Responsible Care

The Commitment of the Chemical Industry to Sustainable Development

Issue No + **35**

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Responsible Care® is a voluntary program operated by the chemical industry with aims to realize environmental protection, safety and human health in the entire process ranging from development of chemical products to their manufacture, sale, distribution, use and removal, internalize and implement them in managerial principles and conduct activities to improve environmental safety and healthcare conditions on a continual basis.

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Address : (110-738) 601, Yeojeongdo Bldg., 190, Yulgok-ro, Jongro-gu, Seoul
Tel : 02-3668-6174
Fax : 02-743-1887
E-mail : rcmaster@krcc.or.kr
Homepage : http://www.krcc.or.kr
Planning/design : Maekyung Buyers' Guide.

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RC ACTIVITIES AIM TO COMPLY WITH GLOBAL STANDARDS AND REALIZE EFFECTIVE ENVIRONMENTAL PROTECTION

As economic success has been achieved, more emphases need to be placed on fulfilling social responsibilities and realizing environmental protection.

Woo-seong Shin, CEO
BASF KoreaKorea

BASF made inroads into Korea in 1954 and established BASF Korea as its subsidiary in 1988. BASF Korea, one of the largest foreign companies in Korea, has 1,120 employees. It provides customers with diversified portfolio including chemicals, plastics, functional products and agricultural product protection products in addition to crude oil and natural gas. BASF Korea, a global chemical leader, highly values social responsibilities and environmental pro-tection as well as economic growth while endeavoring to provide solutions and products that meet customer needs in the entire industrial areas through scientific innovation at the moment and for the future.
We paid a visit to the headquarters of BASF Korea and listened to what Woo-seong Shin, President of BASF Korea, had to say about safety management of the company. President Woo-seong Shin graduated from Seoul National University majoring in industrial chemistry and worked for SKC on graduation before working for BASF for 30 years.

Would you introduce BASF Korea and explain characteristics of domestic business sites?

● BASF Korea is a subsidiary of BASF SE, a global chemical company headquartered in Germany, and it is one of the most representative foreign-invested companies in Korea and cited as one of the top ten chemical companies in the domestic market. BASF Korea is operating six large-scale production facilities in Korea, and construction of a new engineering plastic factory located in Yesan was completed at the end of October.
In addition, the company has five related technologies centers in Suwon, Daejeon, Ansan and Siheung while providing various intelligent solutions and high value-added products to customers at home and abroad through a global BASF network.

Would you introduce representative technological innovation achieved by BASF Korea as well as the future direction?

● BASF has recently made a success in replacing flame retarding material of neopor products, the next-generation Styrofoam products widely used as insulator, with PolyFR, an environmentally friendly high-molecular flame retarding material. In the meantime, HBCD (Hexa Bromo Cyclo Dodecane) that had been used as flame retarding material was designated as POPs in Stockholm Convention on Persistent Organic Pollutants. BASF applied PolyF, environmentally friendly flame retardant material, to all product groups through years of concentrated research and development. As PolyFR is non-toxic and not accumulated in the human body, it is much more environmentally friendly than HBCD. BASF has contributed to sustainable growth in the architecture sector. It also makes continuous efforts to innovate diversified product groups in addition to construction-related products.

What does BASF head office think about BASF Korea and the Korean petro-chemical market?

● BASF Group recorded 1.5 trillion won in domestic sales last year, and 1,057 employees are working for the company in Korea. BASF Korea posted 2.6 trillion won in the total sales including exports in 2014.

BASF Korea takes a very important and strategic position within BASF Group. Excellent employees and proactive business activities by Korean companies contribute to making the Korean market look more attractive in the fast growing industries such as automobiles and electronics, and BASF Group continues to make investments in Korea. A case in point is that BASF established the global headquarters of the organic electronics industry in Seoul in 2013, and since last January, it has completed construction of a production factory of Ultrasone, high-functional special thermoplastic, outside Germany for the first time in Yeosu, It also opened Asia-Pacific Electronics R&D Center on the natural science campus of Sungkyunkwan University located in Suwon, Gyeonggi-do in the same year.

What is your stance on safety of chemicals?

● Chemical products benefits mankind a lot, but if they are misused or managed in an appropriate way, they might cause potentially harmful effects on the human body or the environment all the time. For this reason, BASF Korea is fulfilling Product Stewardship, one of main codes of Responsible Care, with sincerity. Core activities of Product Stewardship espoused by BASF Korea include compliance with laws and regulations on chemicals and voluntary management of chemicals.

The compliance with laws and regulations on chemicals is a prerequisite (License to Operation) for productive activities, and the voluntary management of chemicals is recognized as a mandatory factor required to sustain business based on Striving Beyond Compliance.

What are RC activity practice strategies pursued by BASF Korea?

● BASF puts social responsibilities and environmental protection more than anything else along with economic success. RC activities conducted by BASF Korea aim to operate business safely and environmentally friendly and realize not only safety and health for employees but also effective environmental protection in strict compliance with higher global standards and procedures. And it can be symbolized through such a phrase as 'Never Compromise on Safety, 'the EHS policy for the entire BASF Group. The company is thoroughly conducting risk assessment in an effort to protect employees from potential risks and minimize environmental impact at a time of making investments or changes.

Would you introduce social contribution projects pursued by BASF Korea?

● Since 1954 when BASF Korea advanced into the Korean market, the company has recognized social contribution as the most important factor of sustainable growth while proactively conducting diverse activities by business division. In particular, Kids Lab operated by BASF is a representative social contribution activity conducted by BASF for the purpose of encouraging children to develop interest in science through scientific tests to which children can gain an easy access and helping perceive chemistry as a part of our life.

Kids Lab was introduced from the headquarters in Ludwigshafen in Germany in 1997, and 90,000 or more children from 35 countries in the world

" RC activities conducted by BASF Korea aim to operate business safely and environmentally friendly and realize not only safety and health for employees but also effective environmental protection in strict compliance with higher global standards and procedures. "

took part in the program. It was introduced to Korea in 2003, and since then, 4,200 or more students have participated in it in various cities including Seoul, Yeosu and Gunsan where business sites are located for the past 10 years. In addition, Yeosu Industrial Complex invited regional opinion leaders including civic groups and college professors to introduce business activities and listen to what they have to say so that understanding about the chemical industry can be furthered and positive response to the Yeosu Industrial Complex can be expanded.

What are important social contribution projects conducted this year?

● Celebrating the 150th anniversary in 2015, BASF held a free classical music concert by inviting citizens from Yeosu and Ulsan and contributed to advancing culture and education in local communities by offering scholarship to nurture talents in Yeosu. In addition, the company provides support to help disabled children tend a vegetable garden and proactively participate in taking a walk along with students of schools for the blind and mute and drawing murals for children's centers in pertinent areas. In addition, the company pushes for various social contribution activities by business division in an effort to fulfill social responsibilities in local communities. They include making-gimchi, environmental beautification, provision of support to single mothers and charitable donation.

Would you let us know HR resources of BASF Korea and its future plan?

● BASF aims to induce appropriate talents throug-hout regions, divisions and teams and create work places that go beyond regions, divisions and teams based on achievements and self-realization. The company provides comprehensive framework in order to produce the best results, and toward this end, it is focused on three strategies aimed at excellent human resources, superb work environment and outstanding leaders. As for last year, BASF Korea has 1,057 employees, BASF Korea makes efforts to contribute to furthering the Korean economy through creation of quality jobs while putting an emphasis on strict compliance with labor laws in Korea.

The company introduces various institutions in order to help its employees strike a balance between work and family life based on mutual trust through the use of flexible working-hours, mobile offices and Family Day. Highly recognized for its efforts, BASF Korea was selected as one of the top 30 foreign companies for which Koreans want to work in 2014. As always, BASF Korea is expected to face difficulties next year, but it will do its utmost to contribute to developing the Korean chemical industry by fulfilling its social responsibility on the back of new investments and outstanding human resources.

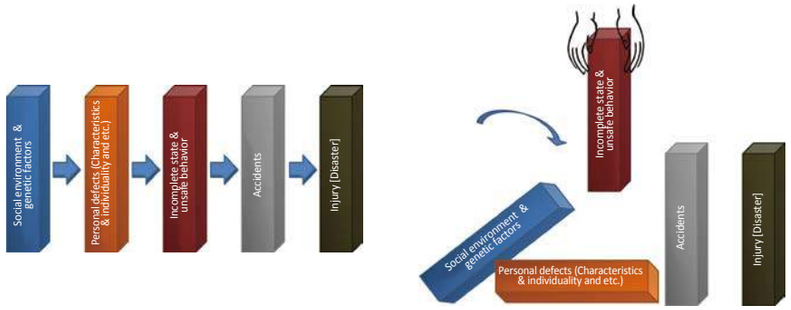
Unsafe behavior explained by psychology

Jun-ho Bang, Team Leader
UNIST Safety Management Team

Ⅰ. Cause of unsafe behavior and countermeasures

Pursuit of a safe life can be a human instinct. Accidents frequently occur around us. Most accidents are directly caused by unsafe behavior and unstable conditions. It means that if unsafe behavior and unstable conditions are eliminated, accidents or injuries do not take place even though there are problems in social atmosphere or personal flaws.

[Figure 1] Heinrich's Domino Theory



What is the rate of accidents caused by unstable conditions and unsafe behavior? In the 1930s, Herbert William Heinrich announced that 90% of accidents stem from unsafe behavior. DuPont confirmed the Heinrich's theory by announcing the result of research conducted for ten years indicating that 96% of accidents are caused by unstable behavior, a human factor. Most statistical outcome also shows that 90% or more of accidents are caused by unsafe behavior.

However, most accident prevention institutions or companies tended to be preoccupied with resolving unsafe conditions instead of unsafe behavior. Despite the fact that most accidents are related to unsafe behavior, many are more concentrated on dealing with unsafe conditions instead of unsafe behavior in order to prevent accidents from taking place because unsafe conditions can be much more easily resolved, and situations before and after measures are taken are more palpable, which leads to convenient improvement of situation.
It is necessary to take an approach in dealing with unsafe behavior in order to reduce actual accidents. A case in point is industrial safety psychology. Currently, industrial safety psychology is going through a process of establishing its theory. Another example is BBS 1) Program applied to global companies in advanced countries. DuPont applied this program to industrial fields in the name of STOP(Safety Training Observation Program). According to announcement by DuPont, the company was able to reduce industrial disasters by 50 to 60% as a result of introduction of STOP. Dow Chemical also introduced BBP (Behavior Based Program), a program similar to BBS.

Ⅱ. Unsafe behavior, external circumstances and human relationships

[Figure 2] A fall from a ladder

A clerk in a clothing store climbed a ladder to attach a signboard reading SALE to a lighting frame on the ceiling before losing her balance to fall on the floor.

Didn't the clerk who fell off the ladder think that she might drop on the floor from a two-meter-long ladder? If she knew that she might fall on the ladder, why didn't she ask her coworkers who were arranging clothes to help her out? Why didn't other coworkers who arranged clothes volunteer to help her out? It is focused on examining external circumstances and human relationships instead of the inner workings of humankind in order to figure out the cause of unsafe behavior through psychological experiments and actual cases2) with regard to external circumstances.

1) BBS (Behavior Based Safety)
① Make sure to establish a checklist for observation by analyzing types of frequent accidents and unsafe behavior by company
② A manager (including workers) regularly petrols sites in order to indicate workers' unsafe behavior and safe behavior
③ Make sure to induce workers to have a sense of safety through a positive dialogue about unsafe behavior and give a feedback to help develop a safe habit through appropriate compliments on safe behavior. In that case, the company should not take punitive measures on individuals except that they intentionally violated corporate safety regulations.
④ Make sure to prevent accidents by establishing statistics based on results of consistent inspections and gradually raising the rate of safe behavior throughout the company
2) Make sure to introduce an EBS show titled 'Two Faces of a Human Being.''The show aired in August 2008 was concentrated on finding the cause in external circumstances instead of inner workings of humankind while reasoning out a proposition that 'human beings are controlled by circumstances.'

Ⅲ. Cause of unsafe behavior

1. Power of circumstances

A fire broke out in Jungang-ro Subway Station in Daegu in 2003 claiming 192 lives, wounding 148 passengers and burning down 12 passenger cars. Casualties were drastically increased right after the accident because of inappropriate material used in passenger cabins, narrow paths, a lack of intake and exhaust facilities, redundant smoke emission pathways and escapes, an absence of reporting system and problematic power disconnecting devices. However, there was another reason. [Figure 3] shows that the passenger cabin looks foggy due to smoke.

[Figure 3] Inside the passenger cabin at a time of occurrence of a fire in subway train in Daegu

Passengers are sitting or standing in the cabin with no trace of embarrassment. Those who know details of the accident cannot help wondering. There are many cases where people recognizing imminent danger pretend not to notice it due to surrounding circumstances in industrial sites. Then, why don't people working in industrial sites wear a protective gear and use press safety devices? We cannot avoid being influenced by the surrounding people and groups to which we belong. If others in the same situation show no trace of agitation without taking particular actions, most tend to find it safe. In addition, the more people gather together, the more influence they exert.

A smoke evacuation experiment

[Figure 4] A smoke evacuation experiment in case of a group of people and in case of one person

①A smoke evacuation experiment in case of a group of people

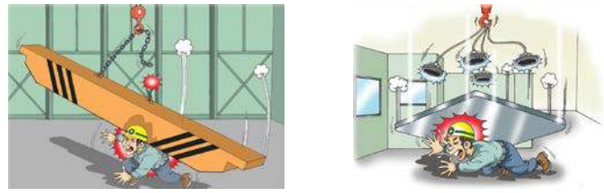
Five college students in their 20s took part in the experiment. Four of them were accomplices who were aware of the real purpose of the experiment. The accomplices were instructed to pretend that they did not notice the smoke. After an examiner left the room, a production team slowly let prepared fake smoke into the room through a door crevice. Only one participant in the experiment who did not know the real purpose of the experiment sensed the smoke before looking around the room with a surprised face. Others in the room continued to answer questions without paying no attention to the smoke. The participant looks totally perplexed. The participant tries to talk to another person close by to no avail. Others lower their head to start answering the questions again. Although the room is filled with smoke, they don't move. After all, ten minutes go by. After that, the experiment was repeated four times by changing subjects. To our surprise, they all produced the same results. No one left the room until the experiment was finished in scheduled ten minutes.

② A smoke evacuation experiment in case of one person

A participant enters a room. Conditions of the experiment are the same. The only difference is that the participant is all alone in the room. After telling that he would come back to collect the questionnaire, the examiner leaves the room, and smoke starts coming into the room in a minute. Catching wind of something odd right away, the participant raised his head to witness the smoke before taking a look around. The participant who stared at the door started answering questions before leaving the room without hesitation in 18 seconds.

Why do you think they do so? Participants were asked the question.

"Since others didn't leave the room, I didn't either."
"Since others did nothing, I felt uncomfortable with leaving the room alone"
"To be frank with you, since others didn't leave the room,
I kept looking around to see how other responded"



[Figure 5] A crane accident

[Figure 5] In order to prevent fretum death caused by falling heavy objects, make sure to prevent workers from accessing transport work areas. Meanwhile, operators conduct work on sides and ensure that there are no hindrances within the area of crane operation and transportation. Make sure to think about workers' surrounding environment. Although workers who were careful about a fall of heavy objects, if they are accustomed to the surrounding environment without safety measures and other workers who casually pass through a transport passage of heavy objects, they start thinking that 'heavy objects never fall off a crane' and they follow suit after others.

2. Force of environment

An experiment on changes caused by a flower garden

[Figure 6] An experiment on changes caused by a flower garden

We visited an area troubled due to garbage. Residents suffered a lot due to garbage accumulated every night. Signboards and mirrors aimed to prohibit people from dumping garbage every corner of streets to no avail. Residents finally came up with an idea. First of all, they cleaned garbage dumping sites and made small gardens there. And then, they installed closed-circuit cameras. As it became covered with a veil of darkness, a stranger put down a garbage bag. After a while, he picked up his the garbage bag before disappearing. In the morning, there was no garbage around the garden.

Some law-abiding citizens tend to imitate others when they break minor rules. What is important is circumstances that induce one to take certain actions instead of how he or she thinks about morality and rules. The garden experiment shows that the environment can change due to a very minor factor. The fact that one very minor thing can change the whole environment means that we are stimulated by very small things. Some minor changes can our mind, and if our mind is changed, the environment can be changed as well.

3. Power of authority

A fraud case in a fast food store

[Figure 7] A fraud case in a fast food store

On April 18, 2004, one man made a call to a fast food store on the outskirts of Kentucky. Identifying himself as a police officer, he told that he needed immediate cooperation to resolve a fraud committed by a store clerk. He said that one of female store clerks stole a wallet from a customer. He gave an order to the manager saying “The police will be there in a minute. Make sure to frisk the woman in advance.” The manager dragged her to a back room and undressed her before frisking her to find money. In the meantime, the man on the other line started giving a weird order. He said, “Make her stand on a chair,” “Make her jump up and down” and “Spank on the bottom if she resists.” The manager followed the weird orders given by the man as they were. The female employee never stole the wallet, and the caller was not a police officer. To our surprise, something similar happened in 70 fast food stores in 32 states in the U.S.

One of managers who were fired after being swindled said, “You would easily say, ”I wouldn’t have done so“. However, unless you are in the same situation, no one knows what he or she is going to do. No one knows.” In various work places, many people would take unsafe actions despite perceived risks due to inappropriate demand by authoritative supervisors and executives. If workers are pressured to meet demanded quantity as soon as possible by using a foot switch instead of a two-hand-operation button, or if a supervisor requests workers to work too much and produce excessive outcome, it is highly likely to result in unsafe behavior. However, most workers find it difficult to refuse those requests due to supervisors’ authority. Most people think that the power of authority can influence our behavior to some extent believing that they can reject unreasonable and inappropriate demand. However, the power of authority cannot be underestimated. Before we know it or even though we believe that we act on our own reasonable judgment, we tend to bow to authority from time to time. If supervisors give an unsafe work order, workers need to be able to reject the order. It is necessary for those with authority not to make inappropriate requests. Toward this end, business operators and workers should have a mature sense of safety and friendly work environment based on unified employees.

Ⅳ. Countermeasures against unsafe behavior

Although we consider ourselves as reasonable and rational beings with our own principles, belief and value system, to our dismay, ordinary people fail to observe their own principles and belief system from time to time. In certain circumstances, they take unreasonable and outrageous actions to cause accidents. The power of circumstances is much stronger than we think. After all, accidents caused by unsafe behavior can be influenced by circumstances facing individuals instead of personal disposition or characteristics. Some might think ‘I wouldn’t do that.’ In consideration of circumstances where industrial disasters are investigated, the idea ‘I wouldn’t do so’ might be very arrogant. It might be difficult to conduct a circumstantial investigation, but if we don’t know the circumstances properly, it would be hard to conduct investigations on disasters in an appropriate way. Then, how can we overcome the power of circumstance, environment and authority that eventually causes unsafe behavior?

1. The power of moving subway trains

[Figure 8] Rescue of a person falling into the floor of a platform in a subway station

The moment when a subway train arrived at a platform in Cheonho Station in Subway Line No. 5 on October 17, 2005, a passenger fell off to the floor between the subway train and the platform. The train stopped, and its doors opened to let passengers out of the train. Meanwhile, images recorded in CCTV showed something strange. Passengers who had gotten off the train started pushing the train. The train wouldn't budge at first, but it slowly began faltering due to reaction. In the meantime, passengers rescued the person who fell off to the floor.

What made each and every passenger push the train? When someone made a suggestion of pushing the train in a loud voice, no one reacted to that. And then, another passenger extended a helping hand, and a third person followed suit.
Those who were close to the train began to help them, and they pushed the train at the word of command without even being told to do so.
Those who were at the platform can be considered as a group of people in a certain circumstance. When all workers remain spectators and refuse to do something to correct unsafe behavior in work places, if the first one who takes action is considered to be in the right, sympathizers begin to appear.
And then, when the sympathizers taking action number three, the power of moving a group is exponentially increased. It is called the power of three.

[Figure 9] An experiment on a principle of three

A man stands at a bus stop in the middle of a road. He watches something gesturing at the sky. Others do not show any response except that they catch a glimpse of him as though he was some kind of a weird person. After a while, another man joins him to stare into the air and express a surprise standing next to him. However, other passers-by are still indifferent. A third man appears, and the three of them look at the sky to utter an exclamation. After a while, countless passers-by stop to stare at the sky along with them.

When they are only two of them, they don't have any effects, but when they become three of them, a turning point is created. When three people gather together, a concept on a group of people begins to be made. Then, it becomes a social norm or principles with special purposes. When three people take the same action, many tend to believe that there must be a good reason for their doing so.
As described above, one deviationist has almost no effect and tends to succumb to pressure, but three like-minded people can make circumstantial changes.
Take for instance the Korean shipbuilding industry. It ranks 1st in production capacity in the global market, and the rate of industrial disasters is two times higher than the entire industrial average. Nonetheless, large shipbuilders make efforts to prevent disasters centering on safety departments by wearing protective gear and complying with safety regulations, but it is still hard to find workers who use a safety support at a time of conducting a high place work in partner companies of small-and-medium shipbuilders and large shipbuilders. In addition, installation of hanging scaffolds is still unsteady.
What can be done in a large shipbuilder can't be done in a small-and-medium-sized shipbuilder. Why? It's because limitations are bound to follow in breaking the mold of communal living to change circumstances. After the first person appears, if it is followed by the second one and the third one, circumstances might change. Although you might not be able to be the first person, you could be the third person facilitating changes.

Ⅴ. Conclusion

A safety accident can be easily regarded as a personal problem of a member of an organization. It is believed that a worker's carelessness or low skills result in safety accidents, and even though safety management issues are a bit more stressed, only such physical working environmental factors as protective system for dangerous machinery, lighting and noise are emphasized.
However, actual cases and psychological experiments indicated that it is closely related with social environment within an organization or safety management in addition to such physical conditions.
If causes of unsafe behavior are examined from three perspectives such as the power of circumstance, environment and authority, each and every member needs to give a thought into taking the circumstantial initiative instead of being subjugated by circumstances to follow them as seen in The Rule of Three in order to overcome the power of circumstance.
As indicated in the change caused by a garden and the experiment on signboards for entrance doors for men and women, changes in surrounding environment such as clean working environment and safety measures against dangerous machinery are likely to induce behavioral modification and reduce unsafe behavior. Lastly, although it seems minor, there are media reports saying that organizations implementing symbolic egalitarianism where managers and workers receive the same treatment in terms of use of cafeteria, professional attire or arrangement of office desks tend to record very low rates of safety accidents compared to other companies doing otherwise. The power of authority failing to check subordinates' delicate state with the greatest care or listen to what subordinates well aware of safety state in the field have to say or restrain from excessively wielding authority ends up in making an organization difficult to obtain confidence from subordinates and keeping an organization from facilitating communication. Accordingly, it is necessary to introduce safety culture based on serious discussions and practice with regard to value, atmosphere, leadership and practice related to safety shared by members in order to understand and change the three powers that cause the unsafe behavior.

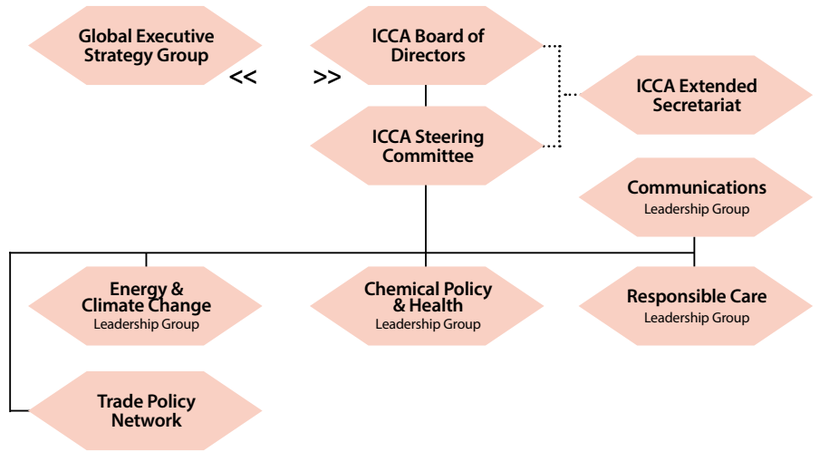
AFTER VISITING GLOBAL RC RCLG MEETING

Responsible Care®
OUR COMMITMENT TO SUSTAINABILITY

2015 International Council of Chemical Associations RCLG (Responsible Care Leadership Group) Conference was held in Cape Town in South Africa for two days on October 21 and October 22. The conference was attended by 30 members from 18 RC member countries including Chairman Dr. Hans-Jürgen Korte (Vice President of Solvay), and RC member countries had heated discussions on the current state of progress and plans on Globally Harmonized Process Safety Metric that has been much discussed in recent years. In addition, the current state of RC and case studies were presented by member country.

Prior to introduction on RCLG Conference, brief explanations on ICCA and RCLG Conference need to be given in order to further understanding. ICCA composed of national and regional chemical industrial representatives was established in 1989 with an aim to push for mutual cooperation among global chemical companies and associations. It exchanges information on the global chemical industry, represents the industry with regard to chemical-related policies and plays an important role as a channel of communications between environment, safety, healthcare and trade industries related to the chemical industry and international agencies (UNEP, WTO, OECD and etc.) A total of 40 countries are currently working as regular members of ICCA, and China, India and Russia obtained membership in 2011. ICCA puts a great emphasis on major issues such as Chemical Policy & Health, Energy & Climate Change, Energy & Climate Change and RC (Responsible Care). Voluntary activities in the chemical industry are promoted through operation of Leadership Group for the purpose of effective implementation.

[Figure 1] Organization Chart of ICCA



RCLG is committed to implementing managerial principles in the whole process ranging from development of chemicals to manufacture, sale, distribution, use and disuse for the purpose of protecting environment and health for human beings. It ultimately aims to spread Responsible Care all over the world, introduce autonomous management system for environment, safety and healthcare, implement Responsible Care Global Charter, raise image of the chemical industry and restore public trust. In particular, it is focused

on voluntarily and consistently pushing for activities to improve environment, safety and healthcare for the purpose of executing strategies and targets.

RCLG is held twice in a year in the first half of the year and in the second half of the year, and during the meeting held this year, RC member countries mostly exchanged their opinions on the current state of Globally Harmonized Process Safety Metric.

As for the background of pursuit of Globally Harmonized Process Safety Metric, since 1985 when RC was initiated, process safety has played an essential role, and process safety evaluation has been developed for 30 years or longer, but there was no well-thought-out global system. With a critical mind, ICCA Board of Directors recommended development of well-thought-out process safety report system to RCLG in 2015 after consecutive chemical process safety accidents in 2012.

ICCA process safety TF formed to develop the system made a final suggestion on adoption of the rate of process safety accidents based on investigations and discussions for two years, and it was accepted by ICCA Board of Directors.

As ICCA finds it possible to report outcome of Globally Harmonized Process Safety Metric in the global chemical and petrochemical industries, it is expected to lead to a road map for associations and companies within areas. Associations and organizations by RCLG country need to conduct investigations on the number of annual process safety-related accidents occurring in pertinent member companies and working hours of employees (including contracted employees) according to schedule.

* ICCA plans to use report on Globally Harmonized Process Safety Metric in the form of the rate of process safety accidents based on standardization of 100 employees and 2,000 hours of annual working hours(Process Safety Event Rate (PSER) = (Total Events/Total Hours)*200,000)

[Table 1] The Current State of Pursuit of Globally Harmonized Process Safety Metric

Distinction	Plan	Remarks
Progress	Review on (RCLG)T/F proposition	Apr. 2015.
	Review on (ICCA Board of Directors)RCLG final recommendation (Draft)	Jun. 2015.
	Sending documents on detailed instructions to (RCLG) member countries and companies	Jul. 2015.
Future schedule	Execution of (RCLG) safe process demonstration program (※Voluntary participation)	2016
	(RCLG member countries) Selectively reporting safe process data	2017-2018
	Mandatorily reporting safe process to (RCLG)KPI(Key Performance Indicator) report system	2019

RCLG plans to push for member countries' voluntary participation in demonstrative programs in 2016, selective submission of data from 2017 to 2018 and mandatory presentation of data to 2019. In the mean time, Japanese Chemical Industry Council announced the current state of progress made by RC member companies in the country with regard to introduction of Globally Harmonized Process Safety Metric. RC member companies of Japanese Chemical Industry Council include diversified chemical industrial groups such as precision, plastic, fiber and films, and a special TF is being operated in consideration of it. With an aim to introduce data report based on implementation of process safety demonstration programs in the middle of 2016, most member companies of Japanese Chemical Industry Council announced that it will initiate or make preparations to file a report. Many member companies plan to report data through application based on GHS.*

* Determination on pursuit of GHS in Rio UNCED in 1992 (Global Harmonized System of Classification and Labelling of Chemicals)

Some member companies showed unwillingness to complete preparations for process safety report within upcoming three years and requested RCLG to provide additional guidelines and support. Detailed support (draft) included competence enhancement workshops, consulting services, translation of pertinent languages, development of computer tools and webs and consistent update of guideline documents.

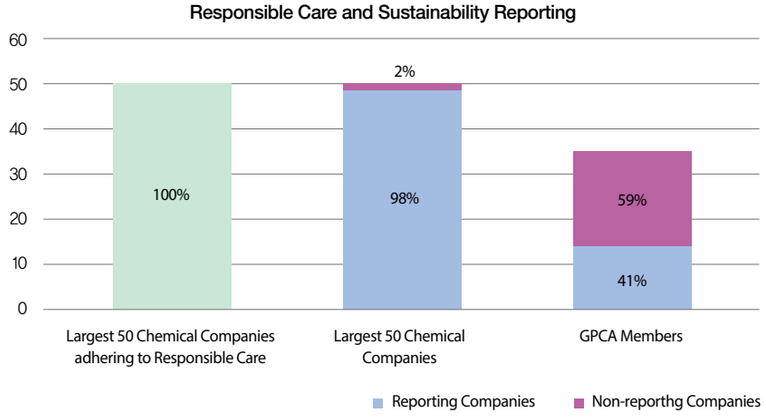
In addition, many companies inquired about direct and indirect losses specified in guidelines and such technical issues as definition of release of chemicals.

Gulf Petrochemicals and Chemicals Association (GPCA) announced RC's contribution to sustainability. RC introduced five main sustainable factors for expanded implementation of RC as a basis for sustainability.

Sustainable management defined integrated management of economic, environmental and social performance with an aim to maximize value of all major stakeholders.

First of all, one needs to have broader perspectives in order to realize expanded implementation of sustainable RC. It is necessary to recognize socio-economic issues in a wide scope for the purpose of sustainable business. Second, sustainable companies need to disclose the result of evaluation on RC and other sustainability for the purpose of increasing transparency. Third, it pertains to risk management on opportunity. Most RC companies concentrate on risk management whereas some companies are focused on opportunities based on innovative products and process from the perspectives of sustainability of CSR and RC. Fourth, targets need to be expanded from the long-term perspectives. Most RC companies are focused on objects by the year whereas sustainable companies have long-term objectives (mostly one year or longer). Lastly, focus needs to be shifted from 'responsibility' to 'sustainability.' RC companies are concentrated on 'responsible'parts for environment, health and safety issues, but RC and sustainable leaders put an emphasis on how to realize innovation and engage in competition.

<Transparency>



Last but not least, there was an announcement on RC case studies and the current state of progress in major countries. In particular, since China joined RCLG,

Diversified events and activities were introduced for the purpose of proliferating RC in China through mutual cooperation between AICM (The Association of International Chemical Manufacturers) and CPCIF (China Petroleum and Chemical Industry Federation).

As Chemical & Allied Industries' Associations show interest in expanding RC members in Africa, demonstrative activities are being conducted in Ghana, Kenya and Tanzania for the purpose of RC membership. In the meantime, as Vietnam was highly recognized for consistent spread of RC activities during the meeting, it was officially approved as an official RC member.

RCLG conference was meaningful as it helped take a glance at the current state of progress of RC in RC member countries in addition to Globally Harmonized Process Safety Metric that has been recently discussed. In addition, it shared diversified perspectives and future vision for RC and announced major RC activities in home countries to encourage spread of RC by member countries.

It is reality that the image of the chemical industry is not positive as many find chemicals detrimental to public health and reminiscent of explosions and contamination. It is impossible to prevent accidents only by imposing legal obligations based on measurement and evaluation. It is because laws and regulations are established after chemical accidents all the time. If we leave the negative image of the chemical industry as it is without improving it, it would eventually deepen uncertainties about the chemical industry, and it would lead to introduction of more strict and rigid laws and regulations. It would ultimately bring about deterioration and collapse of the chemical industry.

RC would make it possible to achieve sustainable development of the entire chemical industry while offering long-term profits. Voluntary activities are the key to successful RC, and combining RC with business strategies is expected to offer more business opportunities in the near future.

Member companies

Lotte Chemical LOTTE CHEMICAL

Provision of "Joint Media Development for Prevention of Disaster" together with Korea Occupational Safey & Health Agency (KOSHA)

KOSHA established a business agreement on Joint Development of Disaster Prevention Media for the Chemical Industry in Lotte Chemical Ulsan Factory on September 24. The business agreement was signed by representatives of the two companies such as Hyeong-cheol Choi, Director of Education, Safety and Specialization with KOSHA, and Yong-ho Kim, Senior Manager of Ulsan Factory of Lotte Chemical.

Since 2012, Lotte Chemical has developed customized safety UCC by exploring major potential risk factors in the field and used it as worker-oriented safety education material as a leader of prevention of industrial disasters and proliferation of safety culture. The business agreement was established based on excellent safety and health management.

Main contents of the business agreement pertain to joint development and distribution of safety and health manuals by facility and task in the chemical industry. According to the business agreement, KOSHA plans and manufactures contents of safe work guidelines based on related statistics on industrial disasters and frequent disasters. Lotte Chemical provides safety and health experts' technical consulting and work material on harmful risk factors in the field by taking part in the planning and manufacturing process. KOSHA plans to distribute jointly produced safety work guidelines to the chemical industry, small-and-medium-sized companies and partners.

SKC SKC

MCNS (Mitsui Chemical & SKC Polyurethanes Inc), a polyurethane joint venture

between SKC and Mitsui Chemical, was officially launched on July 1. The joint venture MCNS recorded $1.5 billion in annual sales and $ 1.1 billion in assets, and SKC and Mitsui Chemical take charge of joint management through investment in kind based on a 50% equity each.

MCNS is headquartered in Seoul, and Gi-don Won, Director of Chemical Business Division of SKC, and Ishimaru Hiroyasu, Director of Urethane Business Division of Mitsui Chemical, serve as joint CEOs. MCNS combines polyol and system products by SKC with polyol, MDI, TDI and system products by Mitsui Chemical and operates 15 production bases in nine countries in the world with regard to a total of 720,000 tons including 280,000 tons of polyol, 200,000 tons of MDI, 120,000 tons of TDI and 120,000 tons of system products. The partnership has enabled SKC to be equipped with the entire product structure ranging from PO required to conduct polyurethane business to system products. The partnership also made it possible to provide total solutions that can compete against products manufactured by global makers and expand a customer group through cross marketing based on a global network of production bases of system products in six overseas countries that are not redundant. As R&D and production technology are shared, the level of technology is expected to be elevated by one notch. Gi-bong Chung, CEO of SKC, said, "We pushed for the partnership in order to achieve structural changes and innovation such as business portfolio amid expanded fluctuations and uncertainties about the global chemical industry. We will spare no efforts to provide support so that our partner MCNS can grow into a top tier polyurethane company in the world."

mcns Mitsui Chemicals x SKC Polyurethanes

Corporate Logo Design
- Rounded ribbon symbolizes unending, rewarding, and global bond between Mitsui Chemicals and SKC with customers and markets
- Green color expresses MCNS's environment-friendly policy

Hanwha Total Hanwha | TOTAL

Share Hope' hereinafter

Local teenagers and 'Share Hope' Hanwha Total! held a ceremony to deliver business expenses and conduct evaluation on 2015 Share Hope along with Hanwha Total ('Share Hope' hereinafter) with Eun Lee, HR Managing Director of Hanwha Total, Seong-beom Cho, Social Welfare Secion Chief with Seosan City Hall, and 50 volunteer mentors on hand in Seosan Culture and Welfare Center on August 26.

Share Hope Project is a social contribution project launched in July 2010 with an aim to enable teenagers from low-income families that can be easily alienated from local communities to grow into responsible citizens in the society. Hanwha Total has donated a total of 220 million won including 30 million won given this time to Seosan City Volunteer Center. Share Hope

Project aims to enable 50 volunteer mentors to set up one-on-one relationships with 51 teenagers in a variety of age groups from elementary school students to middle school students and show friendliness through regular visitations while operating such diverse programs as lectures, cultural experience, health examination and experiment camps. In particular, as it regularly operates experience programs differentiated from general mentoring projects, it achieves excellent results in helping teenagers find emotional stability and realize healthy self-image.

Hanwha Total conducts various support activities to help local youths and schools along with Share Hope Project. It provides annual scholarship to excellent local students who enters colleges while delivering school development funds to Seoryeong High School, Daesan High School and Daesan Middle School located near Daesan Factory. In addition, it provides support to 'Lightning Bug Study Room Project' in which air-force officers with a nearby air force unit serve as teachers in order to eliminate educational gaps for students from low-income families, and it also conducts 'Happy Meal Table Project' aimed to inform students from low-income students of healthy foods, cook various dishes along with students and teach eating manners centering on Housewives' Operating Committee composed of executives' family members.

Kumho Petrochemical 금호석유화학

A challenge to achieve zero energy waste

On August 27, Kumho Petrochemical announced that it would push for a national project (research on TDF ash production network) on establishment of construction component reproduction network through the use of TDF Fly Ash (tire solid fuel ash).

TDF ash production network research is focused on reusing construction materials through re-treatment of ashes remaining after Yeosu Cogeneration Plant of Kumho Petrochemical incinerated the fuel, TDF. It is implemented as one of national projects aimed to establish Eco-Industrial Park in Honam and will be continued until next June with Kumho Petrochemical, related small-and-medium-sized companies and Korea Recycled Construction Resource Institute on hand. The core of the research is to establish a model on virtual circulation of resources. In the past, TDF ash was mostly buried, but in the future, a new production

network is established to collect TDF ash, re-treatment and sale. Kumho Petrochemical expects that it will be able to reduce energy waste treatment costs by up to 50%. Such advanced countries as the U.S., Japan and Taiwan are already using recycled TDF ash as construction components of asphalt and concrete. In the meantime, Kumho Petrochemical made inroads into the energy market by establishing Yeosu Cogeneration Plant in 1997 and expanded business by additionally constructing another power plant in Yeosu in 2009. The second power plant whose expansion is completed in the first half of next year is expected to use TDF as fuel.

Hanwha Chemical 한화케미칼

Hanwha Chemical guarantees safety of partners

On September 10, Hanwha Chemical invited 25 partners to Plaza Hotel in Jung-gu, Seoul to hold a meeting on shared growth and announced that it would support safety management of partner companies. The reason for selecting safety as an assignment for shared growth is that safety management in partner companies has become important amid frequent accidents in industrial fields. Safety experts were invited to the meeting to give special lectures on case studies on accidents, excellent management and safety management in industrial fields.

Hanwha Chemical established MOU with 10 companies running a risk with regard to safety accidents due to characteristics of works including facility manufacture and maintenance construction and was committed to providing support so that systematic safety system can be introduced through specialized consulting companies. Consulting is expected to be conducted in business sites in Yeosu and Ulsan where partner companies are located from October. Consulting is expected to check working environment and safety competence of pertinent companies, install guidelines and related systems and provide customized solutions. In detail, plans were made to establish a list by possible accident, reorganize working manual and introduce working procedures befitting work characteristics and procedures for equipment operation in order to cut off all the sources of possible accidents. Chang-beom Kim, CEO of Hanwha Chemical, said, "As safety determines corporate survival, management needs to be emphasized more than anything else, but it is not that easy in reality from the perspectives of partners. It is necessary to pay attention to partners' safety as well in order to go farther along with them."

Participating partners were mostly long-term customers, and Hanwha Chemical selected excellent partners among them before rewarding them. In addition, it decided to listen to difficulties facing partners, develop new programs on shared growth that reflect opinions in the field and conduct monitoring on a continual basis.

In the meantime, Hanwha Chemical has pushes for diversified support for the purpose of improving financial states aimed at shared growth along with partners, enhancing payment conditions and realizing cooperation in technological development.

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RC Activity

Operation of the 1st RC Advisory Council in 2015

KRRC pursued to offer advice on techniques to investigation into accidents occurring in companies such as multi-national companies in Hanwha Chemical Yeosu on October 12, 2015. Four persons including Environmental Safety Manager and Safety Personnel in Hanwha Chemical took part, and Han-gi Kim (DNV-GL) introduced accident investigation techniques used in multi-national companies. Since 2013, RC Advisory Council has endeavored to resolve member companies' complaints about environment, safety and healthcare areas.

The 2nd Executive Council in 2015

With 12 persons including In Park, Executive Council Chair (Managing Director of LG Chemical), on hand, KRCC held the 2nd Executive Council Meeting on July 29, 2015 (Wed). During the meeting, discussions were conducted to examine the current state of RC checklists, review on checklists (draft) of labor safety and healthcare code and direction of implementation in the future. The 3rd Executive Council Meeting was held on December 9 (Wed).

'2015 Open! An Exciting Chemical World'

KRCC held '2015 Open! An Exciting Chemical World' in Ulsan (Sept. 5), Seosan (Sept. 12) and Yeosu (Sept. 19) for the purpose of establishing a network where participants are given an opportunity to enjoy easy and fun chemical experiences and local communities cooperate with the chemical industry.

○ Participating institutions

Industries (24 KRCC member companies)

Platinum : Lotte Chemical, SK Global Chemical, LG Chemical, Yeocheon NCC, Hanwha Chemical & Hanwha Total
Gold : Kumho Petrochemical, Daerim, Korea Petrochemical Ind., Tongsuh Petrochemical Corp. Dongwoo Fine-Chem, Lanxess Korea, Samsung SDI, Dow Chemical Korea, BASF Korea
Silver : Kumho Mitsui Chemial, Kumho Polychem, Samnam Petrochemical, Evonik Korea, Air Liquide Korea, LGMMA, ISU Chemical, KOLON Industries & Trinseo Korea

Government / Institutioncompanies

Ministry of Trade, Industry and Energy/
Ministry of Environment
Jeonnam Yeosu City Hall/
Chungnam Seosan City Hall
Ulsan Metropolitan City Education Office/
Jeollanam-do Education Office/
Chungnam Seosan Education Support Office/KPIA

Academia (Teachers' Associations in 3 areas)

Chungnam Area
(Seosan Science Information Education Enhancement Support Division)
Ulsan Area
(Ulsan Science & Education Research Society)
Jeonnam Area
(A Gathering of Chemical Lovers)

'2015 Open! An Exciting Chemical World' was successfully held amid much interest in Yeosu, Ulsan and Seosan with 1,000 students from 200 elementary schools on hand. The event entered the 13th year, and it enabled many to develop interest in experiencing chemistry in everyday life on the back of experience programs for chemical experiments, a science play court and chemical industry promotion booths so that they can grow into leaders in the chemical industry in the future.

2015 Petrochemical Safety Seminar

With 50 persons including environment employees with member companies on hand, KRCC (organized by KPIA) held 2015 Petrochemical Safety Seminar in KOCHARM on October 22, 2015 (Thur). The seminar aimed to alert people to the latest safety accidents and take measures to prevent critical accidents in business sites announced ①the direction of policy on high-pressure gas safety management in 2016, ②human-based safety management (PBS) and ③advanced global companies' safety management.

2015 RC Annual Workshop

KRCC held 2015 RC Annual Workshop in Maison Glad Jeju Hotel from November 12 (Thur.) to November 13 (Fri.), 2015. The annual workshop was attended by 50 persons including Jong-hu Lee, President of KRCC, Beom-sik Chung, Honorary President of KRCC, Jong-pil Heo, Honorary President, Ju-hee Han, Honorary President, Woo-seon Shin, President of BASF Korea, Jung-jae Choi, Taegwang Industry, and Je-woong Goh, Lanxess Korea. During the seminar, Jeong-taek Im, Advisor (Former Vice President of KRCC), gave a special lecture, outside lectures (a like-minded healing camp) were offered and case studies were presented with regard to ①Establishment of

NEWS

RC Activity

response system for chemical management by LG Chemical, ②BASF Korea logistics partner selection & evaluation process and ③BASF Korea waste water risk assessment.

Participation in 2015 RCLG Meeting

In the latter half of 2015, RCLG Meeting was held in Cape Town in South Africa from October 20 (Tue.) to October 21 (Wed.). The meeting was attended by 28 RC member companies to discuss on important RC issues and methods of implementation. Contents of the 4th ICCM meeting and the current state of implementation of Process Safety Metric were discussed to help major member countries share RC implementation cases.

Participation in 2015 APRO Meeting

2015 APRO(Asia Pacific RC Organization) Meeting was held in Manila, the Philippines, on November 4, 2015 (Wed). The meeting was attended by 20 persons from 8 countries in Asia, and Asian member countries share their opinions on major RC issues. Main contents include results of RCLG and ICCA meetings in the latter half of 2015, the current state of implementation of Process Safety Metric and the next venue of APRCC.

Participation in 2015 APRCC

2015 APRCC (Asia Pacific Responsible Care Conference) was held in SMX Convention Center in Manila, the Philippines, for two days from November 5 (Wed) to November 7 (Fri) in 2015. The meeting was attended by 150 persons from 12 member countries in Asia Pacific Area. On the first day, an opening speech and a congratulatory remark were given, and diversified presentations and panel session were conducted through 7 sessions for two days with regard to objectives of RC, the current state of RC implementation, product life-cycle care, safe transport, awareness in local communities, process safety and safety and health codes. In addition, a process safety workshop was separately held on November 7, (Sat.) to enable working-level staff members to conduct exchanges with one another.

Key Events of the KRCC in the first half of 2016

- The 1st Borad of Directors' Meeting and the 17th Regular General Meeting in 2016
  Date: 11:00-13:00 on Jan. 27, 2016
  Place: Orchid Room (2nd floor) in Western Chosun Hotel
- 2016 Responsible Care Leadership Group (RCLG) Meeting
  Date: Apr. 27, 2015 – Apr. 28, 2015
  Place: Miami in the U.S.
- The 1st Executive Committee Meeting in 2016
  Date: Apr. 2015
  Place: Conference Room in the council building
- 2016 Petrochemical Environmental Policy Seminar
  Date: May 2015
  Place: KCCI
- 2016 Seminar on Safety Management of Chemicals
  Date: June 2015
  Place: Manila, Philippines

Members

Regular Members

Aekyung Petrochemical
Air Liquide Korea
AkzoNobel PPC Korea
Arkema
ASK Chemicals Korea
Axalta Coating Systems Korea
Capro
Connell Bros. Co., Ltd.
Daelim
Daesung Industrial Gasses Co., Ltd.
Dongwoo Fine-Chem
DuPont Korea
Eastman Fibers Korea
Evonik Korea Ltd.
GS Caltex
Hanju Co., LTD.
Hansu
Hanwha Chemical
Hanwha Fine Chemical
Hanwha Group
Hanwha Total
Hyosung
Isu Chemical
Kolon Industry
Korea Alcohol Industrial Co., Ltd.
Korea BASF
Korea DowCorning
Korea Petrochemical IND. Co., Ltd.
Korea Styrolution
KPX Chemical
KR Copolymer Co., Ltd.
Kumho Mitsui Chemical
Kumho P&B Chemicals., INC
Kumho Petrochemical
Kumho Polychem
LANXESS Korea
LG Chem
LGMMA
Lotte Chemical
Lotte MRC
Merck Bayer Korea
OCI
PolyMirae Dow Chemical
Samnam Petrochemical
Samsung BP Chemicals CO., LTD.
Samsung Fine Chemicals
Samsung SDI
SH Energy & Chemical
SK Global Chemical
SKC
Taekwang
Tongsuh Petrochemical Corp., LTD.
Trinseo Korea
Yeocheon NCC
Yongsan Chemicals

Associate Members

Korea Chemicals Management Association
Korea Chlor Alkali Industry Association
Korea Fertilizer Industry Association
Korea Petroleum Association
Korea Petroleum Industry Association
Korea Specialty Chemical Industry Association
Korea Testing & Research Institute
Metropolitan Area Process Safety Management Association

Information on the 1st Board of Directors' Meeting and the 17th Regular General Meeting in 2016

Since the **1st Board of Directors' Meeting and the 17th Regular General Meeting in 2016** are expected to be held as follows to report outcome of KRCC projects in 2015 as well as a business plan and budget (draft) for 2016 before discussion, make sure to visit the meeting and offer valuable advice for the purpose of successful pursuit of Responsible Care to be fulfilled by the chemical industry.

Time : 11:00~13:00 on January 27, 2016
Venue: Orchid Room (2nd Fl.) in Western Chosun Hotel
Invitees: Executives and employees of member companies and coordinators

Detailed scheduled programs will be announced in the near future. Thank you in advance for your support and participation.