

**Co-op Japan Experiential Work Report:**  
**Taiheiyo Cement Corporation**

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## **Company Profile**

The main goal that Taiheiyo Cement strives for is to produce high quality cement from the most modern, productive, and efficient plants while rapidly supplying products to meet customer's needs. The company provides solutions that are environmentally efficient by managing the environmental impact of its operations while supporting the development of a recycling based society.

In 1881, a cement company was established in the Yamaguchi prefecture, later known as Onoda Cement Co. Ltd. Two years later, Asano Cement Co. was formed by renting a nationally owned cement plant from the Fukagawa Branch of Ministry of Industry. This name was changed to Nihon Cement Co. in 1947. Chichibu Cement Co. was started in 1923, and later on merged with Onoda Cement Co. in 1994. Finally, that company then merged with Nihon Cement Co. in 1998 and Taiheiyo Cement Co. was established.

Seventy percent of the Taiheiyo Cement business is making and selling cement. After this, the next largest part of the company is Construction Material (sand and gravel). Other businesses of the company include: Environmental Management and Recycling, International, Real Estate, Power Generation, and Ceramics and Electronics.

Currently, there are 23 cement plants including five domestic and 10 overseas subsidiaries. There are overseas networks in USA, China and Singapore. Taiheiyo Cement now employs approximately 3,600 people around the world.

## **Research and Development**

The Research and Development Centre, located in Sakura City, Chiba Prefecture, is composed of the following groups: Cement Concrete, Construction Materials Resource Products, Environment, and Ceramics Electronics.

I am part of the Environmental Process Engineering team, which is subdivided into three groups: K-powder, Ecocement, and Eco Department. The K-powder group works on recovering heavy metals from a Chlorine bypass dust that is collected when creating the clinker for ecocement. Ecocement is cement that is made from municipal incineration ash, sewage sludge, and additional limestone and clay. The Eco department deals with researching methods to recover heavy metals from incinerated ash, fly ash,

bottom ash, waste plastic and waste polyvinyl chloride and alkalis.

### **Work Responsibilities**

A large-scale plant was opened in the Kumagaya Cement Plant during the winter of 2005. During my internship, I worked with K-powder, a waste powder that is created by quenching the fumes from the clinker in a cement plant. My job was to determine the conditions and process to treat this waste powder that would optimize the heavy metal separation. Different methods of separation were investigated including: a) Flotation b) Cyclone and c) V\*SEP.

For all methods, the powder is first mixed with water into slurry. In flotation, this powder is treated with different chemicals then put into the flotation apparatus and agitated with a mixer and air pump. In the Cyclone, the slurry is pumped into a large cone-shaped apparatus, which then creates a centripetal force. This force causes lighter particles to rise and heavier particles to stick to the wall of the cyclone, then exit from the top and bottom nozzle respectively. By changing the pumping frequency, the ratio of the particle size between the top and bottom will alter. Last, the V\*SEP machine is a liquid-solid separator that uses a membrane to separate particles from the fluid while it is vibrated at specific frequencies. Out of the three methods, the main focus of my internship was flotation.

From flotation, a float and a sink are acquired from each experiment. The float is the collection of bubbles that are gathered when the slurry is pumped by air, and the sink is the residue of the separation. My job was to increase the lead concentration to at least 65%, and minimize the total concentration of calcium in the float. These conditions are met by altering the different variables during the treatment of the powder before performing flotation.

Some of the factors that were analyzed include: wait time; amount of NaSH, Xanthate, and MIBC; H<sub>2</sub>SO<sub>4</sub> addition and holding time; powder-float mixture ratio; collection rate; batch versus continuous flotation; different pH adjustment values; order of addition of chemicals to the slurry; and concentration of Ca in the powder. These variables were tested with K-powders of different percentages of Ca. Whenever the plant operates under different conditions, the chemical composition of the K-powder changes. Thus, I had to determine the trend of lead separation and relationship between each

variable analyzed and the different K-powders.

A medium scale plant was built in the Sakura laboratory to test the same conditions I analyzed at a larger scale. These results give a more accurate representation of the way the plant would be run in large scale at the Kumagaya plant.

The majority of my time is spent doing experiments in the laboratory. After the experimental samples are collected, I prepare them for analysis using one of three machines: The Inductively Couple Plasma Emission Spectrophotometer (ICP), X-Ray Diffusion (XRD), or X-Ray Fluorescence (XRF).

The ICP machine uses a plasma flame to analyze a liquid sample and determine the weight concentration of specified elements. The liquid sample is created by dissolving specific amount of float and sink and later diluting the sample with distilled water.

The XRF machine uses high energy x-rays to excite characteristic x-rays from the elements present in a solid sample. This machine is limited to measurements relating to the material's chemical composition.

Last, the XRD machine uses x-rays to identify the unique diffraction pattern of a solid sample. This machine can analyze compounds and phases of the sample. The samples for both the XRF and XRD machines are created by compressing small amounts of the float and sink into a briquette.

The work that I do is a continuing process because there will always be better methods to optimize the lead separation.

### **Knowledge and Skills**

Upon coming to Japan, I had a very basic educational background on chemistry. However, throughout the internship, I have learned different chemical reaction process and relationships between particles in an atomic level. Also, I have been exposed to different filtering/separation processes, particularly flotation, centripetal forces, vacuums, and membrane vibrations.

In addition to chemical knowledge, I have gained practical experience with chemical

experimentation. Through this, I learned both experimental skills (how to handle chemical testing equipment such as a pipette, scale, pumps, pH readers, etc) and safety procedures in the laboratory. I had the chance to extensively use machine testing machines (ICP, XRF, XRD) that I would otherwise have no exposure to in my University. Thus, I was greatly exposed to how a research and development laboratory works in Japan. I also expanded my knowledge of chemical terms in Japanese.

Monthly presentations from the team allow me to familiarize myself with the different areas of research within the Environmental Process Engineering group. Through my own presentation to the team, I was able to practice public speaking to an audience where English is the second language.

I was fortunate enough to accompany my team members to a business trip to Akita. There, I was able to see how the flotation experiments that I have been working on at the Sakura Laboratory work in medium-scale. The trip exposed me to both the research area and cultural aspect of Universities in Japan.

### **Academic and Career Development**

Although the Intern position is not directly related to my field of study, I still worked on developing very strong interpersonal skills, especially with the language difference at hand. I also learned how to analyze results acquired from the experiments and determine the next course of action – there is a lot of problem solving that is applied in the workplace.

Working in a foreign country trained me on how to adapt more easily to unknown situations. It taught me how to interact with non-native English speakers and present my ideas in a clear fashion. In addition, the job was a great opportunity to acquire a network of contacts in Japan for future reference. I was able to pick up the Japanese language much quicker through direct immersion, rather than scheduled classes. The job gave me a good insight on how a typical Japanese company is run.

Direct knowledge of chemical reactions and relationships was also acquired, along with practical knowledge of chemical experimentation. Practice with testing equipment that I would otherwise never use during my schooling, gives me a great advantage because I now have experience with using equipment in a professional workspace. I now know how to efficiently work in a laboratory and am aware of safety issues surrounding it.

Through presentations made to my team members and other coworkers on my floor, I improved my public speaking skills and learned how to tailor my slideshow and method of delivery to different types of audiences.

### **Relationships with coworkers and superiors**

Within my office, there is a non-hierarchical way of working. The Environmental Process Engineering team is lead by Miura-san. The atmosphere is very casual, so conversing with superiors is not intimidating because they do not impose their own position upon you. Of course, there is still the level of respect, but there is no higher air in the atmosphere. Welcome parties, farewell parties, and New Years dinners are done within the group, which allows a friendlier gathering outside of the office. Through the gatherings, I have learned that they are very curious of the customs in Canada.

Each intern at Taiheiyo Cement Corporation is assigned a main supervisor in his/her corresponding department. This person delegates the work that the intern must do each day. On top of this responsibility, the supervisor also takes care of the intern's needs outside of work including bank accounts, hanko, Alien Card registration, cell phone activation, and Internet setup. Our relationship is such that I have the freedom to time manage my own schedule, as long as I get the experiments finished in a certain time period. Typically, most of my work is done independently, so I usually only approach my team members for the day's work and any assistance, if required.

It is customary, after going on a trip to another area, to bring back gifts from that place for the people in the office to share. These gifts are typically specialized sweets from each area such as manju, mochi balls, custard cakes, crackers, fruit, etc.

Every coworker is incredibly helpful if I ever require assistance in locating stores, planning trips, or figuring out train schedules. Overall, the support that I have received from my coworkers has made the experience of living in Japan very pleasant and less intimidating.

## **Living Arrangement**

The Taiheiyo Cement dormitory is located a 5 min walk from JR Soga Station. Typically, the dormitories are subsidized housing for single employees, whereas company houses are rented out to employees with families. The dormitory is located approximately 30 min from JR Sakura station and an extra 20 min bus ride to the Sakura Laboratory. Each intern was given a JR commuter pass, which can be freely used between Soga and Sakura station.

The area is slightly sub-urban, mostly filled with housing and some shops, malls, and supermarkets. Conveniently, there is a 100-yen store located above an affordable supermarket very close to the dormitory. The 100 yen shop also sells a variety of groceries, which makes home cooking incredibly cheap.

Each room is equipped with a western-style bed and bedding, desk, television, mini fridge, a kitchen area, balcony, and a personal bathroom. The company pays all of the utilities. However, a phone line and the Internet must be set up individually if required. Depending on the previous resident of the space, each intern received different items that were left behind including pots and pans, a stand for the TV, a chair, etc. Communal washing and drying machines are provided for free, and there are specific ones that designated for women. The dormitory also offers a cleaning service if you prefer not to wash the clothing yourself.

It is possible to eat breakfast and dinner at the dormitory for 250 and 350 yen respectively. These meals are only offered on weekdays, and the cost is automatically deducted from the salary, which is a direct deposit into the bank. This is a good way to sample traditional Japanese home cooking at a very low cost.

The dormitory also has a common room that is equipped with a ping-pong table, two workout bikes, mini golf, and an open space for recreational work. Also on the second floor is a lounge with couches and TV, although the residents seldom use the area.

People entering the dormitory must first punch in a security code on a touchpad located at the main entrance. Many dormitories and apartments in Japan have an outdoor balcony entrance to each room; however, the entrance to my room is inside the building, which I find to be much safer.

## **Cultural Experiences**

Since the internship started during the summertime, I was able to enjoy several different festivals in Japan. The first was one in Narita where six different shrines, each pulled by two long ropes held by people of all ages, were paraded around town for the entire day and then a performance was made at the temple. There was an amazing amount of energy presented by the participants from dancing, to singing, to chanting. In addition, there were several street stalls of sweets, games and food set up to enjoy.

In July, a large group of the Coop Japan students gathered in Kyoto to enjoy the Gion Matsuri. The atmosphere of this festival highly contrasted the upbeat and lively nature of the festival in Narita. Instead, the only noise that was made by the people in the parade was the chimes and flutes played by people sitting on top of the large floats. It took approximate 15 minutes for the main floats to turn a corner because the wheels were constructed so that it could only move in a straight direction. Thus, bamboo was placed under the wheels then pull periodically. The sheer number of people attending was astonishing.

Instead of climbing Mount Fuji, I opted to go on a three day Kendo camp held in Onjuku, Chiba. The physical training, interaction with locals, and food from the lobster and shrimp matsuri was absolutely amazing. Each day consisted of approximately 6 hours of kendo training with a lunch break in between. On the second day, we all went to the beach and did a bit of body boarding, surfing, and just playing around in the sand. It was interesting to see that the way in which they teach kendo is almost exactly the same as how we do in Toronto.

In the Youth 18 Pass summer season, I traveled to Nagoya to see the Aichi Expo. Simply the 7-hour train ride was adventurous in itself since there were so many people doing the exact same thing. It was incredible to see the sheer volume of people attending the Expo, which resulted in a two hour wait to enter the actual event and a four hour wait just to obtain tickets to see the show presented in the Toyota Pavilion. The Expo was a great example of the incredible density of population of people in Japan.

During the fall season, I went to Nikko to see the changing colors of maple leaves. Unfortunately, on the day I went it was raining, so the sight was not as beautiful as it

could have been on a bright and sunny day. Nonetheless, I still could enjoy the unique, colorful temples of Nikko. I also visited Hakone to see the leaves. This time, a friend's coworker drove us there. Again, the leaves had not quite changed color. Despite this disappointment, we still had a great time going to a hot spring and eating eggs boiled in the onsen water. We took a cable car up a mountain and were lucky enough to get a slight view of Mount Fuji from the top. There is also a gyoza restaurant where we tried several different odd fillings for the gyoza including: kimchee, crab, shrimp, and garlic.

A final group trip was made to Kyushu, which was the first time I tried to drive in Japan. Needless to say, as exciting as it was, I would prefer not to drive in Japan after this experience. In a matter of three days, we drove to 4 different prefectures located in Kyushu, from the snowy peaks of Mount Aso in Kumamoto, to the active volcano in Kagoshima, to the night food stalls in Fukuoka, to the Hell's Onsen in Beppu.

## **Recommendations**

### *Communication:*

First and foremost, despite whether the company you work for requires you to speak Japanese, it is still best to familiarize yourself with the language and continue practicing while in Japan. I was fortunate enough to work at a company with most of my coworkers had a firm grasp of English conversation. However, due to my inability to communicate well in Japanese, I could not interact as much as I could have if I was fluent in the language. Knowing the language will not only allow you to form deeper friendships, but also keep you safer in general. Don't be scared of asking questions on job to gain more knowledge about the work that they do.

You should at least memorize the entire hiragana and katakana alphabet before coming to Japan, which will make navigating and translating much easier. Since Katakana is derived from foreign words, it is fairly simple to decipher the meaning of the word in question. An electronic dictionary is very useful for both its portability and also the fact that it will translate kanji, whereas most hand dictionaries only translate from hiragana/katakana to English.

Most major cities will have a local International Association, which provides assistance to foreigners and free/cheap Japanese lessons. The Chiba Association helped me

locate local Kendo clubs that have English speaking sensei and do not require me to own my own bogu and shinai. Joining locals clubs is also a good way to meet locals and indulge in the culture.

#### *Eating on a budget:*

Most of your essential daily needs can be purchased at the Daiso stores (¥100 yen store). This is an easy way to live on a budget in Japan. Most department stores will have a food section in the basement that gives out a variety of samples every day. Supermarkets will have discounts on perishable food items at night. Many restaurants will have lunch set menus, which will provide ample food to support you the entire day.

#### *Travel and lodging:*

Take advantage of your time in Japan by exploring as many areas of Japan as possible. Due to the highly efficient rail system, it is very easy to travel to all areas of Japan by train. In addition, a cheaper method is to ride a night highway bus. Not only is the price a fraction of a day bus, but you will travel to the destination through the night, saving the cost of a night stay in a hotel. Another option is to travel during the Youth 18 ticket season. This is a JR ticket that allows unlimited use of all JR lines for a fixed cost.

Many airlines will have discount tickets if you book the flight earlier or for certain periods. Some will also have cheap flights if you fly around your birthday. However, at times flying to a place is actually more expensive and takes longer than riding the Shinkansen, so it is best to explore all options.

The cheapest places to stay are youth hostels and manga kissa. A manga kissa is an Internet café. Most Manga Kissa's will have a nighttime package, which allows you to sleep overnight for a cheaper price. You are provided with unlimited use of the internet, magazines, manga, and drinks. Some will also provide personal rooms for you to lodge and sleep in, and also a shower that is shared by the other patrons.

### **Overall Impression**

Upon first glance, the society in Japan is very polite and has a high respect for others, customer service, and its own culture. After living here for almost one year, the thought still remains the same. A lot of this is due to the formalities ingrained in the

language. For instance, there are several different greetings for different times of the day, and others that you say to coworkers upon arrival and departure from the office. Bowing is also a large part of the society that signifies respect for others.

The customer service is excellent and very efficient despite the fact that no tip is required for the service.

This internship allowed me to have a deeper insight on how it is to really live in Japan. I could indulge in all aspects of the culture, rather than the typical sights that a tourist would have to rush to see. It was amazing to practice kendo in the country in which it originated from. I even played regularly in a dojo that is over 150 years old and originated during the period Shonan were abolished.

The sheer history and cultural richness of Japan is beautiful. You have the big city and entertainment areas such as Tokyo and Osaka contrasting with the traditional temples and shrines found in Kyoto. There is a strong cultural identity found in Japan.

It was interesting to see the differences between the various areas on Japan. From the big city, incredibly crowded life in Tokyo in contrast with the quaint temples of Kyoto and then to the amazing scenery of Kyushu. It's amazing that one small country can contain such a variety of experience, landscape, and culture. Needless to say, I feel very blessed to be given the opportunity to experience Japan to such an extent.