

**De<sub>sign and</sub> **Ma<sub>nufacture in</sub> **Mech<sub>atronics</sub> **EU – Japan Ex-**  
**change Student Report********

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TU Berlin – The University of Tokyo

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# 1 Personal Data and University information

## 1.1 Personal Data

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## 1.2 Home Institute Information

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Supervisor: Prof. Dr.-Ing. L. Blessing

## 1.3 Host Institute Information

Address: The University of Tokyo  
School of Engineering  
Precision Machinery Engineering  
Kimura Laboratory  
Product Life Cycle Modeling Group

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Supervisor: Prof. F. Kimura

## 2. Executive Summary

The DeMaMech-Program is an exchange Program between four European (TU Delft, TU Berlin, TU Denmark and KU Leuven) and four Japanese Universities (The University of Tokyo, Keio University, Osaka University and Hokkaido University). It is an exchange program especially for Mechanical Engineers. I was exchanged from the Technical University of Berlin to the University of Tokyo. There I spent six month at the laboratory of Prof Kimura. The topic of Prof Kimuras Laboratory is 'Product Life Cycle Modeling'.

Before the exchange program started, there was a two-week preparation course at the Technical University of Berlin. During this course we got a lot of information about the Japanese culture and the way of life in Japan. We also had a Japanese course during this two weeks and made some excursions to companies in Berlin e.g. BMW Motorcycle Plant, Sony. At the end of this two-week course we had to give a presentation about our host University and the Town were it is located, so that we got a lot of information what would expect us.

The topic of my research was: 'Product Life Cycle Management based on Life Cycle Simulation'. During my work I improved the life cycle of an alternator. I also visited some Japanese Course, which were offered by the School of Mechanical Engineering. This was a good change to learn a lot about Japan and the Japanese culture.

The life in Japan is quite different to the Life in Germany/Europe. Most of the people in Japan nearly speak any English so it was sometimes difficult to communicate with them. But when you try to speak to them in Japanese, also when you can only speak a little bit, they are really kind and try to help you. The Semester here at the Tokyo University was a good experience and I enjoyed it a lot.

## **3 Travel schedule**

### ***3.1 Meeting in Berlin***

In August 2005 was a preparatory meeting in Berlin. All students from the European Universities who are joined the DeMaMech Programm met in Berlin. The meeting was held that we get to know each other and know how else will be at the same university in Japan. We also had some Japanese classes during this two weeks, but they were not so efficient for me, because I was going half a year later to Japan. During this two weeks, we also made some excursions to companies e.g. BMW, Sony in Berlin. And we also get to know something about Japan and our University, because we had to hold a presentation at the end.

### ***3.2 Trip to Tokyo***

Departure from Berlin: 31.04.2006

Flight: BA 0991      Berlin (Tegel)      ⇒      London (Heathrow)

Flight: BA 0005      London (Heathrow)      ⇒      Tokyo (Narita)

Arrival in Tokyo: 01.04.2006

### ***3.3 Trip to Berlin***

Departure from Tokyo: 14.10.2006

Flight: BA 0008      Tokyo (Narita)      ⇒      London (Heathrow)

Flight: BA 0988      London (Heathrow)      ⇒      Berlin (Tegel)

Arrival in Berlin: 14.10.2006

### ***3.4 Trips in Japan***

I did a lot of day or weekend trips in this six month whenever I had time. So I went to a lot of places around Tokyo, e.g. Kamakura, Nikko. I also had a week of vacations in

### 3 Travel schedule

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the end of July where I traveled to south Honshu to visit Kyoto, Nara, Hiroshima and some other places.

## 4. Research – Product Life Cycle Simulation

### 4.1 Introduction

Nowadays the resources are going down and the environment is also getting polluted from used products, which are out of order at disposal. The products have to become better and more environment friendly. So at the product have to be looked up in detail, to find parts, which are not long lasting like the others. Therefore the *Product Life Cycle Simulation* is an important tool.

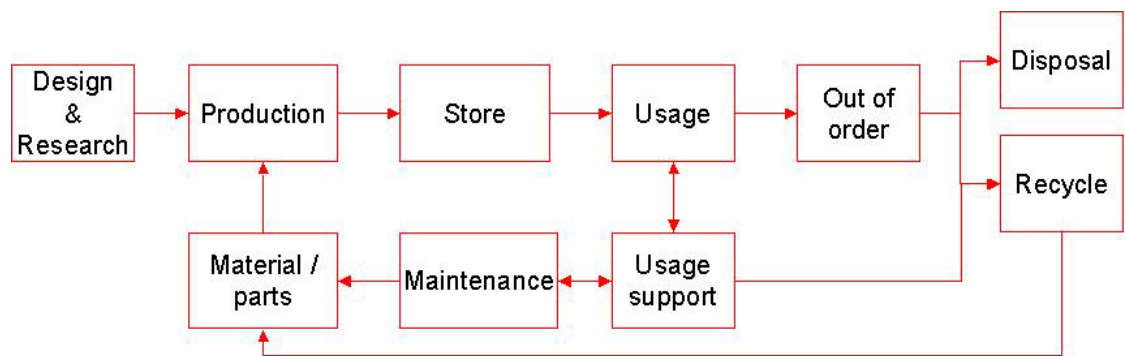


Figure 1: Product life cycle

The main aim of *Product Life Cycle Simulation* is to make the product more environments friendly and also better for the user.

### 4.3 The simulation software

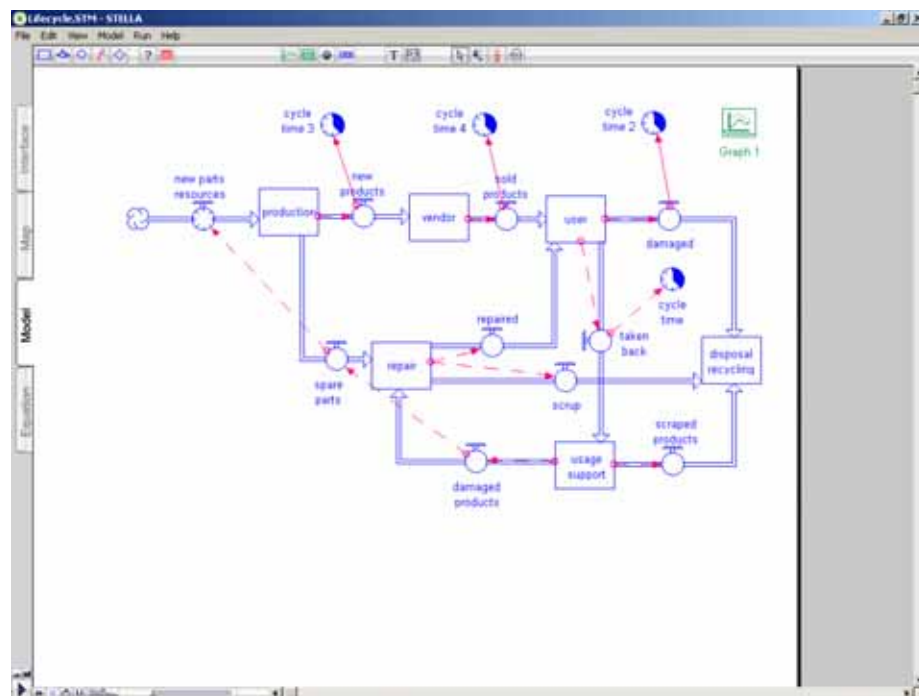
The simulation software I used for the Life Cycle Simulation is called STELLA ®. The Software can be used for nearly every kind of Simulation.

The problem with the software was that is was only available in Japanese first. So it was a problem to work with it. To get to know a new software with out using the help function is really problematic. But after about eight week I got the software in English and I could start to work.

### 4.3 Product

The Product I should do Life Cycle Simulation for was an alternator. An Alternator is a part which belongs to a cars engine. The alternator produces energy for the light, radio, etc.

So first I had to get some background information about the product. I only had some drawing of the product, so that I know about the components which belong to the alternator, but I had no more information about product. With only that kind of information it was really difficult to do a proper Life Cycle Simulation, because most of the information where missing, which you need for a Life Cycle Simulation. And I did not get more information about the product. So it was really difficult to made a proper Life Cycle Simulation for the Alternator.



**Figure 2: The software model**

The next thing was to think about the structure of the simulation. The Life Cycle begins with product development and ends with the reuse of parts or the disposal of the product. The Life Cycle can be seen in following steps:

Product Development -> Producing the Product -> Selling the Product -> Using the Product (with maintenance) -> Disposal or reuse of the product.



## 4. Research – Product Life Cycle Simulation

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The results of the simulation can be seen in Figure 3.

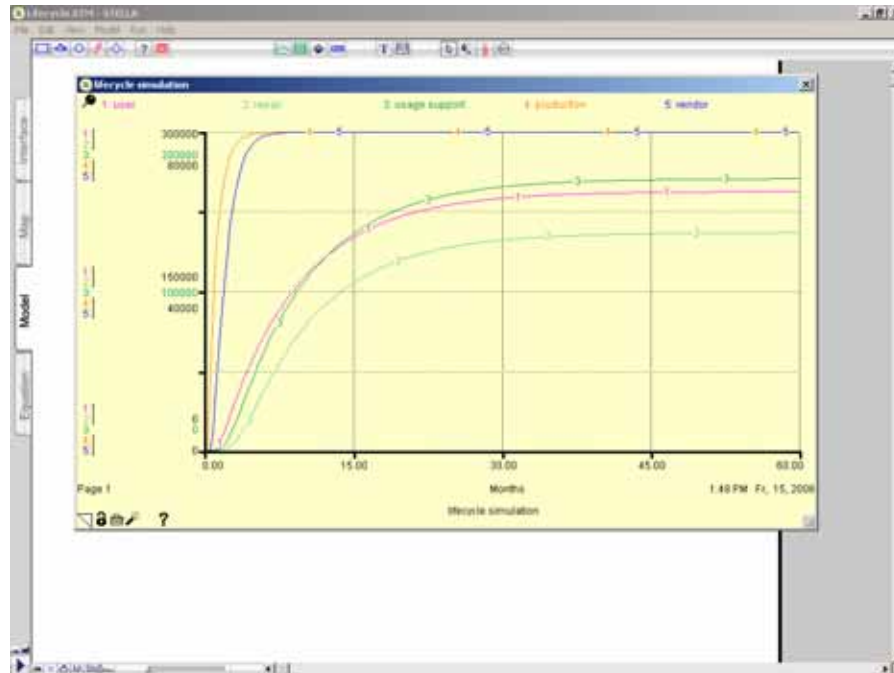


Figure 3: The output graph

### 4.4 Conclusion

There is a lot of work to do to get a good Product Life Cycle. To model / improve the Product Life Cycle you need detailed information about every part of the product. That is also a problem because the companies how produces the product don't give the information you need.

The work in Kimura Lab was not satisfying because I was really difficult to work with out a lot of information about the product.

## 5. Life in Japan

### 5.1 *Social life*

During my stay at the University of Tokyo I lived in the University of Tokyo, Komaba International Lodge. It is a nice place to live there, because there are living a lot of foreign students. So it was no problem in the beginning to get to know some other students from all over the world who also just arrived in Tokyo. The community in the lodge was really good, so we had a lot of parties, BBQ's there. An other good thing about the lodge is that it is located within walking distance to Shibuya and Shimo-Kitazawa, good palces for shooping or going out, especially during night when there are no trains operating in Tokyo.

The life in Tokyo is different from the life I was used to life in Berlin. At first wherever you go there are always so many. Especially to go to university by train during the rush hour was unbelievable. I could not imaging that there fit so many people in a wagon and in the beginning it was kind of strange to stay in the train packed like sardines, but you get used to it after a few days.

In the beginning you need to do a lot of think, you have to get the Alien Registration Card, a mobile phone and a lot of other stuff. That is quite difficult because you cannot read and nearly speak any Japanese. You also have to fill out a lot of forms in the University in Japanese, that impossible, but I got some help from my tutor, so at least it was not that difficult.

Tokyo is also a nice city to live in, at least when you got used to all the people and the huge area. There exist so many things you can do and visit, e.g. Museums, Japanese Gardens, Temples and Shrines. There are also several opportunities for day trips in the weekend to get to know a lot about the Japan and its history. For example there is Kamakura with its history, the second biggest city in Japan Yokohama or all the mountains around Tokyo where you can go hiking.

Also the nightlife in Tokyo is really good but the strangest thing about it is, that there are no trains operating during the night. When you go out for some clubs in Roppongi or

Shinjuku, you have to decide if you like to take the last train back or stay out all night until the first train around 5:00 a.m.

### **5.2 University life**

The University life is really different to the one I knew from Germany. Here in Japan every Professor has it's own laboratory or just lab with his students. All the students sitting together in the lab at their own Computers and working at their researches. The lab is an important thing in the university life.

The way the students work here in the lab is also completely different from the way I know it from Germany. There is not much support from the supervising person and you have to work on your own more or less. That is especially difficult when you work on a subject you have never really worked with before. There where also a lot of other difficulties during the work in the lab. In the beginning the software was in Japanese, so it was really hard to get to know that software, but after about two month I got an English Version. And most of the time I had an appointment with Professor to speak about the project, he was about one to two hours late or I received an email that he will not make it today. And to get a new appointment then need mostly up to one week.

In the begging I was told that I should do the first simulation really quickly so that my Professor and me can go to Denso a check it with them. And also to go there to get more details about the different parts of the Alternator, so that I know later what are the main parts I've to take care in the simulation program. That never happened.

The working here in the Lab at The University of Tokyo was not as satisfying as I thought in the beginning. There where also some other exchange students in Kimura Lab and they had the same problems like. They also did not get any information about their research. And I also talked to a lot of my friends in the lodge and they had similar experience in their labs.

During the summer term I also attended some Japanese courses, which where provide by the Graduated School of Engineering. That was a good opportunity to improve my Japanese skills, also when it is quite difficult to learn Japanese, because there is not so much time besides research and the most time English is the imported language between international students. The Japanese courses where also an good opportunity to

## 5. Life in Japan

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get to know more about the Japanese culture, because the teacher explained and showed us a lot.

At the campus is also a good gym, where you can go for sports. That is also a good place to get to know some people who have not the same major.

## 6. Summary

The six-month I spent in Tokyo at the University of Tokyo was a great time for me. Also when not every thing was perfect here in Japan, especially there were a lot of problems with the work in the university.

But the social life here in Japan was really good. I get to know a lot of friends from Japan and around the world and had a really good time.

So I hope to see a lot of my new friends again and perhaps to go back to Japan sometimes to work here, but I definitely will come back for vacations to visit my friends here in Tokyo.