

Canada Japan Co-op Program Experiential Report

Mitsubishi Chemical Corporation

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Table of Content

1.0 Company Background	1
1.1 History	1
1.2 Products and Services	1
1.3 Structure	1
2.0 Internship	3
2.1 Duties	3
2.2 Working Environment	4
2.3 Skills and Experience Acquired	4
3.0 Lifestyle	6
3.1 Dormitory	6
3.2 Everyday Life	6
3.3 Travel	7
3.4 Culture	9
4.0 Conclusion	11
4.1 Advice for Future Students	11

1.0 Company Background

1.1 History

Mitsubishi Chemical Industries were first established in 1950 and then followed by a series of merging and new establishments which eventually integrated to Mitsubishi Chemical Corporation (MCC) in 1994. By now, MCC is one of the leading chemical companies in Japan with the head office located in Tokyo. MCC has more than 30,000 employees and different plants in operation all over the world, including China, Germany, Singapore, Thailand, and United States of America.

1.2 Products and Services

Mitsubishi Chemical provides a wide variety of products and services which can be distinguished into three domains: performance products, health care, and industrial materials. Performance products include LED lighting panels, CDs, and memory cards; health care includes clinical testing, medical instruments, and pharmaceutical ingredients; industrial materials include organic acids, polymers, and industrial gases. MCC applications have involved in areas of environmental care, agriculture, medical health care, automobiles, electric appliances, industrial chemicals, civil engineering, and mechanics.

1.3 Structure

Mitsubishi Chemical Corporation is one of the four core businesses under Mitsubishi Chemical Holding Company (MCHC), and MCHC is responsible for financial resource allocation and group strategies development. MCC is separated into two parts: plant operation and research and development. Each part is further detailed into different products and their respective technologies and each department has its own set of process plants or

pilot plants that may or may not be interrelated to other departments. Additionally, each department may have even more subdivisions. For example, I belonged to the environmental energy saving group under the production technology department while there are also process modeling group and environmental safety engineering group that falls under the same department.

2.0 Internship

2.1 Duties

As mentioned above, I was part of the environmental energy saving group in production technology department locating in Yokkaichi, Mie Prefecture. During the internship, my duties were to solve problems related to wastewater treatment, and I've used two programs to assist my work. The first software I learned was GPS-X from Hydromantis. It is a simulation tool similar to ASPEN but specialized in wastewater treatments instead of chemical reactions. Another software was gPROMS from Process Systems Enterprise. It is a platform that does complex reaction calculation through mathematical equations input. Equations coding is similar to MATLAB but it has extended functions on process simulation and is capable for running parameters estimation and optimization.

I used gPROMS most of the time to carry out simulation results. At first, I studied knowledge regarding activated sludge model, heterotrophic biomass, and substrates. Then, I moved on to estimation of continuous stirred-tank reactors volume and layouts by using real plant data. After that, I acquired some experiment data from laboratory to work on parameter estimation. The wastewater contained varying types and amount of organic matters that needed be removed, and I was trying to figure out the constants of these organic matters within the biochemical oxygen demand equation. In the end, those parameters were used to simulate actual plant operation under distinct circumstances. Since there were two programs available for simulation, the group would like to observe the accuracy of both as they have distinct calculating mechanism; therefore, simulation results from GPSX and gPROMS were to be compared. With the help of these applications, we were able to figure out the most efficient condition for wastewater treatment.

2.2 Working Environment

The traveling time from dormitory to the plant is roughly 45 minutes by trains due to transferring; otherwise, cycling to the front gate would only take 20 minutes. Another 10 minutes is taken for changing uniforms and walking to the office since the plant site was spacious. Unlike Canada, Japanese office has no dividers to mark up personal work space between desks; everyone works in an open area and can see each other, even our supervisor. Such arrangement allows discussions between the group easier as one can simply turn around and begin the conversation without feeling entering others' space.

Two groups shared the office and there are 6 members in my group, including me. Everyone in the office is very nice and caring. They are always willing to help when I have questions even though there's difficulty in communicating due to language difference. They also throw welcoming party to interns to help them bond to the group, and various gatherings are held to build better relationships between employees. Working with them was a great experience.

Every morning, the group begins with brief conversation on scheduled tasks. The work time begins at 8:30 am and ends at 5:15 pm with an hour lunch break at noon. Another meeting is held on Monday morning to discuss the work from previous week and to scheduled tasks for current week. Every once a month, everyone in the department joins a safety meeting to discuss some accidents happened in the company and the hazards that we have or may encounter whether at work place or outside the company. There is another meeting that concludes and reports all the effort done in the month but only official employees participate in it.

2.3 Skills and Experience Acquired

As a chemical engineering student, I have been in contact with chemical reactions and

processes from school. However, this was the first time for me being so close to actual plant scenario. At the beginning of the internship, I was given a book about activated sludge models. I was familiar to such content because I have learned it in lectures, then soon I realized that the equations I studied were simplified and the actual models were more complex than I expected. By that, I've learned more knowledge in this area. Additionally, working on process modeling allowed me to understand plant operation, and I had a chance to visit the actual waste water treatment system. I was able to code equations to simulate reaction processes and change operating conditions to observe the outcome.

In addition to technical knowledge and skills, the most important experience was to communicate with others that may not speak the same language. Luckily, as an engineer major, flow diagrams and equations were efficient enough to communicate with others. I've also learned to express the meanings as precise as possible with the simplest words. My Japanese also improved significantly though still not good enough for proper conversation. Compared to before, I was able to understand basic and simple conversations. I definitely want to continue on learning Japanese after returning to Canada.

3.0 Lifestyle

3.1 Dormitory

MCC generously offered me a room at the four floors dorm, Utsuberyou. The size of the room is roughly 6 tatami and includes air conditioning. However, there is neither washroom nor kitchen within the room. Instead, public toilets can be found at the hallway, and breakfast and dinner are provided at cafeteria at a reasonable price. Residents can find current week and the following week's menu on the bulletin board and write down whether to order or not. Showering area located in the main hall is shared among everyone and there is a huge hot tub at the center of shower room. For laundry, washing machines are free of charge but dryers would cost a bit. Dry cleaning services are also available with low price. Since I lived on the first floor, I was somehow troubled by the bugs and insects appearing in my room, especially during summer.



A Typical Meal at Cafeteria



The Dormitory: Utsuberyou

3.2 Everyday Life

Japanese food generally tastes good. I've tried various dishes in different cooking styles. There are also many restaurants that served foreign cuisines such as Indian, Korean, Chinese,

or Italian. However, most of the foreign cuisines have their flavor and ingredients altered into Japanese style. Ordering may be troublesome sometimes. Unless it is a famous restaurant, most restaurants don't come with English menu or pictures; very few don't even have menus. As a result, occasionally, I had to guess my food from multiple options.



Japanese Noodle and Fried Rice



Beef Hotpot

Shopping was another enjoyment I had in Japan because finding the clothes of my size was easier. Clothing is relatively cheap compare to America, and it comes in with varying styles and designs. Despite the western brands I found in Japan, Japanese fashion is quite different from western style. There are many regular clothes but also ones that emphasize on specific elements, such as visual, punk, or gothic. One fun thing I did while shopping was to “get lost” so I could discover places or shops hidden in the alleys that weren't so well known. I went to my next destination afterwards with the help of cell phone's maps.

3.3 Travel

Traveling certainly was the fun part during my stay in Japan. Trains were my most common way of traveling as they had railroads extended to almost every corner in Japan. Although trains were fast and convenient, the transportation system was complex, and I often

found myself lost in the train station, especially major station like Tokyo Station.

I've been to cities like Tokyo, Osaka, Kyoto, Nara, and Ise. I was amazed by the crowd at central Tokyo during rush hour when I first visited. Every city gave different feelings when visited. When I first visited Osaka, I was expecting to do some shopping, and then I realized that it is a city full of deliciousness. Nara gave me an atmosphere of being slow and peaceful, probably because of the deer in Nara Park. Got in close contact with them was fun and got tackled by a deer was definitely a special experience. Out of all the places I've been to, Kyoto was my favorite. It was enjoyable to visit those historic temples and to see the great views. Despite big cities and further places, I also explored places around where I live.



The Famous Glico Man at Osaka



Deer at Nara Park



The Famous Ise Jingu



Kiyomizu-dera at Kyoto

Unfortunately, I didn't have the chance to visit further places such as Hokkaido and Okinawa. Also, due to the period I stayed for my internship, I wasn't able to attend many of the festivals and events that happened in autumn and winter, which was one disappointment.

3.4 Culture

There are many festivals in Japan, mostly related with shrines or temples. Some that commonly take place during summer are firework festivals. I was always buried in the crowd during festivals and the enthusiasm I experienced was unforgettable. There were many vendors during festivals and I enjoyed the great food they served. I had seen various performances during festivals. There were drumming, stage dance, singing, and even ceremonies, which I thought was less entertaining as they were usually time consuming.



Palanquin for Yokkaichi Matsuri



Dancing at Citizen Square

Another well-known culture in Japan is hot springs. Japanese hot springs were completely different from what I've experienced in Canada. The fun Japanese hot springs weren't all about the waters only; the ritual for entire trip was the most enjoying part as this was where I experienced Japanese culture. Wearing bathrobe and walking along the wooden floor, I loved the calming atmosphere over there. The hot spring I went to had six

ponds, each looked differently. One had pressured streams of massages and bubbling like hot tubs. Some were located right next to a river where I could easily soak my hand into and feel the clear cold stream. Unfortunately, I went to the hot spring during summer time; otherwise, I could have experience so called “hot spring flowers”, which means flowers fallen from nearby trees floating on the water surface. The view was definitely the greatest attraction at these hot springs and it changed as the season’s routine meaning that visiting at any time would be a different experience from previous times.



View at Hot Spring Resort



Flavored Milk

4.0 Conclusion

My internship in Japan sure was great experience in my life. I didn't experience much of culture shock as I have some understanding about Japan culture. Yet, knowing is completely different from actually living in Japan, so it still took me a while to adapt to the culture.

During the eight months of stay, I've seen a lot and experienced a lot. Working at a different country sure expanded my thought and my view. Also, living in another country by myself made me more independent and mature. Working for Mitsubishi Chemical was rewarding. I've learned so many knowledge and skills that are useful and helpful for the rest of my life. Coming to Japan was the best among all internship I did. Thanks to Canada Japan Co-op Program and Mitsubishi Chemical for giving me this memorable experience.

4.1 Advice for Future Students

As a foreigner, there sure are many culture differences that I've experienced, and the easiest way to adapt Japan culture is to mimic others. A guide book may be helpful in understanding Japan, but it will never replace every single detail. Do whatever others do as this helps to blend into their society. Also, don't be afraid of making mistakes as it happens all the time. Japanese are nice and kind people. They will understand that we are foreigners that come from different background, so don't worry about doing something wrong.

The most important part of joining Canada Japan Co-op Program is to enjoy the stay in Japan. Even though the salary may not be as great as in Canada, an internship in Japan is a life time experience, so please do travel, do shopping, or eat all the great food. If one wants to save up, then Japan is probably not the best choice.

In the end, come with an open mind. There are so many things to experience in Japan, so come with a positive attitude and enjoy the stay.