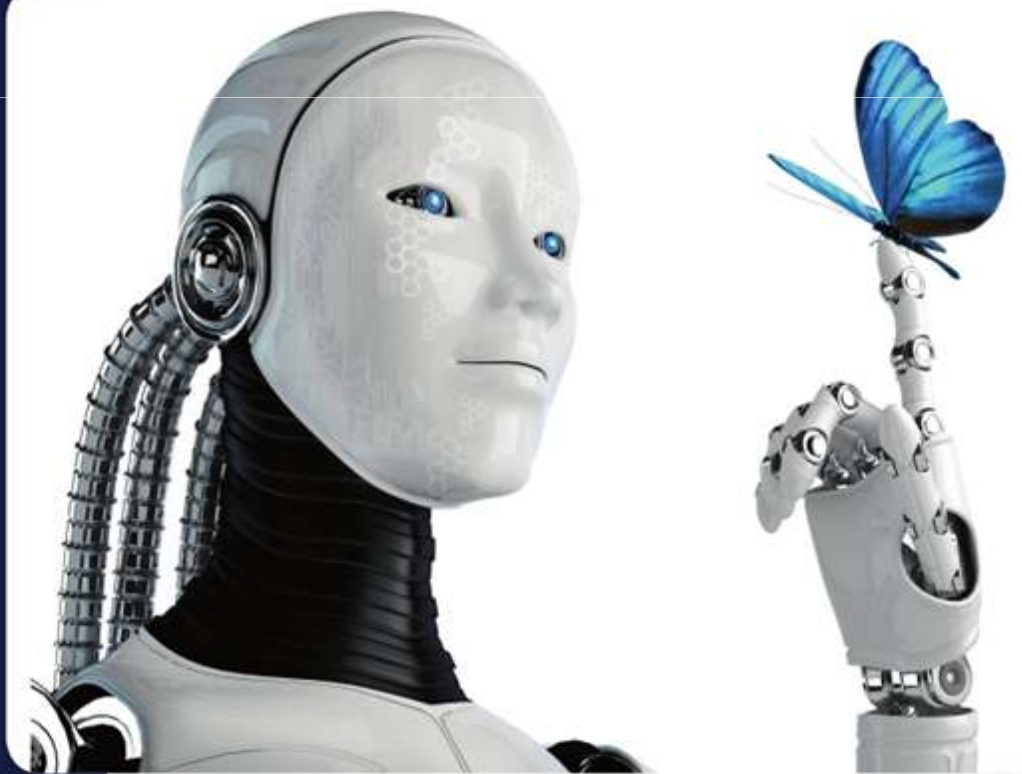


# Newsletter November, 2017



# ICR



## Hot issue

- ISO 45001 Occupational health & safety management system
- OHSMS Certification status
- Cooperation plan between KAB and Korea, Korea Occupational Safety & Health Agency
- Development trends to electric vehicle in the automobile industry and regulatory policy in each country
- How closely has it been reached? Shield material that can prevent North Korea's EMP attack



# ISO 45001 Occupational health & safety management system



## ■ ISO 45001

- OHSAS 18001:2007 Occupational health & safety management system is revised, as a result ISO 45001 standard is going to be published soon.
- The development schedule of ISO 45001 is same as followings.

Proposal	Preparation	Committee draft(CD)	2 <sup>nd</sup> committee draft(CD)	Draft(DIS)	2 <sup>nd</sup> draft(DIS)	Final draft(FDIS)	Expected publish date
Mar. 2013	Nov. 2013	Mar. 2015	July 2015	Nov. 2015	May 2017	Nov. 2017	Mar. 2018

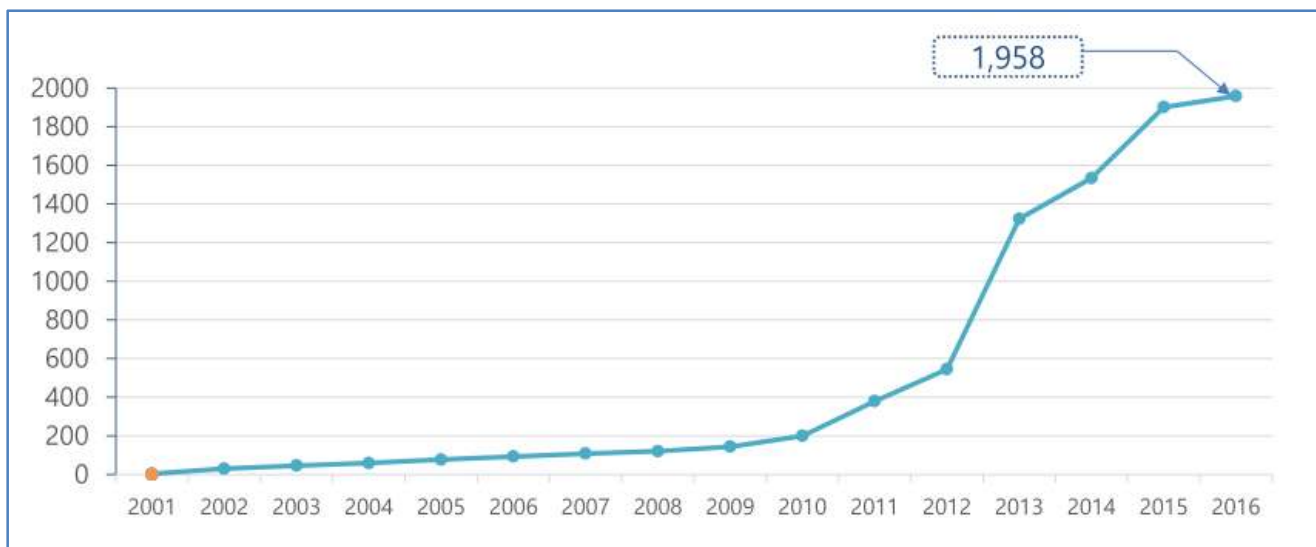
# OHSMS



# Certification status [1]

## ■ OHSMS Certification status

- OHSMS was applied in Apr. 2002 in Korea. So far, 1958 certificates are issued through KAB, and 1876 certificates are issued though foreign accreditation body.



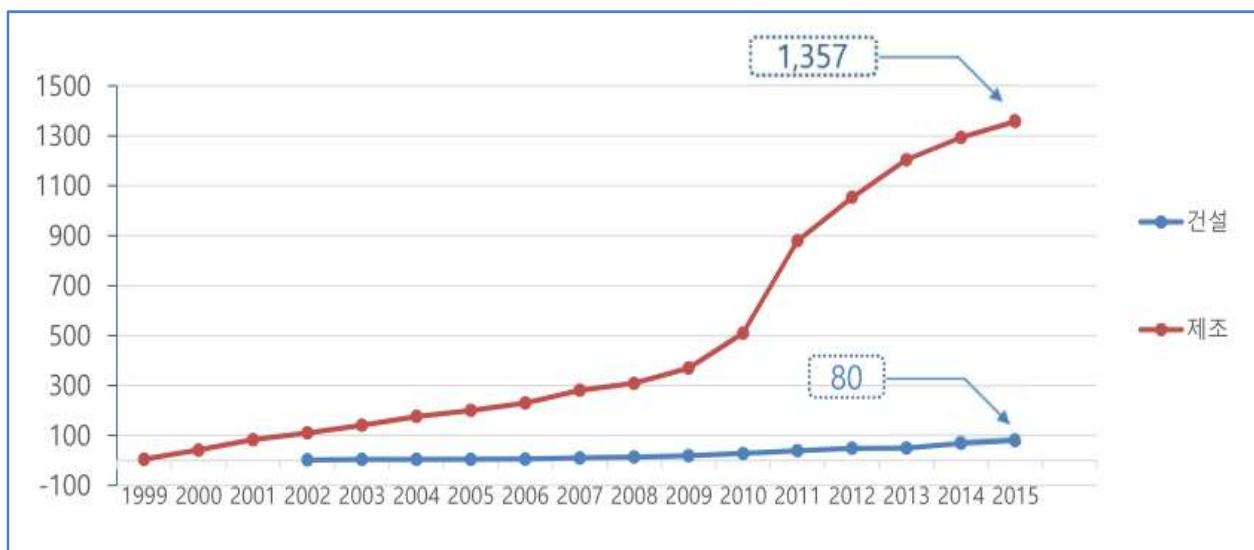
# OHSMS

## Certification status [2]



### ■ OHSMS Certification status

- In Korea, Korea Occupational Safety & Health Agency is issuing KOSHA 18001 certificates since June 1999. So far, 1359 certificates are issued.



# Cooperation plan between KAB and Korea, Korea Occupational Safety & Health Agency





# Development trends to electric vehicle in the automobile industry and regulatory policy in each country [1]



## ■ Development and distribution status of electric vehicles by major companies

### ■ TESLA

Model 3 is a comparison of Tesla's other models, which concentrated on manufacturing existing high class electric vehicles. it is expected to expansion of electric vehicle supply with low price and excellent performance

### ■ GM

Focusing on manufacturing model Bolt EV  
Focusing on a subsequent brand Chevrole's electronic mobile Bolt EV and these model has been under production since Oct. 2016

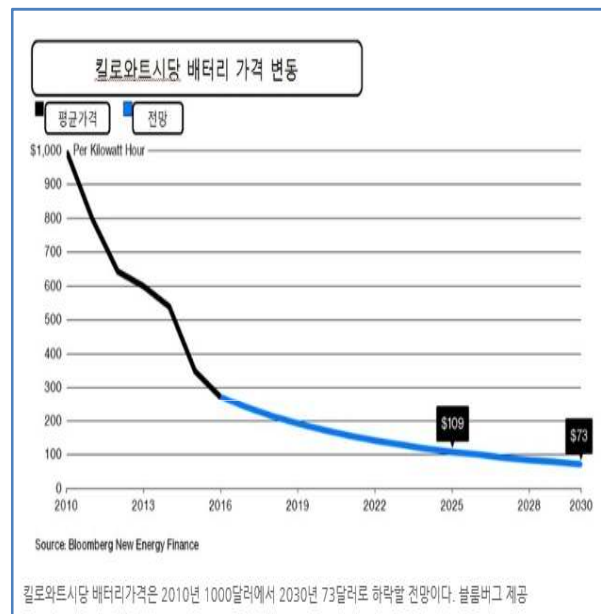
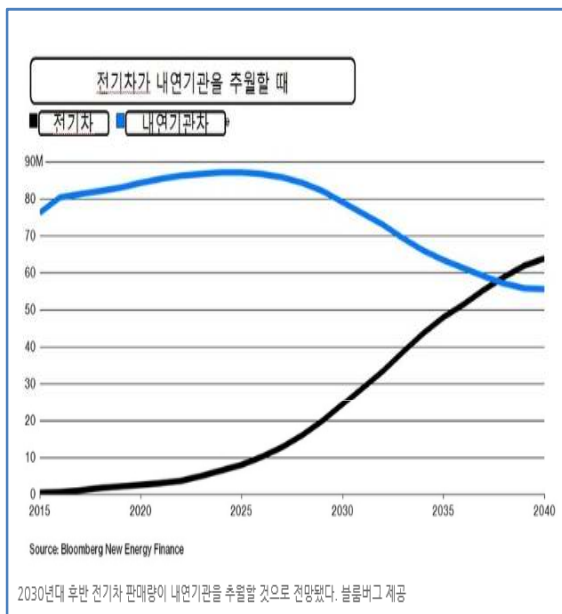
### ■ Nissan

Nissan has an strategy of improving the qauality of products, such as improving the possible driving distances.(2017 model can drive 107miles=171km from one charge.) in response to decline in salse

# Development trends to electric vehicle in the automobile industry and regulatory policy in each country [2]



## Development and distribution status of electric vehicles by major companies



❖ According to the consulting research institution BNEF analysis, the third largest costs spent on manufacturing automobile is battery. (if the battery price declines, the demand for electronic car increases.)



# Development trends to electric vehicle in the automobile industry and regulatory policy in each country [3]



## ■ Development and distribution status of electric vehicles by major companies

### ■ LG Chemistry (Battery Company)

Recent supplier -> Delivering to Hyundai sonata, GM Bolt, ZOE

Production line added territory -> Poland Wrocław (Order a 3th electric vehicle)

### ■ Samsung SDI

Recently released a plan of constructing a production line in Hungary Göd which is capable of producing batteries for 50,000 devices annually

순위	제조사명	2016.1~5	2017.1~5	성장률	점유율 2017	점유율 2016
1	Panasonic	2,423.2	3,420.6	41.2%	29.7%	23.7%
2	LGC	604.4	1,526.7	152.6%	13.2%	5.9%
3	BYD	1,322.4	934.3	-29.3%	8.1%	12.9%
4	CATL	1,061.6	859.3	-19.1%	7.5%	10.4%
5	SDI	441.5	791.0	79.2%	6.9%	4.3%
6	AESC	799.2	735.4	-8.0%	6.4%	7.8%
7	PEVE	697.4	735.2	5.4%	6.4%	6.8%
8	Farasis	0.3	435.8	142304.2%	3.8%	0.0%
9	BAK	126.1	249.0	97.4%	2.2%	1.2%
10	Coslight	16.2	249.0	1432.9%	2.2%	0.2%
OTHERS		2,747.3	1,589.7	-42.1%	13.8%	26.8%
합계		10,239.6	11,525.9	12.6%	100.0%	100.0%

(SNE리서치 2017년 7월)

# Development trends to electric vehicle in the automobile industry and regulatory policy in each country [4]



## ■ Oversea regulation policy(sales forcing)

### ■ Fuel economy regulation

CAFE(Corporate Average Fuel Economy)

Standards In USA, all the finished vehicles have a duty to be achieving criteria fuel efficiency by weighted average of surface area of sold vehicle

In 2016 years, 34.1mile/gallon(MPG),

in 2025 year, If below the criteria fuel efficiency, fined amount of sold vehicles fuel efficiency differences\*55dollar.

Credits provided for over achievement. credit can be detered, saved, tradable.

### ■ CO2 Emission regulation

Based on the Clean Air Act of the US

Environmental Protection Agency (EPA) • Average of 250 g / mile in 2016, 163 g / mile.

Note: Sonata petrol 235.0 g / mile, Sonata PHEV 46.7 g / mile, Ionic (EV) 0g / mile

# Development trends to electric vehicle in the automobile industry and regulatory policy in each country [5]



## ■ Oversea regulation policy(sales forcing)

### ■ Emission gas regulation

Carbon monoxide, nitrogen oxides, non-methane organic gases, formaldehyde, etc.

Only registered vehicles can be registered

### ■ Sales quota

11 states, including California at USA, enact the Zero Emission Vehicle (ZEV) Act Sales of EVs, PHEVs and hydrogen-fueled vehicles to 2.0% or more from 2018 Imposition of fine for

### ■ Emission gas regulation

EURO 6 (European Emission Standard)

Regulation of emissions from EURO1 in 1992

Carbon monoxide, total hydrocarbons, non-methane hydrocarbons, nitrogen oxides, soot particles, etc.

Must be complied with in Europe

# Development trends to electric vehicle in the automobile industry and regulatory policy in each country [6]



## ■ Oversea regulation policy(sales forcing)

### ■ CO2 Emission regulation

The excess of the average CO2 emissions of newly registered vehicles is multiplied by the number of vehicles, Progressively applied from 5 to 95 euros (Plan to charge 95 euros uniformly from 2019)

In 2015, the average CO2 emissions of the car makers are 119.3g / km, which is 130g / km Some credit (95g / km in 2021)

Super Credit: 2 cars are accepted as less than 50g / km Electric cars are given incentives CO2 emissions per kilometer will eventually be indirect It also acts as fuel cost regulation

### ■ Fuel economy regulation (Europe)

26.5Km/l at 2020 years.

# Development trends to electric vehicle in the automobile industry and regulatory policy in each country [7]



## ■ Trends a electric vehicle

- If below the criteria fuel efficiency, fined amount of sold vehicles  
\*fuel efficiency differences\*55dollar. Credits provided for over achievement. credit can be detered, saved, tradable.
- From the view of korea automobile company, in long term, they have to put in there large portion of effort on developing specialized electronic car's components such as Electric motor, Lithium Ion batter, controller.
- Hyundai and Kia motors are planning to expand their PHEV and EV cars to 8 and 6 respectively from current 6

# How closely has it been reached? Shield material that can prevent North Korea's EMP attack [1]

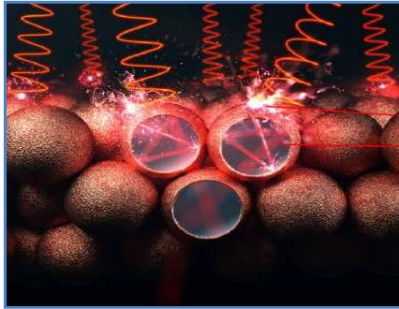


North Korea announced that it decides a hydrogen bomb at high altitude, transmits high power electromagnetic waves (EMP), and is going to attack- Black Bolt.com offers

We will live together with dozens of electronic devices until we fall asleep in the morning, and the electro magnetic waves that are generated at this time are favorable It has become a coexistence with mankind. The fear of electromagnetic waves has changed. Recently six nuclear arms advanced EMP 'may be attacked.

In the movie "Matrix", EMP appeared as a powerful method of attacking machine guns "Centennial" at once EMP causes electronic equipment to be damaged by strong electromagnetic waves. For example, when a high voltage of 500 V is applied to a device using 220 V, It is the same principle as the one in which the circuit can not write anything else, Communication facilities are destroyed, and the financial network becomes paralyzed Can be confused.

# How closely has it been reached? Shield material that can prevent North Korea's EMP attack [2]



A state of the electromagnetic wave shielding material developed by the Korea Science and Technology Research Institute (Hokkaido University) The electric conductivity was enhanced by placing a hollow ball coated with copper in the polymer "polycaprolactone." - provided by KIST

Scientists are studying ways to neutralize EMP attacks diverting electromagnetic waves. There are two main methods of protection. It is a material that reflects electromagnetic waves, coating circuits etc Protect the space with the main communication facilities with the way to protect the electronic equipment itself It is a method of making a shielding room.

The former Jong min Korea Institute of Science and Technology (KIST) Research Center for Materials Structure Control Research Researchers is a researcher representing Korea who studies shielding materials. Various materials that can prevent electromagnetic waves by 99.9% We are developing.

The old researcher said, "The higher the electrical conductivity, the more current is scattered to the outside, the next As the effect of the lungs increases, existing circles and metals such as copper were utilized as shielding materials.



# How closely has it been reached? Shield material that can prevent North Korea's EMP attack [3]



However, on the substrate of the microelectronic device For writing, it is relatively heavy and it is difficult to process, so there is a limit to using it for future electronic equipment. "Researchers introduced the new material "MXene" in September last year to the international scientific journal "Science" is not a metal, but also a polymeric substance Excellent electrical conductivity

The new material "MXene", which researchers introduced in September last year to the international journal " Saiens", is not metal, but has excellent electrical conductivity for polymeric materials. The thickness of 1 nm (nanomaterials), The thickness of 1 nm (nanomaterials, 1 nm is 1 billionths of a meter) The shielding film with a thickness of 1m (1m for 1m) showed the shielding performance of metal only.

Polycaprolactone, a polymer hollow spherical body, has recently been developed, and the surface of the hollow sphere is coated with copper and then injected into the polymer, resulting in electrical conductivity.

When an electromagnetic wave approaches the material, it is reflected from the surface by the copper coated with the ball, and the electromagnetic wave that has not been reflected but walks through the sphere is lost to heat loss. This research was published on September 21 in the international journal "Nanoscale".

# How closely has it been reached? Shield material that can prevent North Korea's EMP attack [4]



The researcher, Lee Seung-hwan, KIST researcher, said, "As for the matrix and the polycaprolactone complex, all the processing can be easily dispersed as a spe- cle and the semiconductor substrate can be easily processed by chipping. It is possible to solve the malfunctions caused by the electromagnetic interference in the latest electronic equipment in which components are highly integrated, as well as attacks.

Protection law that puts the equipment of the main communication equipment inside a special space with electromagnetic wave shielding ability. Currently I place a special shielded room in the building. It is to weld the steel plate tightly and to make a hexahedral space which can not enter or leave any electromagnetic waves.

# How closely has it been reached? Shield material that can prevent North Korea's EMP attack [5]



This method has a problem that another space is separately prepared in the building. The Korea Construction and Technology Research Institute (construction year) started research to give shielding performance to building materials themselves in order to solve such inefficiency. Building the building as a specially developed shielding material so that the entire building will not suffer electromagnetic wave damage without additional equipment.

Researchers focused on concrete used for most domestic buildings. General Reinforced Concrete has no electric conductivity and does not reflect electromagnetic waves.

Structural Integration Research Institute Structural Research Institute, Structural Integration Research Institute, Gim Sung-Uke Construction Co., said, "EMP protection requires unique research as it is impossible for national security issues and technical exchanges between countries," he says, "Building materials for high-output electromagnetic wave protection The research will be started in earnest next year, We will be able to increase protection efficiency by applying it to major information and communication infrastructure in the future.

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Address :3611, Hagun-ri, Yangchon-eup, Gimpo-si,  
Gyeonggi-do , South Korea (10048)

Company Id No : 110111-243147  
Tax & VAT Id No : 105-86-35114

Tel : (+82)2-6351-9001~6 / Fax : (+82)2-6351-9007  
Home page : [www.icrqa.com](http://www.icrqa.com)