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# Co-op Japan Experiential Report

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## **Company Background**

Osaka Gas is a gas utility company that imports and distributes gas to the Kansai region of Japan. Founded in 1905, Osaka Gas has grown to currently serve 6.7 million customers and employ 16,000 people. In terms of assets and revenues, Osaka Gas is one of the top 5 gas utility companies in the world. In addition to providing gas to the Kansai area, Osaka Gas is also involved in a broad range of research. The research activities range from gas transmission technology to residential gas applications.

## **Role of my Department and Background of my Work**

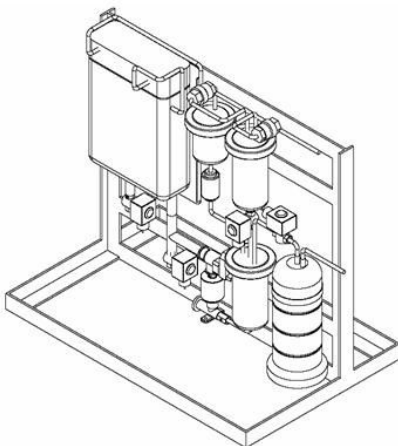
I worked in Osaka Gas' Living Systems business unit. My department's role was researching and developing new residential technologies. On the first day of work my boss explained to me that Osaka Gas was proposing the development of over 20 steam products for the home. Steam has the potential to be used in applications such as bathing, cleaning and heating.

Electric steam products such as steam cleaners and saunas have already proven to be popular and are sold by various companies around the world. Osaka Gas hopes to improve upon these products by replacing electric power with gas power. Gas can be used to produce steam faster and more efficiently than electricity. Developing gas powered steam products will promote the use of gas in the home and increase gas sales.

## Responsibilities and Details of my Work

My main focus at Osaka Gas was designing and prototyping steam appliances. I was required to create specific designs and working prototypes for a number of products. Making specific designs of each proposed product allowed my department to visualize how each product would work. Creating prototypes allowed my department to demonstrate the products to the sales department.

At first I worked closely with my boss developing a gas powered steam generator. Steam generators are small low-pressure boilers and in this case the steam generator was intended to be used for residential appliances such as steam cleaners and steam saunas. I was given the opportunity to use 3D-CAD to design the layout. After designing the layout on my computer, I produced manufacturing drawings and a working prototype was built. The CAD model and prototype are shown in the picture below.

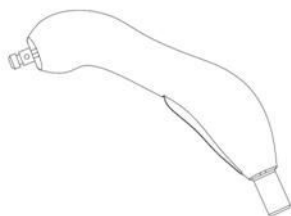


*Steam Generator CAD Model and Prototype*

After designing the steam generator, my next project was to create a steam cleaner for the kitchen. Due to steam's heat, it is a very effective tool at killing bacteria and removing dirt from kitchen counters. Scrubbing the kitchen with steam reduces manual labor and eliminates the need for conventional chemical cleaners.

I worked independently on this project and was given complete freedom over everything from the mechanical design to the aesthetics of the product. Because the steam cleaner would be a permanent fixture in the kitchen, the design was required to be visually appealing to customers. This was an interesting challenge because normally engineers aren't concerned with the physical beauty of their products. Initially I made hand sketches to determine the most appealing shape for the product and then used 3D-CAD to layout the mechanical components like valves and trigger. I was also able to render my CAD models in order to visualize the final appearance.

After designing the steam cleaner in CAD I created a prototype which was installed at an Osaka Gas display room. The prototype was demonstrated to Osaka Gas' sales department as well as Japanese housing developers. A picture of the CAD model and prototype is shown below.



*Steam Cleaner CAD Model and Prototype*

One non steam related project I worked on was the development of a new type of heat pump for residential heating. In Canada most of us have the luxury of central heating but in Japan they are currently looking for more efficient methods of heating their homes. Heat pumps transfer heat from one location to another (a refrigerator is an example) and are more efficient than conventional forms of heating. The heat pump being developed by Osaka Gas is unique because power is inputted in the form of heat rather than the mechanical work of a compressor like a typical heat pump. My role was testing a prototype of the heat pump to determine the coefficient of performance (similar to efficiency). I worked closely with two mechanical engineering PhDs and a chemistry PhD so this project turned out to be an excellent learning opportunity. As an undergraduate student, the opportunity to be able to work closely with experienced PhDs is very rare and valuable. The COP was measured for a variety of operating conditions and the results of the tests will be presented at a conference in Kyoto in October 2007.

### **Relationship with Coworkers**

The biggest difference I noticed between Japanese and Canadian workplaces was the relationships between coworkers. Japanese companies try hard to build friendships between coworkers and strengthen morale through activities like drinking parties and karaoke. As a result, everyone in my department was very friendly and helpful. In particular, my boss always went out of his way to help me with my projects and even met with me outside of work sometimes to go hiking, visit temples or eat lunch with his family.

During lunch I tried to practice my Japanese by having conversations with my coworkers. Usually I would ask them simple questions about what they did on the weekend or how their projects were going at work. These basic conversations were the biggest factor in improving my language skills and also allowed me to bond with my coworkers. Towards the end of my work term two of my coworkers invited me to their houses to meet their families. This was an interesting experience because it was my first opportunity to see what Japanese family life was really like. They were both excellent hosts and it was very generous of them to invite me into their homes.

Before coming to Japan I had envisioned Japanese offices as being very strict and hierarchical places. After working in Japan my view has completely changed and I now realize that Japanese coworkers value each other's happiness strongly and have very healthy and friendly relationships with one another.

### **Skills Acquired and Benefits to Career Development**

Working at Osaka Gas allowed me to develop a variety of skills including design and oral presentation. I spent a lot of time using 3D-CAD which is a valuable tool to have as an engineer. Before moving to Japan I had limited experience with CAD programs but now I am able to use them comfortably and quickly. I'm glad I was given the opportunity to learn how to use 3D-CAD and I'm sure I'll use it in the future.

While prototyping my designs, I was introduced to a variety of manufacturing processes.

For example while prototyping a steam cleaning nozzle I used a technique called fused deposition modeling (FDM). FDM automatically deposits thin layers of plastic on top of one another other to create plastic models. By inputting my CAD files to an FDM machine, I was able to create a tangible plastic model of my design. I used the plastic model of the steam cleaning nozzle to verify that the components fit together properly and to feel how comfortable the nozzle was to hold. Learning about new manufacturing processes like FDM is valuable for a mechanical engineering student and I'm glad I got the exposure while in Japan.

In addition to the things I learned at work, my boss also arranged for me to attend a manufacturing tradeshow, an international robotics tradeshow and a Toyota factory tour. At the tradeshow I was able to meet Japanese engineers and see some of the technology they were developing. I come from Western Canada where the manufacturing industry is small so seeing tradeshow and factories in Japan was a unique experience that I probably wouldn't have been able to have in Vancouver.

At the beginning of my work term I mentioned to my boss that I was interested in improving my presentation skills. Throughout my work term I was given many opportunities to give technical presentations. Occasionally visitors from Osaka Gas' main office visited our research center and I demonstrated my prototypes and explained the results of some of my research. My boss also arranged a presentation for me at Osaka University where I explained the applications and benefits of CAD software to Chemical Engineering graduate students. I'm grateful for the opportunities I was given to present during my work term. Strong presentation skills are necessary in

every profession and I'm sure the experience I gained during my work term will benefit me as an engineer.

### **Living Arrangements and Daily Life**

Osaka Gas provided me with a free place to live at their company dormitory. Rent and utilities at the dorm were free so the only thing I had to pay for was a small 4000 yen laundry fee each month. I was given one room with a tatami mat, desk and futon. During my first morning in Japan it became apparent how small my room was when I accidentally kicked a hole through my wall. My alarm clock startled me and as I scrambled to wake up I felt my foot going through the paper wall of my closet. Luckily my dorm manager wasn't too angry and I rearranged my futon so it didn't happen again.



### *Company Dormitory and Room*

Each morning I headed to a convenience store near my house to buy breakfast and then walked 10 minutes to the train station. I took the train to work each day from Hirakata to Osaka. Unfortunately the commute took 75 minutes each way but it gave

me some time to read novels, listen to music or study Japanese. My company paid for my train pass and in addition to making my commute free it also saved me a lot of money on the weekends when I visited my friends around Osaka.

My workplace was an open office with no cubicles or dividers. This was a big change from the solitary office I worked in during my previous co-op job in Canada. The open work space made it easier to communicate with coworkers and added a sense of unity to our department. I was surprised to find that even with a large number of people working in the same room, the office was normally silent. In my Canadian co-op job, the office was always filled with noise from coworkers speaking loudly on their phones and people walking around the hallways. The silent and peaceful Japanese office setting was very different from my experience in Canada and made it easier to focus on my work.

After work I usually went back to my dormitory and ate dinner at the dorms cafeteria. The cafeteria food was very cheap and saved me a lot of time in the evenings because I didn't have to cook or wash dishes. My dormitory also provided free access to a small gym which I normally made use of after dinner. After exercising I usually had a few hours of free time in the evenings and then went to bed.

### **Cultural Experiences**

I was lucky enough to live between Osaka and Kyoto, which meant there was always something interesting to do on the weekends. Initially I was curious about Japanese

culture so I spent my free time visiting historical sites with friends. Kyoto is the former capital of Japan and provided many opportunities to see traditional festivals and temples. For example, in July the other interns and I went to Gion Matsuri, which is the biggest festival in Kansai. At Gion Matsuri, we were able to wear Yukattas (summer kimonos), eat food from street vendors and watch a traditional Japanese parade.



*Temples in Kyoto*

In addition to the historical sightseeing, Osaka and Kyoto had all of the typical activities that can be found in big cities like bars, clubbing and shopping. Trains stop running at midnight but fortunately most clubs and bars are open all night. Most weekends my friends and I would enjoy the nightlife in Shinsaibashi or Namba (the two best places to go in Osaka at night).

For people who are looking for a fun way to make Japanese friends, I would recommend attending international parties. International parties are thrown by various organizations around Japan and they provide a place for Japanese people to meet foreigners and practice English. Usually there is an entry fee of around 2000 yen which includes food and nomihodai (all you can drink). The international parties I

attended were usually on Friday or Saturday nights and lasted 3 hours.

In Canada we often take nature for granted but in Japan people have a deep appreciation of the outdoors. For example, in the fall many people head to the park to watch the leaves change colour and in spring people enjoy drinking parties under the blossoming sakuras. One of the best memories I have in Japan was climbing Mount Fuji to watch the sunrise. The view from the top of the mountain was beautiful and I would recommend a trip to Fuji to anyone visiting Japan. I also went on smaller hikes with my coworkers around Kansai and in the spring I visited Mt. Yoshino with my boss which is home to over 30,000 sakura trees. Before my internship, my image of Japan was busy streets and crowded metropolitan areas but I've come to realize that Japan has vast amounts of beautiful natural scenery as well.



*Climbing Mount Fuji*

### **Conclusion and Overall Impression**

When I first attended the co-op Japan information session last year I had a lot of concerns about the costs and time requirements and was debating whether not to

participate in the program. In retrospect, working in Japan was one of the best decisions I've ever made. The co-op Japan program allowed me to travel, make money and gain valuable engineering experience all at the same time.

From the work itself to the people I've met and the places I've seen, everything about this internship has been perfect. I will always have fond memories of Japan and I would like to thank JETRO, Co-op Japan and Osaka Gas for making this an incredible year.