azbil

2016 Vol.3
azbil Group PR magazine

azbil FIELD

Aichi Forging Company of Asia, Inc.

azbil MIND

Devoting every moment to innovative quality improvement, our aim is to achieve an even higher level of customer satisfaction.

Special Feature
Fantastic World of ORIGAMI

Special Feature

Fantastic World of ORIGAMI

Out of a sheet of paper, a variety of forms and structures can emerge before your eyes. This is **origami**, *the time-honored art of paper folding. Known to the world by its original Japanese name, origami has undergone a fantastic evolution. Its fans today are surprised to see a variety of works created through complicated techniques and unique expressive forms. Some techniques and the resulting structures are today applied in the manufacturing industry as well as in space engineering. A flapping paper crane, an elementary and typical origami, has now flown high in the world of art and science. Makoto Yamaguchi, an origami artist and the Secretary of Japan Origami Academic Society (JOAS) told Azbil how origami fascinates people, young and old, male and female, by tracking its course of evolution.*

Joy of Creation and Pursuit of the Utmost Origami Knows No National Borders

For ordinary Japanese, origami brings back happy childhood memories of playing with sheets of colored paper, making boxes, dolls, cranes, airplanes and so forth. Yet origami has surprisingly evolved from the world of fun to the world of modern art and science.

Yamaguchi, a well-known origami artist and the Secretary of JOAS says, “The Japanese term origami has won citizenship in international society. There are so many origami enthusiasts all over the world today. Some Japanese, who teach origami to people from abroad, are surprised to see that their pupils are much better at origami art. The world of origami knows no national boundaries. It’s open to everybody. While some works are so complicated that only fanatics can achieve them, others are for practical use or for kids to enjoy simple paper folding. “Origami is for anyone, anywhere... anytime!” as the late Michael Shall, one of the co-founders of the present OrigamiUSA declared. Young and old, male and female, skillful or not, you can enjoy origami so long as you have a sheet of paper at hand.”

Makoto Yamaguchi

Origami artist and the Secretary of Japan Origami Academic Society
Founder of Origami House
Lifetime member of OrigamiUSA
Honorary member of Korea Origami Association

Once you have learnt to fold paper to create the shapes you have imagined, you want to share your new creation with somebody. Here, communication begins with the people around you. Even overcoming the language barrier, you can communicate by hand the joy of origami and knack of paper folding you have figured out yourself. This is why origami knows no national borders.

Focus upon a Sheet of Square Paper— Self-Imposed Limit Leads to Evolution

It is not known for certain when origami started in Japan. Yet historians claim that origami was practiced back in the 10th century. More recently, an encyclopedia published during the end of the Edo period(1603-1867), explains how to fold paper and craft birds, plants, dolls. When you read Japanese classic literature and folklore, you will notice glue and cuts were used in some origami crafts.

Yamaguchi continues, “There are no rules in the art of origami. You can transform a sheet of square paper into an artwork without any cuts. It’s OK to link at least two parts for your craft. Both are traditional, authentic ways of origami art. What to use or not to use, it’s you who decide. Yes, you are the rules committee. However, I tell you this. Your joy of origami will be greater when you have managed to complete your work after stretching your creative imagination to the full within the self-imposed limit of what to use. Complicated and elaborate ‘complex origami’ evolves through such challenges of ingenuity and techniques.”

Ryu jin (Eastern dragon), photographed herein, is an example of complex origami. Some two square-meter paper is being used to fold down over 1,200 pieces of dragon scales. To achieve complex origami, you need a mathematical background and mind-set, precision, concentration, artistic talent and the like. It is this profoundness of origami that has captivated the hearts of enthusiasts all over the world.

龍神 Ryu jin

(Eastern dragon) by Satoshi Kamiya

Interacting with Overseas Fans and Fostering Young Artists Applications to the Manufacturing Industry Accelerated

Over 30 countries house origami-related organizations, including Japan and the United States. Cultural exchanges are active among them. Yamaguchi attends overseas conventions every year. In addition to these “hand to hand” communication stages, the Internet has provided a new medium through which to increase the next generation of origami lovers worldwide.

Yamaguchi says, “Even in countries and regions where books on origami are not easily available, videos of origami and crafting can be directly accessed on the Internet. Thanks to its wider use, the environment surrounding origami has changed dramatically.”

For those foreign origami lovers, Japan is a land they long to visit. Although there are many excellent origami artists overseas, here in Japan, there are a large number of origami fans and many young Japanese artists are engaged in complex origami. Japan has a long history of origami culture and JOAS’s Yamaguchi and other veteran artists have been making strenuous efforts to foster young artists. JOAS regularly holds origami contests and offers opportunities to present their works in the organization magazine. Furthermore, he founded the International Collegiate Origami Association by networking origami clubs at universities and colleges. He is a supporter of young artists and aspirants in their exchange events.

Origami is a fun way to use the hands and the brain. When you are moving your fingers to fold paper, you are also thinking how to fold it for your imagined work and trying to remember how. This brain activation effect has attracted professional attention. Origami has been employed in medical care and welfare for physical and mental health rehabilitation services.

The story goes further. Research is being conducted to apply origami art in the field of manufacturing. A decorative origami for Japan’s traditional star festival gave a clue to the development of honeycomb cores, shock absorbing material with a honeycomb structure. Up in space, solar panel arrays for satellites have adopted the Miura map fold, that is, an origami-originated technique of folding a flat surface into a small area or vice versa with one simple motion.

According to Yamaguchi, “Most Japanese people had the opportunity to play with origami as children, but few are aware that origami has produced such a variety of formative works in many fields, and its applications are being accelerated.” He went on to say, “Whilst I widely disseminate the success of origami, I will continue to foster young artists. The young are the ones to evolve this fantastic art form and pass it on to the next generation.”

Folding a sheet of paper gives unexpected forms to our creative imagination. It is origami. We should pay attention to this fantastic world of origami, which brings various opportunities into being.

The cooperation of Gallery Origamihouse is appreciated for the story and photos.

Aichi Forging Company of Asia, Inc.

Aichi Forging Company of Asia, Inc. is an Aichi Steel Group company production base in the Philippines which provides the automotive industry with transmission-related forged parts. In order to reduce the cost of electricity while making use of existing equipment, the company turned its attention to compressor operation. By controlling the number of compressors running, it optimized compressor use and successfully reduced the power consumed by the air supply for the production line.

Compressor Operation as a Key to Reducing Electricity Costs

Aichi Steel Corporation was established in 1940. Formerly, it was a department of Toyota Automatic Loom Works Ltd. (the present Toyota Industries Corporation), which was in charge of the research and manufacture of specialty steel for domestically produced cars. Today, Aichi Steel Corporation provides various kinds of products, particularly forged parts, whose raw materials include varieties of specialty steel, such as nickel chrome and stainless steel and titanium alloy, in order to meet a wide range of needs, from the automotive industry to industrial machines, electronics, construction, and even the pharmaceutical and agricultural industries. Particularly in recent years, the company has been vigorously expanding its affiliate companies operating as production and sales bases in such regions as North America, Europe, the ASEAN area, and elsewhere in East Asia, establishing a global production system to strengthen its competitiveness in the international market, while focusing also on optimizing its supply chain.

Aichi Forging has the longest history of any Aichi Steel Group overseas production base. The company was established in 1995 when Toyota Motor Corporation expanded to the Philippines. The production factory operates day and night to forge parts for automobile transmissions, supplying them to Toyota and other Japanese automotive manufacturers' overseas production bases in Thailand and Indonesia.

"The power infrastructure in the Philippines has high rates compared to other ASEAN nations. Finding a way to reduce the cost of energy at the factory was one of the company's important challenges for a long time. Compressors, in particular, were a focus of our attention since they create the air for various metalworking machines used in different processes such as pressing. How to make their operation more efficient and cut power consumption was a big problem," says Hiroki Morishima, Aichi Forging's Executive Vice President for Marketing.

To reduce energy use, Aichi Forging had taken measures not to operate all of its six compressors 24 hours a day under normal circumstances. Previously, when production quantity increased and consequently air pressure to the production line dropped, an alarm sounded. When they heard the alarm, operators would head out to the utility building and start the necessary number of additional compressors. Compressors were also stopped manually when they were no longer needed.

"Adjusting the air supply manually to meet the need of the production line is difficult. However, if the compressors are put in automatic operation mode they can unload, which leaves the motor running even though the compressor is not supplying air. As a result, the energy driving the compressors sometimes didn't match the load at the production line. Additionally, we did not have enough information on the amount of air being used in the factory and the power being consumed by the compressors, which made it even more difficult for us to control the air supply properly," says Maintenance Department Manager Jaime N. Fajardo.

Azbil's Energy-Efficiency Achievements in Japan Lead to Selection of Its Proposal

To address its concerns regarding compressor operation, Aichi Forging accepted a proposal from Azbil Philippines Corporation to use Azbil's compressor optimization control solution, ENEOPT™comp.

"At first, we were thinking about replacing aging compressors with new and more efficient ones. However, Azbil's proposal was to use the existing units and more efficiently control the number of compressors running in order to achieve optimal power consumption. In this way, we thought, we could take energy-saving measures with a minimal investment. Because we knew that in Japan, one of Aichi Steel Corporation's factories had introduced ENEOPTcomp and increased its energy efficiency, we accepted Azbil's proposal without question," explains Mr. Morishima.

The company decided in December of 2014 to introduce ENEOPTcomp, and construction started in March 2015. It was completed in the following month, and operation began in that same month.

"All of our six compressors were introduced a long time ago, and we did not have enough material about their specs. However, thanks to support from Azbil, we were able to figure out the specifications for each of the different types of compressor, and we then incorporated them into Harmonas-DEO™, the central monitoring and control system for ENEOPTcomp," says Frank Niel F. Fajilan, Facilities Staff Engineer.

Harmonas-DEO system, which is installed in the central monitoring room, monitors the consumption and pressure of air supplied by compressors to the production line. On this basis it controls the number of compressors operating.

1 Compressed air from the compressors is stored in an air tank which supplies the necessary amount of air to the production line. Bravolight™, a pressure sensor, has been installed to monitor the air tank for the first time. Harmonas-DEO works to start the necessary number of compressors to supplement the air supply when the pressure sensor detects increased air use on the production line, which causes pressure in the air tank to drop.

2 The utility building has a total of six compressors. The number actually running is controlled by Harmonas-DEO. Before ENEOPTcomp was installed, operators would come to this building to manually start the necessary number of compressors.

Optimized Operation and 10 % Cut In Power Consumption by Controlling the Number of Operating Compressors

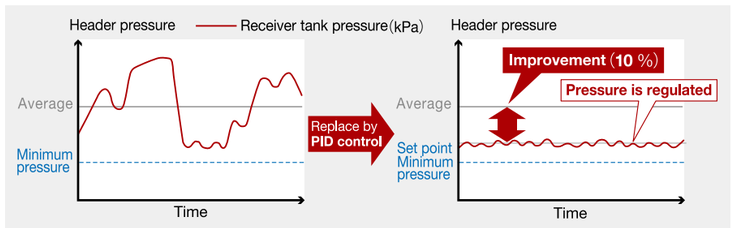
After introducing ENEOPTcomp, the company now operates the three compressors that deliver better efficiency, and Harmonas-DEO controls the starting and stopping of the other three according to the need for air. It has achieved optimized operation that responds to the requirements of the production line in real time while thoroughly eliminating unnecessary power consumption by the compressors.

"These efforts have brought about a 10 % reduction in power consumption per month. They have also reduced operators' workload at the production line, since monitoring of compressors and manual starting and stopping of the equipment is no longer needed. In addition, with Harmonas-DEO, we can track trends in air use, accumulate data, and visualize such trends over the long term, which we believe will be helpful in creating future energy-saving measures," explains Mr. Fajardo.

The Harmonas-DEO system operating at Aichi Forging now collects data on air consumption and air pressure. The company is thinking about using it also to gather data on power consumption by the compressors in order to optimize energy use by better control of the balance between the amount of electricity and the amount of air used.

"In Phase 2 we will further advance our energy-efficiency efforts by controlling supply air pressure and moving into other areas, such as control of the three cooling towers that supply cool water to the production line," says Lord Nero F. Gazo, Electrical Maintenance Staff.

"In taking these further measures, we will be counting on Azbil's support. We very much look forward to Azbil's proposals for energy-saving measures based upon the high level of know-how that can only be offered by Azbil," says Mr. Morishima.



A comparison of air tank air pressure trends before (left) and after (right) introducing ENEOPTcomp. Afterwards, compared to the period of manual operation, the stabilization of pressure and elimination of excessive pressure rises can be observed.

Aichi Forging Company of Asia, Inc.

Location
Barrio. Pulong Santa Cruz, Santa Rosa, Laguna 4026, Philippines

Founded
January 19, 1995

Business area
Manufacture and sale of forged components

Hiroki Morishima
Executive Vice President for Marketing

Jaime N. Fajardo
Manager
Maintenance Department

Lord Nero F. Gazo
Electrical Maintenance Staff
Maintenance Department

Frank Niel F. Fajilan
Facilities Staff Engineer
Maintenance Department

azbil MIND vol.23

Devoting every moment to innovative quality improvement, our aim is to achieve an even higher level of customer satisfaction.

The azbil Group considers the quality of its products and services to be vital to its future, and endeavors to increase customer satisfaction by implementing continuing quality improvement, which is led by the azbil Group Quality Assurance Department.

With a New Organizational Structure, the Whole Group Strives for Quality Improvement.

The azbil Group develops its businesses guided by the pursuit of human-centered automation, in order to achieve its mission of helping customers and society to develop sustainably. One of its necessary social responsibilities in the course of its business activity is the provision of quality assurance. The azbil Group products play important roles in buildings, factories, and plants, and it is easy to imagine that a malfunction might have a tremendous impact. Moreover, azbil Group products are in most cases used for a long period of time after installation, so the Group must be highly reliable not only in its products and technology, but also in its maintenance and other services.

Azbil Corporation has been striving for quality improvement for a long time, proactively implementing initiatives such as QC Circles* and acquiring ISO 9001 certification for Fujisawa Technology Center in 1991. Later, to make sure that company-wide quality improvement would extend as well to the expansion of the Life Automation business and of the overseas business, in 2004 Azbil Corporation established the Quality Assurance Headquarters which would play an important quality-boosting role. Beginning in 2009, the Quality Assurance Headquarters worked together with business units to achieve zero-defect processes. It advanced the practice of built-in-quality manufacturing to eliminate variability in products by maintaining optimal conditions in terms of workers, facilities, materials, procedures, and manufacturing environment.

In 2012, the Quality Assurance Headquarters was replaced by the current azbil Group Quality Assurance Department (QAD). The mission of this department is to lead not only Azbil Corporation but the entire Group in quality improvement. Its duties include the overall management of decision-making on quality policy and quality targets, the planning and promotion of quality improvements and measures for enhancing quality assurance systems, auditing of such systems, cross-organizational sharing of quality information, and planning and promotion of quality training.

Review and Evaluation of Business Unit and azbil Group Company QA, and Assistance in Examining Problem-Solving Measures

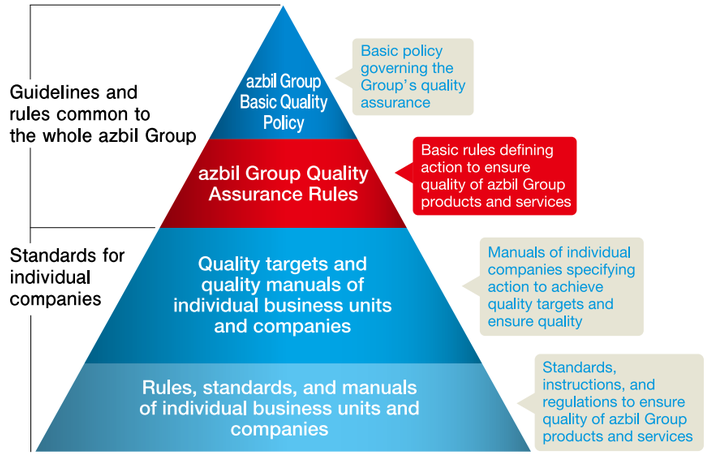
In accordance with the azbil Group Basic Quality Policy, in 2014 the azbil Group formulated the azbil Group Quality Assurance Rules, which define the construction of quality assurance systems for products and services provided to azbil Group customers, as well as the basic points with regard to system operation. These rules have become a bible for azbil Group business units and azbil Group companies when checking and evaluating QA activities. More specifically, two regular meetings, chaired by the member of management who is in charge of quality and served by the azbil Group QAD as the Secretariat, are held to make sure that daily QA activities are being carried out steadily according to these rules. One the meeting which is held monthly and attended by the development, engineering, service, and QA departments. The other meeting is the azbil Group Quality Assurance Committee, which meets twice a year and is attended by representatives of QA departments from azbil Group companies in Japan. This committee checks progress on numerical quality targets set by each azbil Group company or department and examines their activity to identify problems and make adjustments to address them.

Promoting Cross-Organizational Communication to Share Information on Effective Initiatives

Information on effective initiatives and other useful information on quality improvement is increasingly shared across the Group, among azbil Group companies and departments. Previously, information on past problems, or know-how on built-in quality in product design, was stored in various locations within the organization, with the result that this valuable knowledge could not be effectively used. To address the problem, the azbil Group QAD built a "design knowledge data base," which provides integrated management of information and know-how on past problems, etc., for reference during the design phase.

In addition, the azbil Group QAD plays a leading role in quality-related staff training, risk management for the risk of a serious accident caused by a quality problem with a product or service, communication across the Group, and the preparation of systems to deal with such matters.

■ **azbil Group Quality Assurance System**



The azbil Group's Quality Policy

The azbil Group is committed to realizing safety, comfort and fulfillment in people's lives through "human-centered automation," and contributing to the global environment.
Under this philosophy, we consider customer satisfaction as one of management's priority issues and aim to become a "company of superior quality" that provides trusted products and services that respond to the customers' needs and expectations.

To meet our customers' satisfaction,
we will challenge toward Best Quality,
create Best Quality, and continue to provide Best Quality.

April 1, 2012
Hirozumi Sone
President and CEO
Azbil Corporation

QA at Overseas Sales Subsidiaries

While the overseas production subsidiaries in Dalian, China, and Thailand have already implemented the azbil Group's built-in quality manufacturing process, overseas sales subsidiaries are increasingly purchasing products from outside companies through their own channels as their businesses expand. For that reason also, a system for quality evaluation and assurance has become a necessity. In response, the azbil Group QAD instructed overseas sales subsidiaries to conduct self-evaluations of their QA activity in the light of the azbil Group Quality Assurance Rules, and then provided support and training opportunities according to the evaluation results, steadily pressing ahead with quality improvement initiatives. The Group continues to guide every one of its employees to a clear awareness of quality issues, making quality improvement initiatives a part of its corporate culture. In this way "the azbil Group, an enterprise known for quality, will provide even higher customer satisfaction.

* QC Circles are small groups in the workplace who voluntarily make efforts to improve the overall quality and safety of products and service.

Production line at Azbil Production (Thailand) Co., Ltd., where automatic control devices, such as temperature controllers and air conditioning controllers, are manufactured.

Keywords A to Z Vol.9

Keyword Spectral Intensity (SI)

Spectral intensity (SI) is an indicator of earthquake intensity. It quantifies the size of the response by buildings, such as homes and factories, to an earthquake.

Clarification of Correlation with Damage to Homes and Factories and with Seismic Intensity as Measured by the Meteorological Agency

In recent years, earthquakes have caused damage around the world, making people realize the dreadful power of natural disasters.

Today, we use several measures to tell the intensity of earthquakes. Japan has its own seismic scale of zero to seven, which indicates the amount of shaking (shindo) from the earthquake at points on the ground. Another system, the magnitude scale, indicates the amount of energy released by an earthquake. General seismometers measure the acceleration of ground and building motions.

SI is another such measure, and indicates how much an ordinary building will be damaged by an earthquake. Homes, commercial buildings, and factories have a characteristic natural frequency of vibration. The probability of damage is high if vibration continues at this frequency. Using this natural frequency, the velocity at the peak response of the building (velocity response spectrum) can be calculated. SI is defined as the mean value of the velocity response spectrum.

SI was first suggested in 1961 by an American seismologist, George W. Housner. Housner's spectral intensity reappeared in the spotlight a half century later when it was discovered that there is a high correlation between SI and the actual level of damage to buildings.

Analysis of the correlation between past measurements of earthquakes and the actual damage they caused has revealed that it is not always true that the higher the acceleration (the measure widely used today), the greater the damage. On the other hand, it was found that the majority of buildings were actually damaged when the SI measured over about 30 kine (cm/s). So, SI has increasingly been accepted as an indicator of the impact of earthquakes.

Quick Evaluation of Earthquake Impact Helps to Prevent Secondary Disasters

Of course, SI is not accurate enough to tell the exact size of an earthquake. However, if we know the size of an earthquake with a certain level of accuracy, it is easier for us to keep damage to a minimum and to take action to prevent secondary damage.

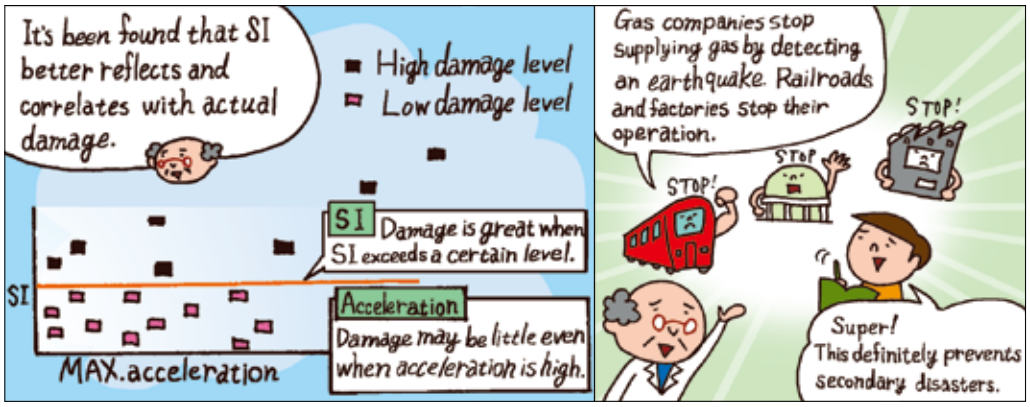
SI has already been used to make decisions as to whether or not to stop operation at factories and various types of essential infrastructure when an earthquake strikes. For example, facilities that handle dangerous substances, such as chemical plants, are strongly urged to stop operation quickly and safely when a dangerous situation like a fire, explosion, or discharge of hazardous substances is predicted. By installing an earthquake sensor that calculates SI and embedding a system that automatically stops facility operation when the value exceeds predefined criteria, we can reduce delays in the initial response to a dangerous situation. Likewise, using SI, which has a high correlation with possible damage, will reduce the risk of unnecessary shutdowns.

In Japan, gas companies, waterworks, railroads, and others have increasingly been using SI to make important decisions such as whether to stop supplying gas or water and whether to stop train operation.

In the future, as the range of applications of SI expands, and as its usefulness as an indicator for use in disaster prevention measures is increasingly recognized, we can expect that society will become better able to cope with earthquakes.

Azbil's Intelligent Earthquake Sensor detects the acceleration caused by an earthquake using a small built-in accelerometer and then calculates and outputs the synthetic acceleration, the estimated Japan Meteorological Agency seismic intensity scale (shindo scale) value, and the SI value, which is an estimation of damage to structures caused by earthquake motion.

Intelligent Earthquake Sensor Model : SES70



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Cover photo by Koji Mizutani, MERRY PROJECT Representative

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Yamatake Corporation changed its name to Azbil Corporation on April 1, 2012.

azbil Group PR magazine, azbil 2016 Vol. 3, No. 6
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PRINTED WITH SOY INK

MIX Paper from responsible sources FSC® C002215

PR-3001E-1607 (1607-4K-D)

Company/Branch office