"Accident Investigation and Problem Solving for Safety Professionals."



Speaker:
Mr. Edmund Fung,
Executive Council Member of SRSO

Topic on
"An Introduction of Accident Investigation Process."

建造業議會訓練學院2009年度學員畢業典禮

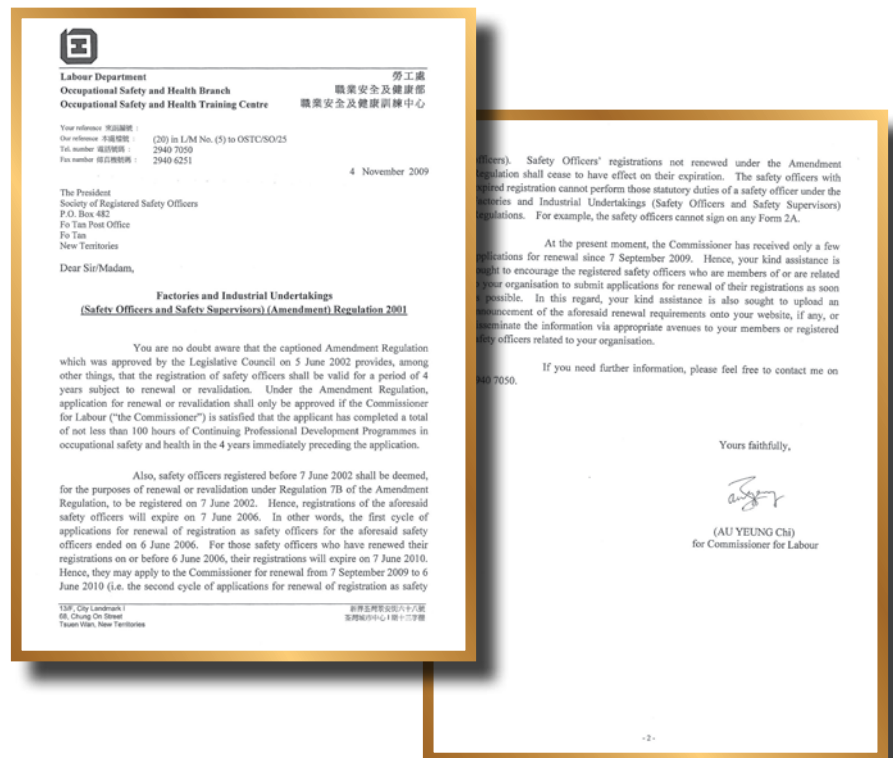
本會一向支持安全學員培訓，培育人材。於2009年12月本會會長出席建造業議會訓練學院『2009年度學員畢業典禮』，並頒發「註冊安全主任協會盾」給成績優秀學員。



Reminder on Renewal or revalidation of Safety Officer

Please be reminded that you are required to apply to the Commissioner for renewal of your qualification from 7 September 2009 to 6 June 2010 if you have renewed your registration on or before 6 June 2006. Safety officers with expired registration cannot perform statutory duties of a safety officer under the F&IU (Safety Officers and Safety Supervisors) Regulations.

You are advised to submit your applications for renewal as soon as possible to avoid unnecessary delay.



Mr TSE Ming Sing

The Society notes that with sadness the passing away of Mr Tse Ming-sing, ex-Chief Occupational Safety Officers of Labour Department. Our deepest sympathy goes to their families and friends.

**Note from the Society: If members come across to know any of our members who has passed away, please notify us.*

Policy on Reinstatement

Members who have been removed from the membership roll (due to resignation or striking off by Executive Council) will be required to submit fresh applications should they wish to re-join the Society. Subject to the above, the payment scale for reinstatement of membership is a reinstatement fee of HK\$500, plus the subscription.

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Vice-President

Mr SHING Wai Lam, Johnny

Hon. Secretary

Mr HAU Jesse

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Ms CHOW Kim Mei, Agnes

Members

Mr AU Ho Fo

Mr FUNG Chi Leung, Edmund (Chairman of Membership Committee)

Mr LEUNG Chiu Ping, Freddy (Chairman of Editorial Board)

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Dr FAN Chun Yu, Norbert

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Labour Department - Safety Officers Advisory Committee
Mr LEUNG Chiu Ming, Michael

Labour Department - Advisory Committee on Certification of Operators of Specified Plants and Equipment
Mr FUNG Chi Leung, Edmund

OSHC - Construction Industry Safety & Health Committee
Mr SHING Wai Lam, Johnny

OSHC - Metalware & Plastic Industry Safety & Health Committee
Ms CHOW Kim Mei, Agnes

OSHC - Electrical & Mechanical Trade Safety & Health Committee
Mr HAU Jesse

HKQAA - OHSAS 18001 Technical Committee
Mr LI Siu Kai, Patrick

Welcome new members

The following applications were approved by the Executive Committee of the The Society of Registered Safety Officers:

357	CHUNG WING YIN	鍾榮賢	(Member)	360	LEUNG NGAI LUNG	梁羿龍	(Graduate Member)
358	LAM CHIN WA, WALLACE	林展華	(Member)	361	KWAN CHONG TAT	關創達	(Member)
359	WONG CHI PANG	黃智鵬	(Member)	362	CHENG CHI FUNG	鄭志豐	(Member)

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Notes for Contributors

1. OSH Review aims to provide a platform for sharing information and ideas on the law, practice and theory of Occupational Safety and Health. All contributions to this end including those in related fields such as engineering, humanities, management and social science are all welcome.
2. OSH Review prefers short articles of no more than 4,000 words. Submissions should include an electronic version or hard copy and should be sent to one of the Editors. Titles, headings and subheadings should be short and footnotes should be kept to a minimum. Neutral citations should be included for all authorities cited or footnoted. We reserve the right to make any changes.
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4. Submission of material for publication will be taken as acceptance of the terms of publication described in these notes.
5. The address for all Editorial correspondence is: Michael Leung, Johnny Shing and Norbert Fan, Society of Registered Safety Officers, P. O. Box 482, Fo Tan Post Office, N. T., Hong Kong.

Towngas Aims at a Greener Future



We conduct our business with environmental responsibility in mind - for a greener future, for our younger generations.

Towngas always strives to be Asia's leading clean energy supplier. Our early environmental initiatives date back to the 70s when we began using naphtha rather than heavy oil and coal to produce town gas, greatly reducing the emission of sulphur dioxide and contributing to the prevention of acid rain. In recent years, we have succeeded in utilising landfill gas for gas production purpose further lowering carbon dioxide emissions. Towngas has also ventured into the green auto business by providing the liquefied petroleum gas that is a cleaner fuel for Hong Kong's taxis and mini-buses – helping improve the air quality for all of us. In 2006, we introduced natural gas as feedstock in addition to naphtha in an attempt to further improve the environment.

