

Nagoya University Summer Intensive Program

2009

**Latest Advanced Technology & Tasks
in Automobile Engineering**



December 24, 2009

Nagoya University

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NUSIP Reminiscences Photo Album 2009 and CD

Preface

As globalization goes on dramatically these days, it became nothing unusual for Japanese students and faculties to attend academic conferences in other countries. Also, it often happens that company employees conduct their manufacturing and sales activities outside of Japan. This is especially true while experiencing intense international competitive situations. To meet this demand, universities need to educate and train students so that they can show their leadership and be competitive in the global community. In order to achieve these objectives, universities must enhance their academic qualities and produce internationally-minded and aggressive students who not only have professional skills as experts, but also have a deep understanding for other cultures. Moreover, some issues we are confronting, such as global warming, can not be solved by a single nation. It is necessary to tackle these problems in collaboration with many countries worldwide. It is also necessary for universities to offer education from this global point of view.

Unfortunately, it is inevitable to state that university education in Japan is out of fashion, while taking a look at what is going on in the whole world. Although we have developed our country by learning a lot from western civilization, the way we have learned has been based on literatures, but not through people-to-people interactive communication. It is also pointed out that, compared to foreign students, Japanese students are less aggressive to go abroad to study and to get an occupation than those students in other countries. This is because they usually feel satisfied working in their country, thanks to our developed Japanese industries.

For these reasons, Nagoya University is now attempting various strategies to produce internationally-competitive people and global citizens. We have high expectations of this summer program where Nagoya University students can learn Japanese Advanced Automotive Technology with international students. It is our goal, and great pleasure, to have this program contribute to the world's peace in the future.



Takashi Miyata
Trustee & Vice-president
International Exchange & Technology Transfer

Greetings

In July of 2005, Professor Nobuhiko Sawaki, the previous Dean of Graduate School of Engineering, received a letter from Professor Stella W. Pang, an Associate Dean of Graduate Education in the College of Engineering at the University of Michigan, suggesting that both universities should expand our student-exchange more than ever. We have had an academic agreement with the University of Michigan for about 30 years, since its initiation in 1980. We have exchanged faculties and students and organized cooperative symposiums. Based on this agreement, we have sent five faculties (each for four months) and 27 students to the University of Michigan, and have accepted 18 students from the University of Michigan. Until recently, we continued sending more students to the University of Michigan than accepting from there. Now the number of students from the University of Michigan is exceeding. For example, five students (one year for each) have traveled to University of Michigan while thirteen students (eight of them each for one semester, and five of them each for one year) have come to our university, during the past five years.


In this letter, she asked how many lectures are provided in English in our Department of Engineering, and whether we have short-term programs such as summer programs or summer internship programs. She asked in order to expand our student-exchange of one-semester through one-year programs. Unfortunately, we had few lectures given in English in the Department of Engineering, except for the NUPACE (Nagoya University Program for Academic Exchange) lectures. We also didn't have any short-term programs, such as summer programs.

Under these circumstances, we answered to Professor Pang that we would like to organize a summer program given in English. In order to make the program available to a wider audience, it was most essential to decide a theme for the program that is fascinating enough for international students. Taking advantage of our campus location, which has good access to some plants of world's largest automotive companies, such as Toyota Motors and Mitsubishi Motors, the Dean approached Professor Yukio Ishida, a professor in the Department of Mechanical Science and Engineering. As a result, one unique lecture style was suggested where faculties from our university and researchers from automobile-related enterprises collaborate to give lectures about frontier topics with its theme "Latest Advanced Technology and Tasks in Automobile Engineering". The program also includes visits to automobile plants and research institutes, and Japanese representative cultural heritages in Kyoto, Tokyo, and others. Moreover, lectures for Japanese language are also included following the strong request from University of Michigan.

After spending about two years of preparation, the framework of the Summer Program

was established and we had started to accept applications since 2008. The universities which could apply to this program were limited to those that have an academic agreement with the Nagoya University Department of Engineering and the members of AC21 (Academic Consortium 21) due to several reasons. In 2008, the first year of this program, we got twelve students from the USA and twenty five students from Nagoya University including part-time auditors. In 2009, this year, we accepted twenty-five students from the USA, three students from England, two students from France, and nineteen students from Nagoya University.

We heard high evaluations from the participants for the lectures on Automobile Engineering and Japanese. We are very appreciative of the researchers from enterprises and faculties of our university who took part in this program. We highly expect that the students who participated in this program develop the technology and fulfill their roles to contribute to international amity as global citizens in the future based on the experiences, technical knowledge, and friendships that they gained through this summer program.

A handwritten signature in black ink, appearing to read 'K. Onogi', written in a cursive style.

Katsuaki Onogi

Dean, Faculty of Engineering, Nagoya University

1. Committee

Eiichi Tanaka	Vice Dean, Professor, Mechanical Science and Engineering, Graduate School of Engineering
Satoshi Sato	Chief, Professor, Electrical Engineering and Computer Science, Graduate School of Engineering
Yukio Ishida	Coordinator, Professor, Mechanical Science and Engineering, Graduate School of Engineering
Tsutomu Nomizu	Advisor, Professor, Education Center for International Students
Takahiro Seki	Professor, Molecular Design and Engineering, Graduate School of Engineering
Reiko Furuya	Associate Professor, International Academic Exchange Office, Graduate School of Engineering
Ryo Sasai	Assistant Professor, Civil Engineering, Graduate School of Engineering
Kazuyoshi Tatsumi	Assistant Professor, Micro-Nano Systems Engineering, Graduate School of Engineering
Mehrdad Panahpour Tehrani	Assistant Professor, Molecular Design and Engineering, Graduate School of Engineering
Susumu Nii	Associate Professor, Applied chemistry Chemical Engineering and Biotechnology, Graduate School of Engineering
Yoshiyuki Tsuji	Associate Professor, Energy Engineering and Science, Graduate School of Engineering
Shigeru Okuma	Professor, Electrical Eng and Computer Science, Graduate School of Engineering
Takeharu Sakai	Associate Professor, Aerospace Engineering, Graduate School of Engineering
Hiroki Tanikawa	Associate Professor, Civil Engineering, Graduate School of Engineering
Kaori Umemura	International Student Affairs Section, Graduate School of Engineering

2. Participants

International Students

Jeffrey Duperret	B2	Electrical Eng., U. of Michigan	USA
Anthony Budzinski	B3	Aerospace Eng., U. of Michigan	USA
Joshua Hoemke	B3	Material Sci. and Eng., U. of Michigan	USA
Gyu Jin Ahn	B3	Mechanical Eng., U. of Michigan,	USA
Bernard Murphy	B3	Mechanical Eng., U. of Michigan	USA
Patryk Mastela	B3	Chemical Eng., U. of Michigan	USA
Robert Rasmusson	B3	Computer Sci., U. of Michigan	USA
Evelyn Woen	B3	Industrial Operations Eng., U. of Michigan,	USA
Jason Geathers	B4	Mechanical Eng., U. of Michigan	USA
Janani Viswanathan	M1	Mechanical Eng., U. of Michigan	USA
Cheng-Hsien Wu	M1	Mechanical Eng., U. of Michigan	USA
Chang-ping Lee	M	Mechanical Eng., U. of Michigan	USA
Kevin Zaseck	D	Mechanical Eng., U. of Michigan	USA
Joseph Bisognani	B3	Mechanical Eng. and Energy Processes, Southern Illinois U. Carbondale	USA
Theodore Tragas	B4	Automotive Tech., Southern Illinois U. Carbondale	USA
Loretta Kwan	B4	Mechanical Eng., U. of Kentucky	USA
Juanri Juanri	B3	Materials Eng., UCLA	USA
Sean Rosenfeld	B3	Chemical Eng., UCLA	USA
Daniel Bellers	B3	Mechanical Eng., UCLA	USA
David Sinnaduray	B3	Electrical Eng., UCLA	USA
Eric Wen	B3	Bioengineering, UCLA	USA
Selma Lee	B4	Chemical Eng., UCLA	USA
Albert Duong	B4	Mechanical Eng., UCLA	USA
Chardeep Grewal	M1	Electrical Eng., UCLA	USA
Ying Heng Peng	B4	Mechanical Eng., UCLA	USA
Antoine Navarro	M1	Physics, U. of Strasbourg	France
Romain Fanchini	M1	Physics, U. of Strasbourg	France
Wanxiao Shao	B3	Computer & Information Eng., U. of Warwick	England
Chirag Panjwani	B4	Systems Eng., U. of Warwick	England
Chirag Daswani	B4	Manufacture & Mechanical Eng., U. of Warwick	England

Nagoya University Students (Full Course)

Hidehiro Ogura	B4	Electrical Eng. and Computer Science
Shinji Kajiura	M2	Mechanical Science and Eng.

Nagoya University Students (Auditors)

Yohei Kushida	B4	Mechanical and Aerospace Eng.
Keisuke Fukuoka	M1	Mechanical Science and Eng.
Tomohiro Horibe	M1	Mechanical Science and Eng.
Jian Zhang	M1	Mechanical Science and Eng.
Katsutoshi Nishimoto	M2	Mechanical Science and Eng.
Masatomo Yamaguchi	M2	Mechanical Science and Eng.
Shinji Saito	M2	Mechanical Science and Eng.
Devendra Bhetuwal	M2	Micro-Nano Systems and Eng.
Masaki Kaneko	B2	Physical Science and Eng.
Takashi Ishibashi	B4	Electrical and Electronic Eng. and Information Eng.
Yusuke Nomura	M1	Applied Chemistry, Chemical Eng. and Biotechnology
Suk Hwa Jung	D1	Electrical Eng. and Computer Science
H. C. N. Premachandra	D2	Electrical Eng. and Computer Science
Shinichiro Yamaga	M2	Computational Science and Eng.
Hiromu Takahashi	D1	Computational Science and Eng.
Yui Aio	B4	School of Education, Human Developmental Science
Changiun Zheng	Research Student	School of Engineering,
Zeinab Sadoughi	Research Student	Graduate School of Languages and Cultures

3. Schedule

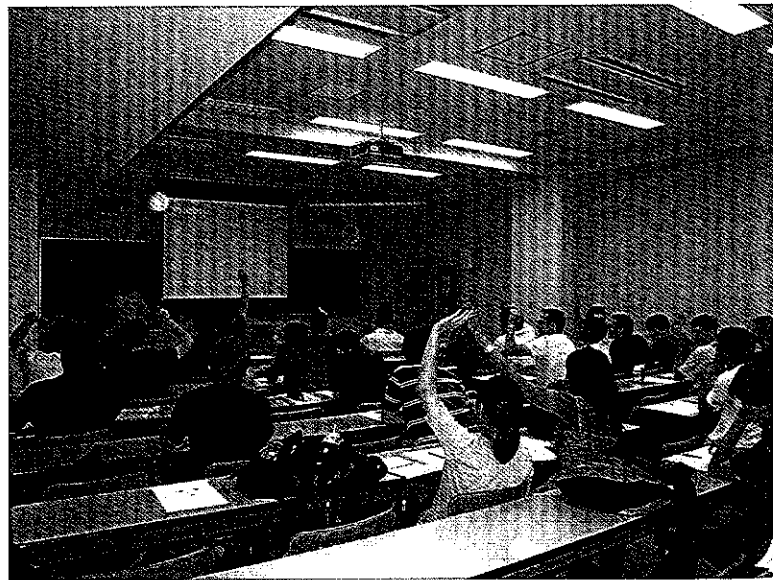
		8:45-10:15	10:30-12:00	13:30-16:15 (Automobile, rest time included)		
2009/6/15	M	Arrival at Nagoya / Settlement in Housing				
2009/6/16	Tu					
2009/6/17	w	15:00 Orientation IB012		17:30 Welcome party (Granpiatto)		
2009/6/18	Th	Field Trip to Meiji-mura Museum (Inuyama)				
2009/6/19	F	1.Japanese IB012	2.Japanese IB012			
2009/6/20	Sa					
2009/6/21	Su					
2009/6/22	M		3.Japanese IB012	3.Automotive Embedded Computing Systems	133	
2009/6/23	Tu		4.Japanese IB012	1.Current Trends in Automobile Eng., and the Car Industry and Market	322	
2009/6/24	w		5.Japanese IB012	4.Recycling	133	
2009/6/25	Th	Cultural Excursion to Kyoto				
2009/6/26	F	6.Japanese IB012	7.Japanese IB012	5.Communication Technologies in ITS	133	
2009/6/27	Sa	Home Stay				
2009/6/28	Su	Home Stay				
2009/6/29	M		8.Japanese IB012	6.Car Materials and Processing	133	
2009/6/30	Tu		9.Japanese IB012			
2009/7/1	w		10.Japanese IB012	7.Observation and Evaluation of Drivers' Behavior	133	
2009/7/2	Th	Factory visit and Cultural Excursion (Tokyo area)				
2009/7/3	F	Yamaha, NTSEL, Honda				
2009/7/4	Sa					
2009/7/5	Su					
2009/7/6	M		11.Japanese IB012	8.Crash Safety	133	
2009/7/7	Tu		12.Japanese IB012			
2009/7/8	w		13.Japanese IB012	9.Energy Saving Technology for Automobiles	133	
2009/7/9	Th	Factory visit (Toyota & Denso)				
2009/7/10	F	14.Japanese IB012	15.Japanese IB012	10A. Traffic Flow Characteristics 133 10B. New Manufacturing System in Car Industry		
2009/7/11	Sa					
2009/7/12	Su					
2009/7/13	M		16.Japanese IB012	11.Movements and Control of a Car	133	
2009/7/14	Tu		17.Japanese IB012	Factory visit (Mitsubishi)		
2009/7/15	w		18.Japanese IB012	12.Current Status of CAE Activity in the Vehicle Development		
2009/7/16	Th	19.Japanese IB012	20.Japanese IB012	2.Safety Engineering for the Prevention of Accidents	322	
2009/7/17	F	21.Japanese IB012	22.Japanese IB012	13.Fuels and Automobile Catalysts for Environmental Friendly Cars		
2009/7/18	Sa					
2009/7/19	Su					
2009/7/20	M					
2009/7/21	Tu		23.Japanese 322	14.Presentations	133	
2009/7/22	w			15.Presentations 133	Farewell Party Co-o	
2009/7/23	Th					
2009/7/24	F	Departure from Housing by 12 noon				

4. Lectures on Automobile Engineering

The lectures of NUSIP focused on the issues of the latest advanced technology related “Environment”, “Energy” and “Safety” in collaboration with the excellent researchers from the car industry and professors from Nagoya University. 14 topics are taught.



(Lecture by Professor Suzuki)



(Lecture by Mr. Teratani, Toyota Motor Co.)

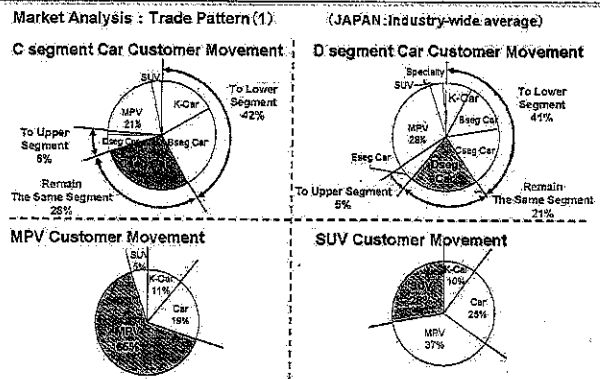
4.1 The Car Industry, Market Trend, Circumstance and Its Future

Lecturer: Mr. Hiroaki Yoshimatsu (Mitsubishi Motors Corp.)
 Prof. Yukio Ishida (Nagoya Univ.)

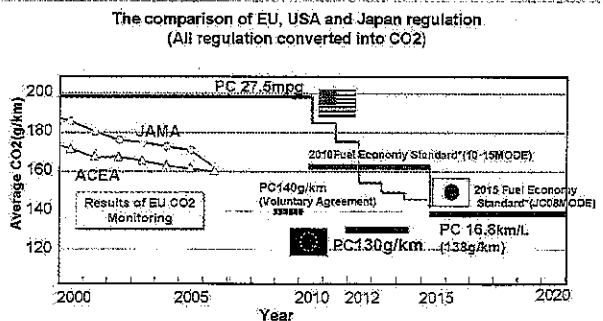
Contents:

1. Introduction
2. Global Market Trend by Region
3. Development Process (Including Current Market Situation)
 - (i) Market Analysis
 - (ii) "Target Segment Image" Board
 - (iii) Car Design Process
 - (iv) Design Clinic Survey
 - (v) Tests under Various Conditions and Crash Test
4. CO₂ Regulation
 - (i) Global Automotive Regulation and Counter Measures
 - (ii) Fuel Economy Standard in Japan
 - (iii) CAFÉ Regulation in USA
 - (iv) CO₂ Regulation in EU
 - (v) CO₂ Tax System Example in Europe
5. Safety Features
 - (i) Electronic Stability Control (ESC)
 - (ii) Adaptive Cruise Control
 - (iii) Smart & Dual Stage Airbags
 - (iv) S-AWC System
6. Cars in Future
 - (i) Sustainable Mobility
 - (ii) Fuel
7. Electric Vehicles
 - (i) Transition of Electric Vehicle Battery
 - (ii) Energy Economy
 - (iii) i-Miev
 - (iv) Battery and Motor

2. Development Process



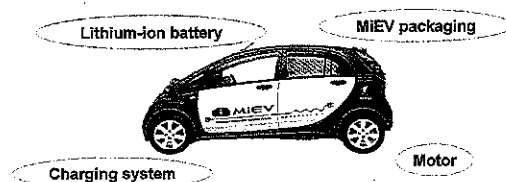
5. Global Automotive Regulation and Counter Measures



JAMA: Japan Automobile Manufacturers Associations
 ACEA: European Automobile Manufacturers Associations

7. Electric Vehicles

i MIEV Technical Features



4.2 Observation and Evaluation of Drivers' Behavior

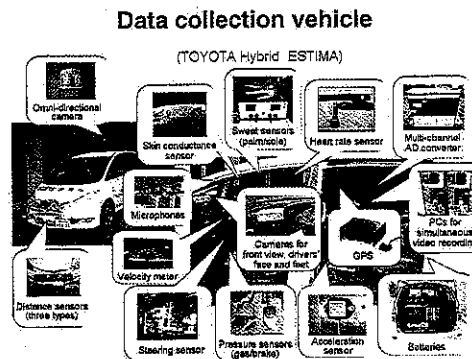
Lecturer: Mr. Masato Oikawa (Tokio Marine & Nichido Risk Consulting Co., Ltd.)

Prof. Kazuya Takeda (Nagoya University)

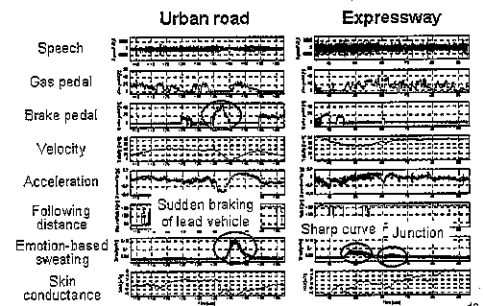
Contents:

Part.A

1. Introduction
 - (i) Why do we study driver?
2. Collection of large-scale multimodal data in real-world driving
 - (i) Multiple sensors (Microphone, Camera, Physiological sensors, etc.).
 - (ii) Distraction tasks
3. Driver identification
 - (i) A stochastic method for the pattern classification
4. Detecting dangerous traffic
 - (i) Detecting potentially hazardous points from dynamics of behavioral signals
 - (ii) Brake pedal force-based detection.



Examples of driving signals

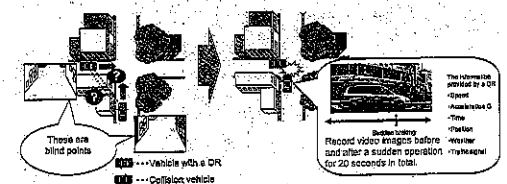


Part.B

1. What is the drive recorder
2. Rough driving
3. Dangerous driving
4. Diagnosis of driving risk
5. The correlation between accident and diagnosis

1. What is the drive recorder

When a sudden operation such as hard braking occurs, the drive recorder (DR) starts to save "Acceleration G force value", Speed and Position, and records the following images.
Ex: Intersection collision



Acceleration, Speed and Position while driving a car are analyzed so that the results help you understand the overall driving behavior and traffic condition, such as when, where and how to drive.

4.3 Car Materials and Processing

Lecturer: Dr. Shinichiro Fujikawa (Nissan Motor Co. Ltd.)
Prof. Takashi Ishikawa (Nagoya Univ.)

Contents:

Part A : Manufacturing innovation for forging process

1. Forging technology, applications
2. Material for crankshaft
3. Production preparation for crankshaft
4. Simulation techniques for cost Reduction of crankshaft
5. Quality assurance by reverse Engineering

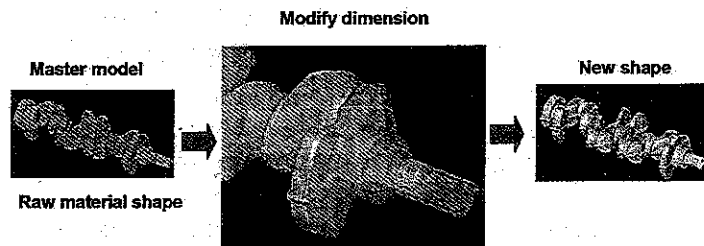
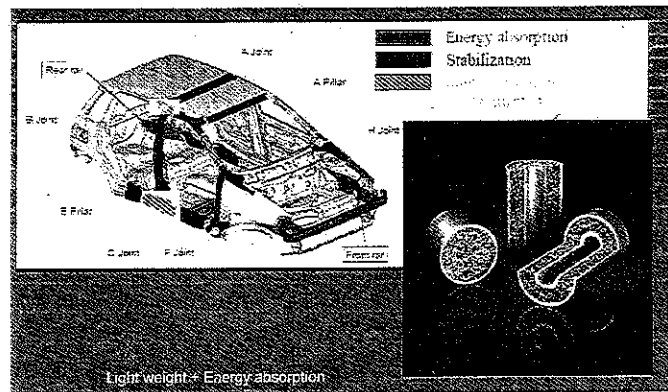


Figure 4 Parametric modification

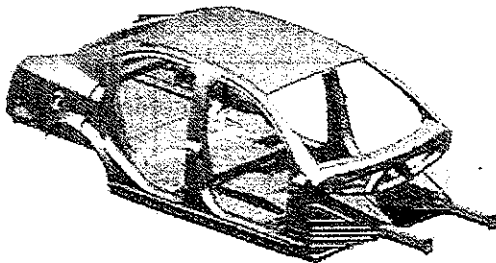
Part B : Car Materials and Deformation Processing

1. Introduction
2. High Strength Steels (HSS)
3. Tailored Blanks
4. Aluminum Alloy
5. Miscellaneous
6. Summary

Metal foam



Ultra Light Steel Auto Body



4.4 Movement and Control of a Car

Lecturer: Mr. Yoshikazu Hattori (Toyota Central R&D Labs., I)

Mr. Daisuke Yamada (ibd.)

Dr. Masatoshi Hada (ibd.)

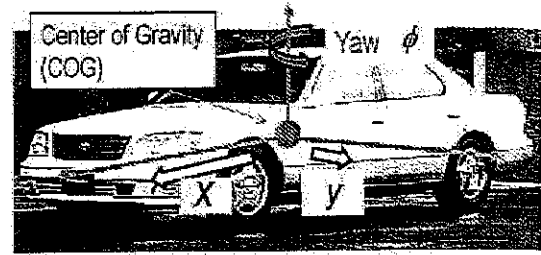
Prof. Kenji Fujimoto (Nagoya Univ.)

Contents:

Part. A

1. Modeling of Vehicle Dynamics

- (i) Introduction
- (ii) Equivalent Two-Wheel Vehicle Model
- (iii) Equivalent Quarter Vehicle Model



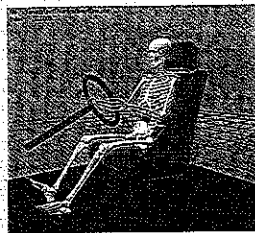
Part. B

2. Design of Vehicle Dynamics Control

- (i) Concept to design vehicle dynamics
- (ii) Determining Ideal Targets of vehicle dynamics
 - Human Motion Sensitivity for Low Frequency Ride Comfort
 - Movement and Control of a car - Human Centered Design -
- (iii) Realization of the targets
 - Vehicle Dynamics Integrated Management (VDIM)

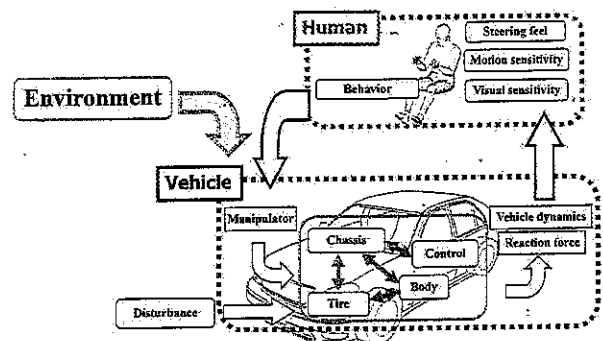
How do we move in a car?

Case 2 : Between 4 and 5 Hz



- Resonant motion of an entire human body.
- The elbows moves in an open-close motion.

Human-Vehicle closed loop system



4.5 Safety Engineering for the Prevention of Accidents

Lecturer: Mr. Yousuke Akatsu (Nissan motor Co. Ltd.)

Prof. Tatsuya Suzuki (Nagoya Univ.)

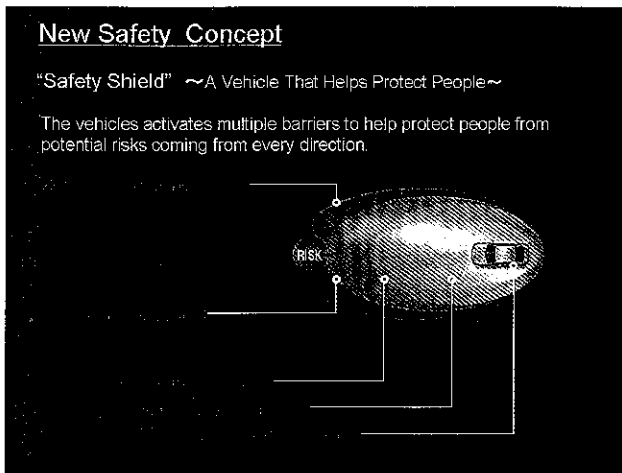
Contents:

Part A.

1. Nissan's Real World Safety Target
2. Fatal/serious injuries involving Nissan's vehicle (Japan)
3. Trend involving Nissan's vehicle (Japan)
4. Effort toward accident reduction
5. Definition of Safety Shield
6. Solution for Safety Shield Concept

Part B.

1. Deterministic Modeling of human driving behavior
2. Stochastic Modeling of human driving behavior
3. Fault tolerant control design
4. Innovative Safety Conception in Nissan



Two cases of turning-right

Decision of turning-right is detected when the braking is released!!

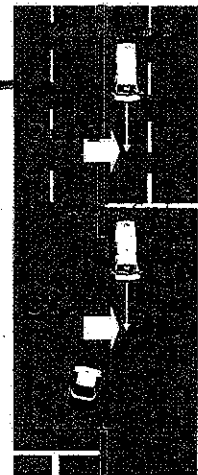


There are two cases of turning-right.

- Case 1: Turning-right before the Oncoming Car 1
- Case 2: Turning-right between the Oncoming Car 1 & 2

We model each case separately!

- { Case 1 → Model 1
- { Case 2 → Model 2



4.6 Crash Safety

Lecturer: Mr. Koichi Kamiji (Honda R&D Co. Ltd.)

Prof. Masahito Hitosugi (Dokkyo Medical Univ.)

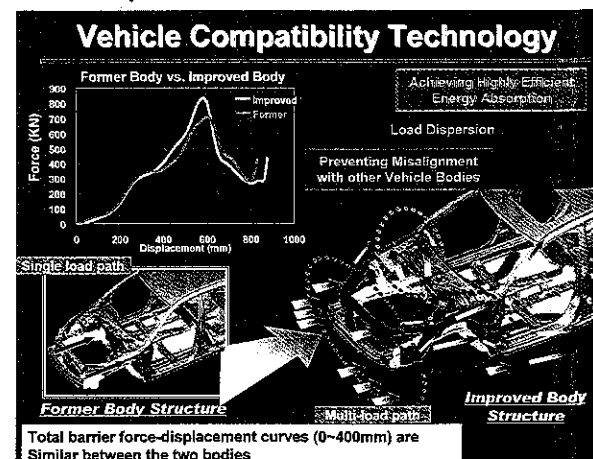
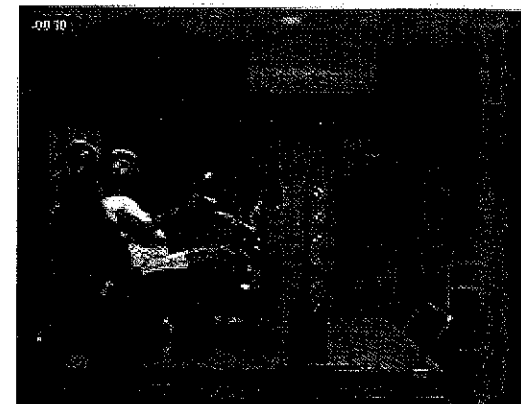
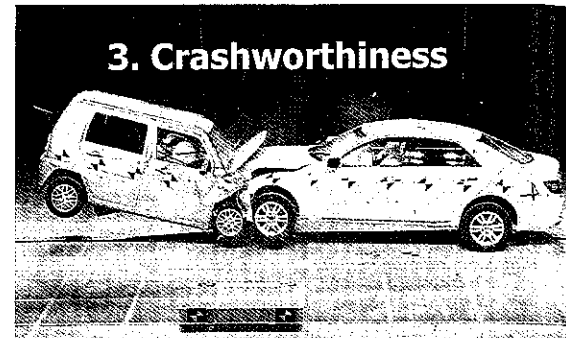
Prof. Koji Mizuno (Nagoya Univ.)

Contents:

1. Basic Theory of Crash Safety
 - (i) Introduction
 - (ii) Impact Biomechanics
 - (iii) Crashworthiness
 - (iv) Occupant Protection

2. Traffic Injuries and Impact Biomechanics
 - (i) The Broad Goal of Injury Biomechanics Research
 - (ii) Characteristics of Traffic Injuries
 - (iii) Comparison between Obese and Non-obese
 - (iv) Models in Injury Biomechanics
 - (v) Material Injury and fetal loss in MVA
 - (vi) Animal Experiments

3. Research and Development of Crash Safety
 - (i) Status of Traffic Accident in Major Countries
 - (ii) Traffic Accident Research
 - (iii) Regulation & NCAP
 - (iv) Safety Assessment Program
 - (v) Crash Compatibility
 - (vi) Occupant Restraint System Airbag
 - (vii) Pedestrian Protection



4.7 Automotive Embedded Computing Systems

Lecturer: Prof. Kenya Sato (Doshisha Univ.)

Mr. Kazuhiro Kajio (Toyota Motor Corp.)

Prof. Hiroaki Takada (Nagoya Univ.)

Contents:

Part A :

1. Automotive Embedded (Computing) Systems
2. Classification of Automotive Embedded Systems
3. Requirement on In-Vehicle Networks
4. Evolution Steps of Automotive Control System
5. Integrated System/Service Examples
6. Platform-base Development – A solution to the problems
7. Future Trends of Automotive Embedded Systems
8. Major Research Projects of NCES

Part B:

1. E/E systems
2. E/E architecture
3. On-board Software
4. Standardization

Part C:

1. In-vehicle communication
2. In-vehicle network
3. CAN
4. Vehicle interface protocol

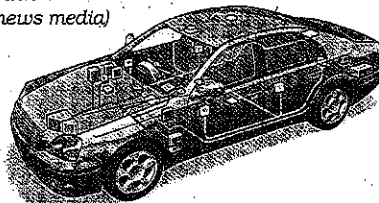
Introduction to Automotive Embedded Systems

Example: LEXUS LS460

- ▶ released in September, 2006
- ▶ more than **100 ECUs** with all optional equipment
- ▶ about **7,000,000 lines** of software embedded (from different news media)



<http://www.lexus.jp/>

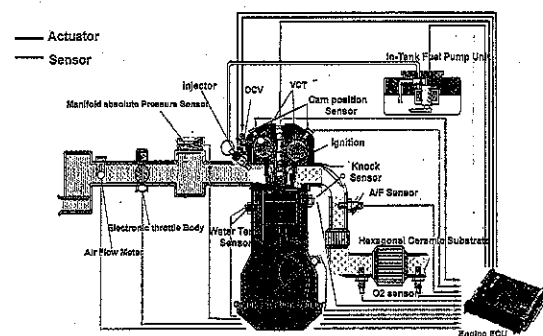


Automotive Embedded Systems and Networks

Hard Real Time System(EMS)

TOYOTA

- Current EMS(Engine Management System) consists of several Sensors and Actuators to reduce fuel consumption and improve emission.



4.8 Communication Technologies in ITS

Lecturer: Dr. Hiroyuki Kumazawa (Mitsubishi Electric Co.)

Prof. Masaaki Katayama (Nagoya Univ.)

1. Problems in road transportation

- (i) Environment (Traffic Jam, CO2 Emissions, Fuel Consumption)
- (ii) Traffic Accidents

2. What is ITS ?

3. Key technologies in ITS

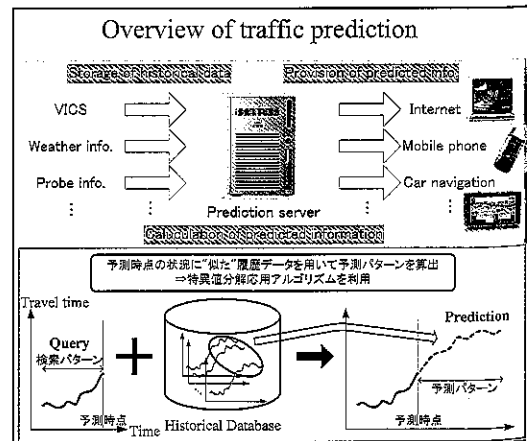
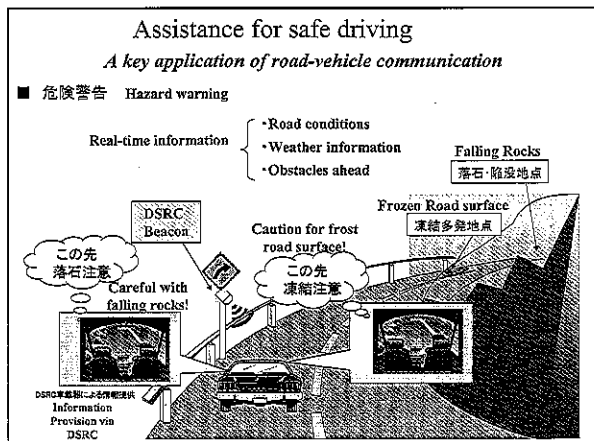
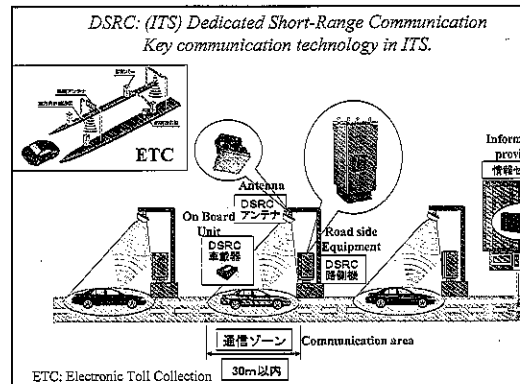
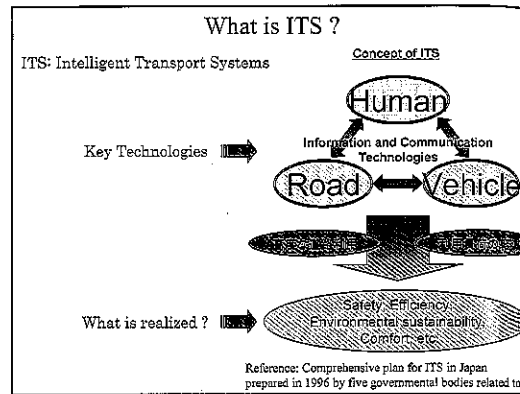
- (i) Information Collection
- (ii) Information Processing
- (iii) Information Provision
- (iv) Information Utilization

4. Applications of communication technologies

- (i) Communication in ITS
- (ii) Dedicated Short-Range Communication
- (iii) Communication Protocol
- (iv) Assistance for Safe Driving

5. Applications of information processing

- (i) Traffic Information System
- (ii) Traffic Prediction



4.9 Current Status of CAE Activity in the Vehicle Development

Lecturer: Mr. Shigeaki Hayashi (Toyota Motor Co. Ltd.)

Prof. Toshiro Matsumoto (Nagoya Univ.)

Contents:

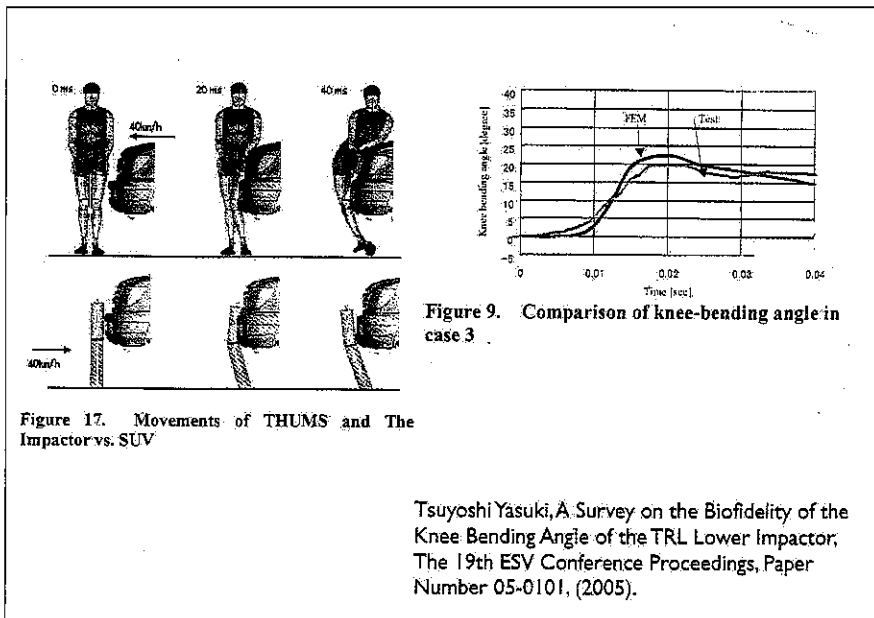
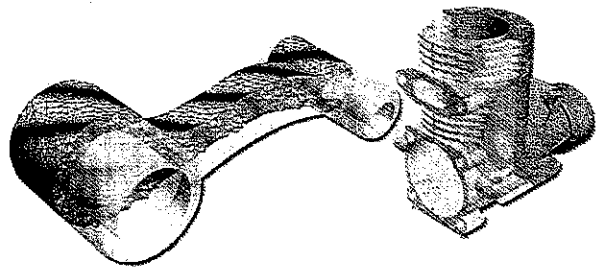
Part A: Introduction to CAE

- (i) CAE Mathematical Models
- (ii) FDM : Finite Difference Method
- (iii) FEM : Finite Element Method
- (iv) BEM : Boundary Element Method
- (v) Topics in CAE

Part B: Current Status of CAE Activity in the Vehicle Development

- (i) Development of human finite element model
- (ii) Validation of human FE model
- (iii) Body deformation in CAE simulation
- (iv) Modification vehicle structure to realize compatibility
- (v) Occupant protection in a crash

FEM mesh examples



4.10 Energy Saving Technology for Automobiles

Lecturer: Mr. Tatsuo Teratani (Toyota Motor Co. I)
 Prof. Shigeru Okuma (Nagoya Univ.)

Contents:

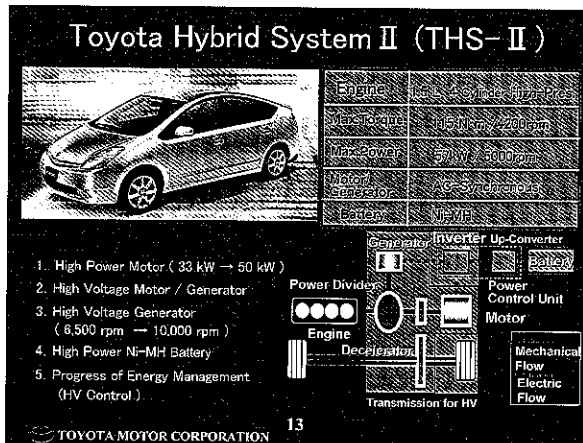
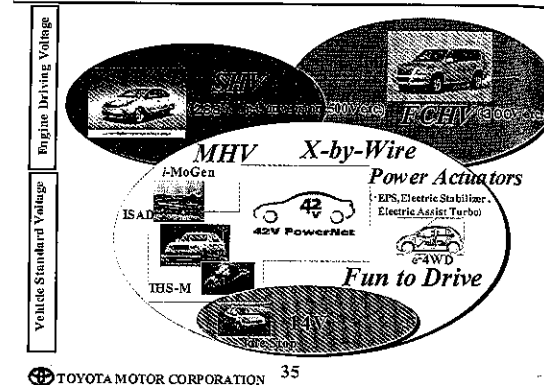
Part A: Evolutional Automotive Electronics

1. Now, the Earth and now, the Vehicles
 - History and Market of Vehicles
2. Intelligent Car is Electronics Car !
 - History and Integration of Electrification
3. Current Technical Issues
 - 7 Technical Issues
4. Road Map of Next Generation Vehicles
 - Road Map of Next Power Supply

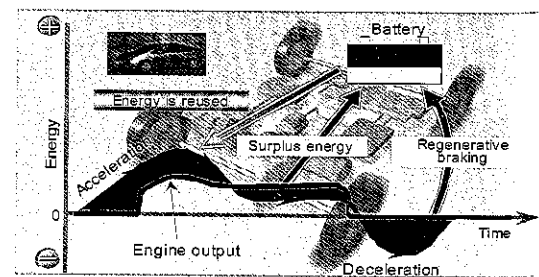
Part B : Vehicle Energy Management

1. Environmental Technologies
2. Energy-saving Technologies
3. Energy Issues & Countermeasures
4. Future View
5. Conclusion

“Position of 42V for Next Generation Vehicles”



Energy Management of Hybrid Vehicles

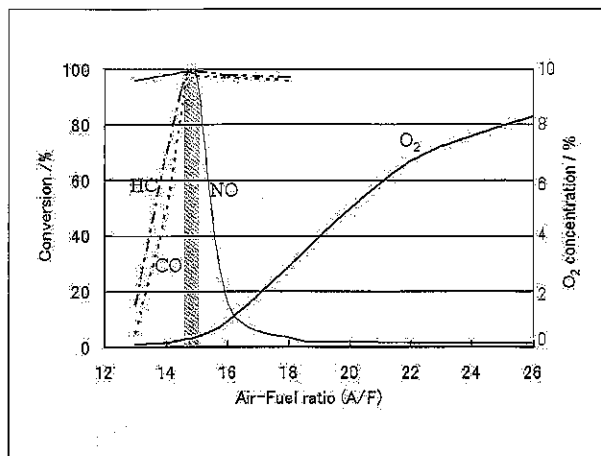


4.11 Fuels and Automobile Catalysts for Environmental Friendly Cars

Lecturer: Prof. Atsushi Satsuma (Nagoya Univ.)

Contents:

1. Automotive Catalysts for Gasoline Engines
 - (i) Why gasoline engine exhaust is clean ?
 - (ii) Role of Catalysts
2. Novel Catalysts for Gasoline Lean-burn and Diesel
 - (i) Diesel particulate filter (DPF)
 - (ii) NO_x storage and reduction (NSR) catalysts
 - (iii) Selective reduction of NO by urea (Urea-SCR)
 - (iv) Selective reduction of NO by hydrocarbons (HC-SCR)
3. Production of Fuels
 - (i) Petrochemical Industry
 - (ii) Hydrodesulfurization
4. Fuels in Future
 - (i) Fuels from biomass



Composition oils after distillation.

Boiling point Low \rightarrow High

Gasoline (~C8)
Petrochemicals

Diesel (~C16)

	Naphtha	Kerosene	Gas oil	Residue	Vacuum Gas Oil	Residue
Boiling point (°C)	40 ~ 150	150 ~ 250	250 ~ 360	> 340	340 ~ 500	> 500
In crude oil / %	~20	~10	~20	~50	~30	~20
C/H ratio	2.0 ~ 2.2	1.9 ~ 2.0	1.8 ~ 1.9	~ 1.6	~ 1.7	~ 1.4
Sulfur content / %	0.01 ~ 0.05	0.1 ~ 0.3	0.5 ~ 1.5	2.5 ~ 6.5	1.5 ~ 3	3 ~ 6
Nitrogen content / %	0.001	0.01	0.01 ~ 0.05	0.2 ~ 0.5	0.05 ~ 0.3	0.5 ~ 0.8
V content / ppm				20 ~ 1000		50 ~ 1500
NI content / ppm				5 ~ 200		10 ~ 400

Hydro cracking
Fluid Catalytic Cracking (FCC)

Hydrodesulfurization (HDS)

octane cetane 78

4.12 Recycling

Lecturer: Mr. Jun Sato (Toyota Motor Corp)
 Mr. Masatoshi Takano (ibid.)
 Prof. Toshiharu Fujisawa (Nagoya Univ)

Contents:

Part A: Automobile shredder residue (ASR)

Recycling initiatives at Toyota

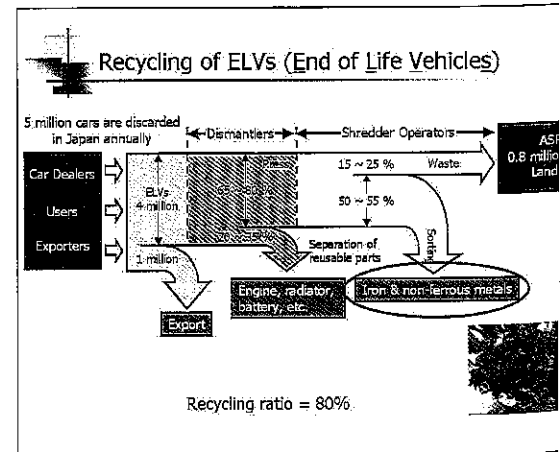
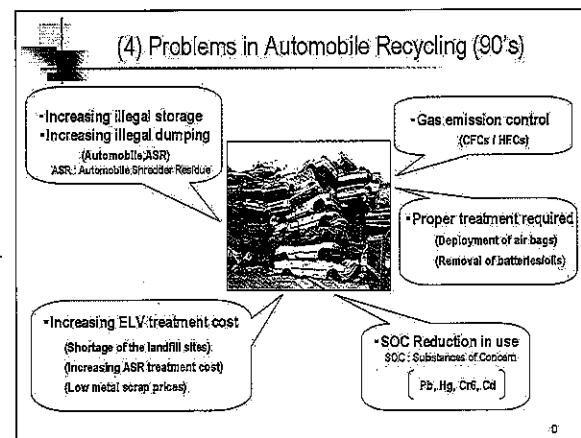
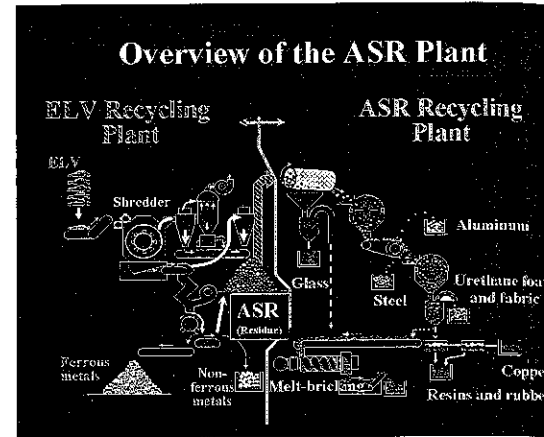
1. Overviews of ELV to ASR
2. Practical uses of recycled ASR
3. ASR recycling process

Part B: Automobile recycling legislation in the World

1. A Sustainable Society and Automobile
2. Recycling
3. Global Movement towards a Sustainable Society
4. Automobile Recycling Legislation in the World
5. Promotion of Design for Recycling (DfR)

Part C : Recycling as secondary resources

1. Exhaustion of resources
2. Recycling of ELVs
3. ASR recycling
4. Recycling of base metals
5. Recoveries of PGM from waste catalyst for exhaust gas purification
6. Conclusions



4.13 Car Production System

Lecturer: Mr. Hiroshi Furuhashi (Denso Corp.)

Mr. Kunihiro Kodama (ibid.)

Prof. Rei Hino (Nagoya Univ.)

Contents:

Part A: DENSO Profile

1. Overview
2. Company policy (DENSO VISION 2015 etc.)
3. Organizations
4. Products & Customers

Part B: Concept of the DENSO Production System

1. What is the production system
2. How to develop the Production system Manufacture the best products with the best production system
3. Role of Production Engineering

Part C: Development Strategies of the DENSO Production System

1. History of the DENSO Production System Development
2. Classification of Production system (Fig.1)
3. Production System Examples
 - (1) High-speed throughout transfer line
 - (2) Manual Operation Cell and Its Automation

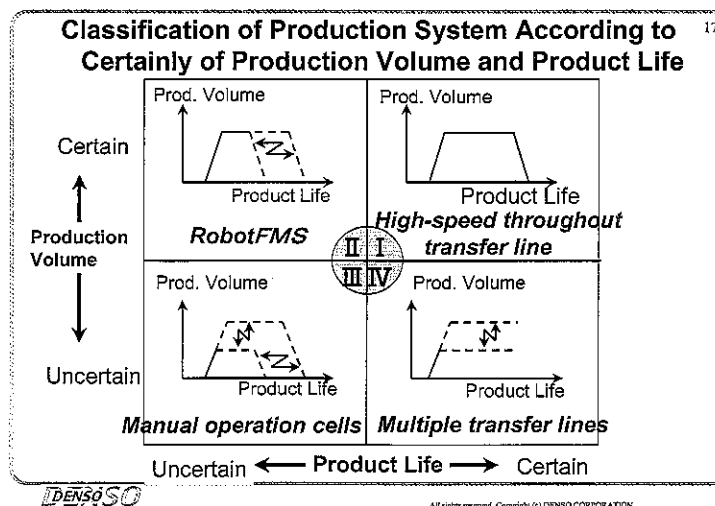


Fig.1

4.14 Traffic Flow Characteristics

Lecturer: Prof. Hideki Nakamura (Nagoya University)

Contents:

1. Role of traffic engineering
 - (i) Transportation and Traffic Engineering
 - (ii) Major Concerns of Traffic Engineering
 - (iii) Microscopic and Macroscopic Analysis
2. Fundamentals of Traffic Flow Analysis
 - (i) Phenomena in the Vicinity of a Bottleneck
 - (ii) Relationship between Speed, Spacing, and Flow
 - (iii) Fundamental Speed-Flow-Density Relationship
 - (iv) Speed-Flow Relationships in the Vicinity of a Bottleneck
3. Traffic Congestion and Bottleneck Phenomena
 - (i) Typical Bottlenecks
 - (ii) Bottleneck Sag
 - (iii) Mechanism of capacity Drop at Sags
 - (iv) Flow at Bottleneck

interchange

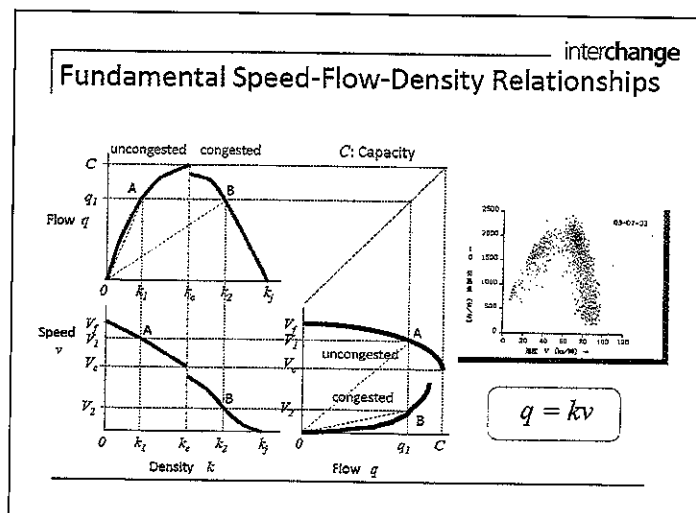
Bottleneck and Types of Congestion

- Bottleneck
 - Any location which a reduction in capacity (e.g., lane drop or red light of traffic signal) causes demand to equal or exceed capacity

*without bottleneck

*with bottleneck

- Types of congestion
 - Recurrent congestion: occurs repeatedly at the same place (upstream of a fixed bottleneck)
 - Nonrecurrent congestion: the result of some incident (accident, disabled vehicle, dropped obstacles, etc.)



4.15 Special Lecture

Lecturer: Mr. David Goldstein (GM Program Manager)

[1] *The Changing Landscape of the US Automotive Industry: Post WWII*

Abstract

The presentation will consider a decade by decade examination of the key events in the United States automotive industry, from post WWII to today, reviewing the successes and challenges that the US automotive industry has faced. The presentation will trace the path of events that led to the current crisis, including an analysis of how deep the crisis is and what are the possible outcomes from the current situation.

[2] *Program Management in the United States: Business and Technical Perspectives*

Abstract

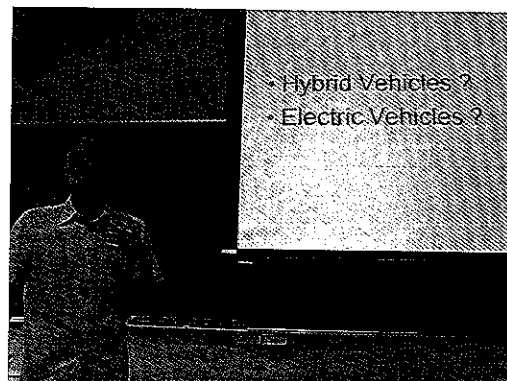
What is program management? Why is it important? What are the key components? The presentation will present a general overview, and then examine the program management structure of a specific US corporation. The various components of that program management structure will be explained. In addition, what happens when two companies from different countries work on a joint program, for example, from the United States and Japan? In this situation, one must have an understanding of how the different cultures operate. Towards the end of the presentation, we will review some of the key differences between US and Japanese cultures and how those in program management need to take these differences into account in order to be successful when working on a joint program.



5. Group Projects and Presentations

All international students and full-time students from Nagoya University are required to work on group projects. They are split into groups depending on which topic from the lectures they're most interested in. Each group is composed of some international students and one student from Nagoya University. They write 10-page report about the topic they are interested in and make presentations.

- Group 1: *Current Trends in Automobile Engineering, and the Car Industry and Market*
Ptryk Mastela, Charndee Grewal, Wanxiao Shao
- Group 2: *Automotive Embedded Computing Systems*
Jeffrey Duperret, Robert Rasmusson, Chirag Panjwani
- Group 3: *Safety Engineering for the Prevention of Accidents*
Loretta Kwan, Ying Heng Peng, Hidehiro Ogura
- Group 4: *Crash Safety*
Gyu Jin Ahn, David Sinnaduray, Shinji Kajiura
- Group 5: *Movements and Control of a Car*
Bernard Murphy, Cheng-Hsien Wu, Theodore Tragas, Sean Rosen
- Group 6: *Energy Saving Technology for Automobiles*
Chang-ping Lee, Kevin Zaseck, Joseph Bisognani, Antoine Navarre
- Group 7: *Fuels and Automobile Catalysts for Environmental Friendly Cars*
Anthony Budzinski, Selma Lee
- Group 8: *Car Materials and Processing*
Daniel Bellers, Albert Duong, Eric Wen, Juanri Juanri
- Group 9: *Recycling*
Joshua Hoemke, Romain Fanchini, Chirag Daswani
- Group 10: *New Manufacturing System in Car Industry*
Jason Geathers, Janani Viswanathan, Evelyn Woen



6. Lectures on Japanese

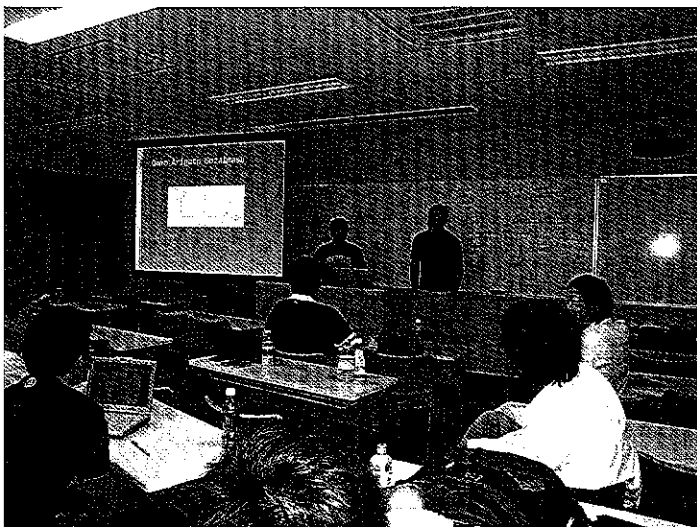
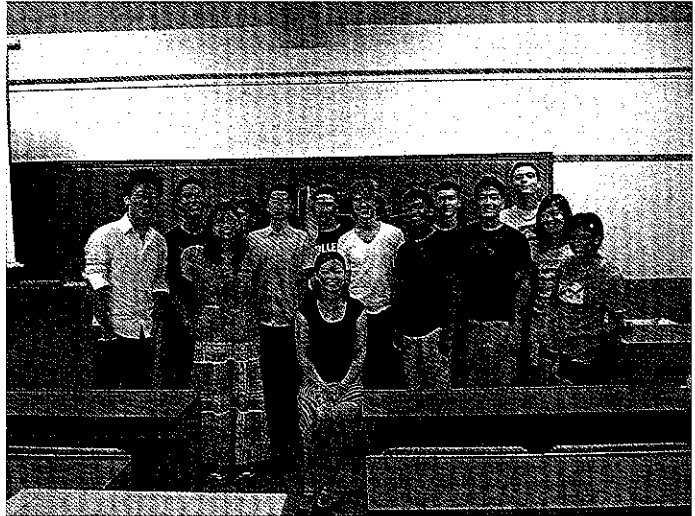
6.1. Elementary Japanese

Lecturer: Prof. Emi Koga and Prof. Miyoko Inoue

Textbook : Japanese for Busy People (Romanized version)

Contents:

1. Meeting people,
2. Shopping,
3. Getting around,
4. A weekend excursion
5. Dining out,
6. Visiting a Japanese home,
7. Going to a festival,
8. On business outside Tokyo,
9. Seeing a museum



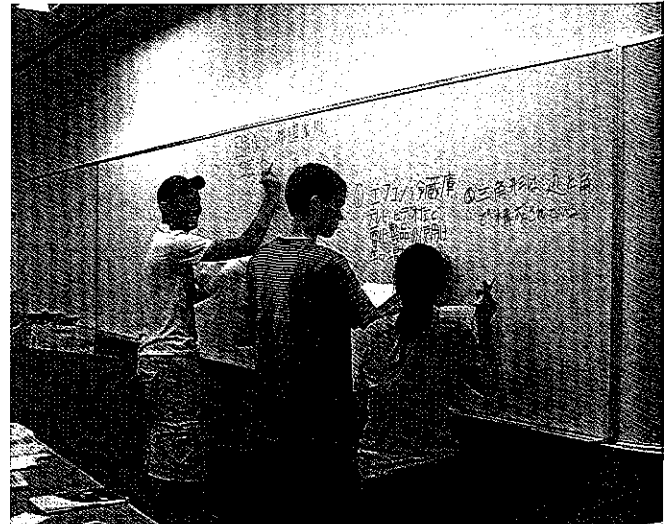
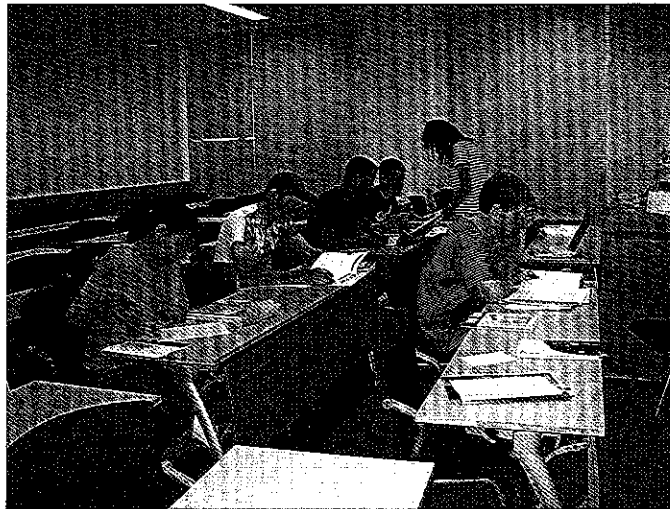
6.2. Intermediate and Advanced Japanese

Lecturer: Prof. Yumi Okumura

Textbook : 1. An Introduction to Technical Japanese
2. Japanese For Busy people 2,3

Contents:

1. Reading and Writing some basic technical articles,
 - Personal computer and the Japanese Language
 - Taking a look at a Homepage
 - Writing Japanese on a Word Processor
 - Temperature Changes
 - The Bullet Train Robots
 - New sources of Energy Global Warming
2. Grammar and Learning the Conversation



7. Factory Visits

Factory visits are included in this program. All the participants visited six representative automotive industries and one research institute. Three of them are plants located in Aichi prefecture where Nagoya University belongs. They visited three plants in the factory visit tour in Kanto area. They stayed two nights in Tokyo, the capital of Japan. The trip to Kanto area also included a couple of sightseeing, such as, visiting Tokyo tower, Asakusa Kannon Temple, Owakudani Hot Spring and Shiraito waterfall. The following list shows the places they visited.

- (1) National Traffic Safety and Environment Laboratory
- (2) Toyota Motors Co.
- (3) Mitsubishi Motors Co.
- (4) Yamaha Motor Co.
- (5) Honda Automotive R&D Co.
- (6) Denso Co.



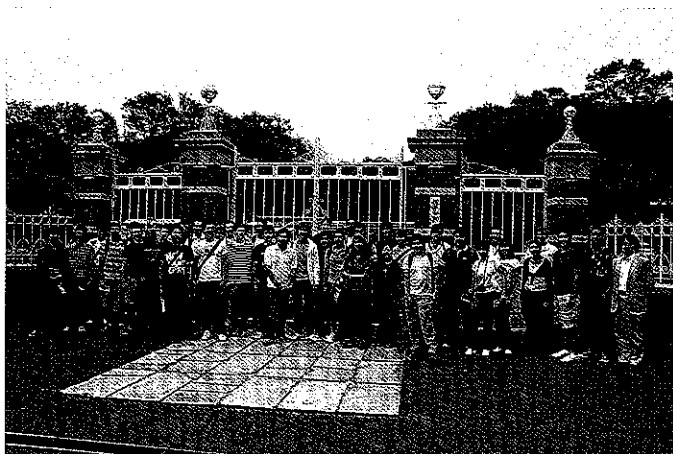
8. Other Activities

8.1 Cultural Tours

In order to understand Japan and Japanese culture, cultural tours are also included in the NUSIP program.

(1) Meiji-Mura

The participants joined to the field trip organized for NUPACE (Nagoya University Program for Academic Exchange) students and visited Meijimura in Inuyama City. Meijimura is a unique village-sized museum where many noteworthy edifices as relics of the Meiji period (1868-1912).



(2) Kyoto

Cultural tour to Kyoto is organized to NUSIP students. Kyoto was the capital of Japan and the center of the nation's civilization for more than 10 centuries, from 794 to 1868. Teenagers with historical and religious traditions and noted as the birthplace of arts and crafts of old Japan. They visited Kinkakuji or Gold pavilion and Kiyomizu Temple.



8.2 Home Stay

International students visited Japanese families and were entertained. They enjoyed Japanese food and conversations in Japanese.



9. Voice of Participants

9.1 Automobile Engineering

- In general, although the lectures were long (it is a little difficult to stay awake during a three hour lecture), they were very informative and interesting.
- I found all of the topics very interesting and relevant.
- (Current Trend in Automobile)- very interesting. Liked the comparison of trends between the different countries.
- (Safety engineering)- a very interesting lecture and it ultimately became my primary topic at the end of NUSIP
- (Crash safety) This was one of my favorite lectures. It went along very well with the Honda visit.
- I will comment on the lectures as a whole. The lectures were well prepared and covered many interesting topics. The lectures did sometimes feel a bit long which I think could be solved by inserting a 5 minute break every hour. Also, many of the students stood around the room even though there were available seats in the front so I encouraged the professor to ask the students to sit closer to the front to clearly hear what the lecturer was saying.
- (Recycling) Great message from Mr. Sato and interesting developments at Toyota. Recycling of automobiles has always been a concern of mine and many of the questions were answered. Should include programs for batteries.
- (Control and Catalysis) Too technical

9.2 Group project works

- The group projects were fun and allowed the students to more thoroughly examine a topic of choice.
- The Group Project was successful.
- It's very helpful for us to learn more by ourselves but I think most of the people spent too much time on it. Since the deadline is at the end we all wanted to travel and see around Japan again. Maybe there's a better way to evaluate our performance. Anyway, it's still a very good opportunity to do projects
- It was not really a group project as all work was not collaborative and was accomplished independently. The time allowed for each assignment is reasonable, perhaps the report should only be required for those who need the credit.

9.3 Japanese Language Class

(Elementary)

- By the end of the program, I learned enough Japanese to perform day-to-day activities such as ordering food at a restaurant.
- I really enjoyed taking Japanese. It was my first time taking it formally. I really like Japanese culture, so I listen to a lot of Japanese music and watch anime and movies with subtitles only. Before arriving to Japan, my Japanese was very limited. While learning the language, I was comfortable to go to Tokyo and Osaka with my NUSIP friends also only learning Elementary Japanese. Improvements that could be made would be to teach the necessities in the first two weeks of NUSIP. I think we started learning how to order food on the 4th or 5th week. The important topics I would have found very useful on the first few weeks would be:
 - Curtsies: Greetings/thank you/ excuse me/ please/ no thanks. I was grateful that these were immediately covered because I used them on a daily basis.
 - Asking for directions
 - Ordering food at a restaurant
 - How to buy things
- The lectures were very educational and I was eager to learn the language. I was able to gain quite a firm grasp upon the very fundamentals of Japanese. While the instructors were very great at teaching us, the teaching was still done very much from the book. Since many of us didn't know the language before coming to Japan it was difficult to talk to other Japanese people which is why I suggest for future years that a couple of the tutors come to the class and become the teachers. Nobody knows the language better than the Japanese students and since they are willing to learn English as well it would be wonderful learning experience for both of us. The professor could break up a class of 12 students in 4 groups with 3 students each along with 1 tutor per each group. This tutor could go over what the teacher assigned for that day and afterwards begin to talk to the students using some of the words that they just learned. If the international students have questions they could ask the tutor in English and thus his English language comprehension would also improve. Because the groups would only be the size of 4 students they would quickly become friends and would be more likely to.

(Advanced)

- Okumura-sensei did a great job adjusting the curriculum to the skill level of the students

9.4 Factory Visits

- These were the highlight of the program. They were a unique opportunity, and I enjoyed them very much.
- Very Impressive.
- My favorite factories were Honda R&D, NTSEL, and Mitsubishi. I felt that the factory visits and sights I saw were truly unique; I honestly do not think I'll have another chance to see and experience the following:
 - *The new Honda development in action. The researchers at Honda were very kind to provide such an interesting presentation and Q and A session.
 - *At NTSEL I was chosen to drive the simulation vehicle. It was an amazing experience, incredibly impressive.
 - *Riding the high speed bus and electric vehicle at Mitsubishi.
- They were great, I really liked Honda and the National Safety Lab.
- Wonderful! It's a once in a life time experience. My friends all envy me.
- The factory visits were phenomenal. Not only were we getting a chance to learn about them in the classroom, but we had the opportunity to see how everything is done. The visits were really interesting and I think the Q&A time was well allocated.
- Best aspect of the program. All the factory visits were extremely valuable.

9.5 Cultural Tour

- These were also interesting and gave us greater insight into Japanese culture.
- Educational and Interesting experiences
- Meiji-Mura- a very educational field trip. It was a good introduction to an era of Japanese history. Having coupons was a generous and helpful thing.
 - Kyoto- An incredible experience. The temples we visited were gorgeous and the lunch was delicious. I really wish that we had more time at each temple. It was about 15 minutes at each. I wish I went to the top to see the Kiyomizu-dera temple. Instead, I saw the fountains, took a long detoured path, and ran out of time to see the temple.
- Great! I love all cultural tours and the home-stay program. I really experienced Japanese culture.
- I really enjoyed visiting all the different places especially in Tokyo when we had the chance to walk around the city by ourselves. While the other excursions were educational, interesting they were quite quick and some of the students that did not stay long in Japan might have missed out on all the great spectacles of Japan. I would recommend making all the excursions on Friday and if possible a 1-night stay in the city so that students can venture out into the city by themselves. To offset the additional

would suggest increasing the program fee. I would also recommend making one of these types of trips to be early in the program because I made the most friends during the time when we were in Tokyo just trying to find our way around the subways. I really can't thank you enough for all the wonderful experiences and for all the friends that I had a chance to meet because of the tours.

- Great location selection. I especially enjoyed going to Meij-mura.

9.6 Tutor System

- I had very little contact with my tutor. We have no such system in the U.S., so many American students did not utilize it.
- Successful
- I really liked the tutors and they were all very helpful during my stay in Japan. I didn't always consult my assigned tutor since I saw some of the others more frequently.
- Very good, we all loved Hidehiro and Shinji
- I think it's not a necessary system since my tutor seldom came to class but only helped me at the beginning. Anyway, I still thanked him.
- It seems like great resource, however, I never used it, though I wished I had. I never needed help completing the assignments. Towards the end of the program I had the chance to go to a restaurant with my friend and his tutor and it was a pleasant experience. While the tutor system is in place to help students with their assignments I think that it should also be strongly encouraged for students to go and meet with their tutors for no particular reason just so they can talk and get to know each other. This sort of experience would add even more to an already excellent study abroad program.
- Helpful and it was really nice being able to meet and bond with Japanese students.

9.7 Message to the Future Participants

- Pay attention in lecture because the information that the company representatives are going to present is very valuable. Dress nice and respect the employees you run into during the factory visits because it is very rare to be involved in these types of experiences.
- Bring cash to exchange money; you'll save a lot on transaction fees. There are money exchange centers that often have better exchange rates and are faster than bank transactions. When visiting other cities, if you're not pressed for time and do not have a Japanese Rail Pass, taking the bus is much cheaper than the shinkansen.
- If you want to have a wonderful summer that you won't forget you must attend this program! You will learn much more than you can expect and it's great to meet people

from different countries.

- Get ready for the best summer of your life!
- This unique program offered by Nagoya University is an opportunity not to be missed. You will be learning from the best in the field and meeting people from all over the world. Many engineering students do not have time for studying abroad but this summer program should fit into everybody's schedules. I'm extremely glad I decided to participate.

9.8 Additional Comments

- I enjoyed this program very much, and I would highly recommend it to anyone interested in automotive technology or Japanese language or culture. I am grateful to Nagoya University and the professors for making this program possible.
- Thank you very much again to all the 2009 NUSIP faculty, I really enjoyed the experience.
- I had the best time in Japan. I thank NUSIP and everyone who helped make this program a success. It was an incredible experience and I've made some amazing friends all over the world because of NUSIP. Right now it's been a month and I still miss Japan and its culture.
- NUSIP was a great experience. Thanks for putting this program on.
- NUSIP is an excellent program that educated me about automotive engineering as well as provided me with a foundation of Japanese and the Japanese culture. Though the program was only a few weeks long I felt that much was accomplished and I hope future participants can get even more out of the program. To get things rolling quickly and getting the students to get used to Japan I think it would be great if each student spent some mandatory time with their tutors just walking around Nagoya. While I enjoyed the interaction with other students from all over the world as a great benefit I wish I had a chance to interact with the Japanese people even more to better understand their culture and way of life. If possible I would recommend scheduling classes as early as possible so that students have more time to explore Nagoya. I remember one day when we only had Japanese and classes ended at 12 – many of us decided to meet up and explore Nagoya and its surroundings since many of the attractions close at 5 PM which is usually the time I would get back from classes. Also, to get better feedback I would recommend handing out a feedback sheet that the students can hand back in at the end of the class so that the professors get much better responses because I had a hard time recalling all of the different lectures. I think the Japanese class was great, but I wish there would have been more homework or tests even that would test our understanding. These homework

tests shouldn't be too difficult, but they should motivate the students to ask their tutor for help so they can develop a better understanding of Japanese. Overall, I have to say that this program was nothing short of exceptional. I learned a lot, made many new friends, and not only grew to better understand Japan and its people, but now I have a better understanding of what it means to be a global citizen. This has absolutely been the most memorable summer of my life and I cannot thank you enough for all the experiences.

Appendix 1 : Poster

JAPAN

2009 Summer Intensive Program at Nagoya University

June 16-July 22, 2009

Latest Advanced Technology & Tasks in Automobile Engineering

+ Elementary Japanese

Language: English
Place: Nagoya, Japan

Inquiries & Applications:
International Office of your University



Movements and Control of a Car
Crash Safety
Recycling
Communication Technologies in ITS
Car Materials and Processing
Traffic Flow Characteristics
Automotive Embedded Computing Systems
Observation and Evaluation of Drivers' Behavior
Safety Engineering for the Prevention of Accidents
Energy-Saving Technology for Automobiles
Current Status of CAE Activity in the Vehicle Development
Fuels and Automobile Catalysts for Environmental-Friendly Cars
New Manufacturing System in Car Industry
Current Trends in Automobile Engineering, and the Car Industry and Market
Individual Research Projects

Application Deadline: February 28, 2009

WEBSITE  <http://www.engg.nagoya-u.ac.jp/en/nusip/>

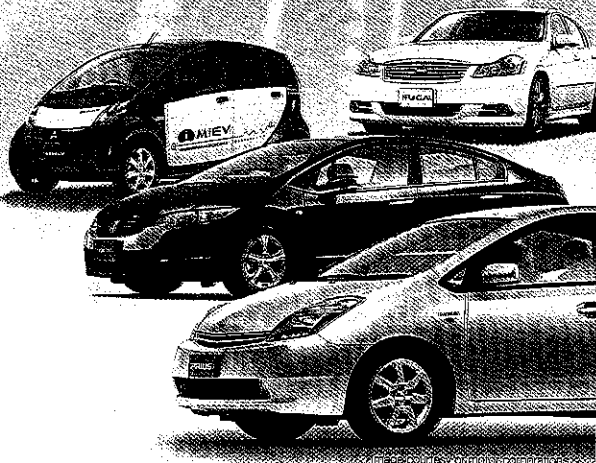
Appendix 2 : Leaflet

JAPAN

2009 Summer Intensive Program at Nagoya University (NUSIP)

Latest Advanced Technology & Tasks in Automobile Engineering

+ Elementary Japanese



"Earn college credits while immersed in another culture and engage your intellectual curiosity with the latest findings in automobile industries in Japan that focus and succeed on a level you never thought possible. Join NUSIP for six weeks and experience the full range of Japanese cultural life. Course-related excursions will provide you with an opportunity to discover Japanese amazing cultural scene that has enticed and entranced observers for generations".

Time schedule:

Application Deadline: February 28, 2009

Course Duration: June 16 to July 22, 2009

Contents

1. Summary	1
2. General Information	2
3. Course Overview	3
4. Eligibility	6
5. Application Procedures	7

Courses offered

1. Seminars on Latest Advanced Technology and Tasks in Automobile Engineering (400 level) (3 credits)
2. Elementary Japanese Language Course (100 level) (3 credits)
(Students with previous Japanese language experience will be offered a more advanced language course.)
3. Automobile industry factory and laboratory visits
4. Cultural excursions

Student Capacity

Approximately 35 students (25 overseas students and 10 Nagoya University students)

Program Fee

\$1,600 US, excluding meal and air-ticket expenses. Accommodation in Nagoya, the Japanese language course, orientation, public transportation pass, cultural excursion and social activities are included in the program fee.

(Nagoya University students will have the fee for the Automobile Engineering course waived, but will be charged for cultural excursions and social activities.)

Language

English

General Information

Overview

The 2008 summer program at Nagoya University will provide students with a rare opportunity to connect with and play a role in automobile technology. The program offers academic credits towards students' engineering degrees and, beyond the core curriculum, students may further supplement their practical know-how with enrichment as they are exposed to the authentic environment of the automobile factory and research center. A Japanese language course is also offered.

Study with an advanced curriculum that gets results

- Each lecture invites you to learn in a new context, in new ways, gaining perspectives that shape the way you engage with the automobile world.
- Each lecture is as demanding as it is rewarding, resulting from the commitment of Nagoya University faculty and, in some cases, collaboration with industrial researchers from Toyota, Honda, Nissan, and Mitsubishi.
- Unlike many study opportunities abroad, the NUSIP program is led exclusively by faculty, ensuring the same quality education that students encounter on their own campus.

Accommodation

Monthly-rental apartment especially appointed for you (rooms in each apartment shared by two or three students).

Meals

Lunch and dinner are available at the campus cafeteria at a reasonable price.

Visa

'Temporary Visitor' (tourist) visa

Health Insurance

Participants should take out an appropriate health travel insurance covers the duration of their stay in Japan before that program commences.

Learn from the Staff Committed Excellence

Program Director:

Professor Jun-Ichiro INOUE,
Associate Dean, Graduate School of Engineering

Chief Coordinator:

Professor Yukio ISHIDA,
Dept. of Mechanical Science and Engineering

Instructors (Omnibus):

Researchers or engineers from automobile companies and professors at Nagoya University

Course Overview

1. Latest Advanced Technology and Tasks in Automobile Engineering (3 credits)

Class hours: Three 45-minute classes a day, three days a week
(13:30-14:15, 14:30-15:15, 15:30-16:15 on Mondays, Wednesdays and Fridays)

1 Current Trends in Automobile Engineering and Car Industry and Market

The car industry world-wide / Important issues relevant to the car industry and market / Law and legal coverage / Marketing know-how factors / Future trends of the automobile industry and market
[Lecturers] Mr. Hiroaki Yoshimatsu (Mitsubishi Motors Corp.), Prof. Yukio Ishida (Nagoya Univ.)

2 Observation and Evaluation of Drivers' Behavior Perspective

Measurements of drivers' behavior / Driving models / Evaluations of risk factors / Differences in characteristics of drivers

[Lecturer] Mr. Masahito Oikawa (Tokyo Marine & Nichido Risk Consulting), Prof. Kazuya Takeda (Nagoya Univ.)

3 Car Materials and Processing

Lightweight materials for automotive applications / Innovation in metal forming / Computer aided engineering for metal forming.

[Lecturers] Dr. Shin-ichiro Fujikawa (Nissan Motor Corp.), Prof. Takashi Ishikawa (Nagoya Univ.)

4 Movements and Control of a Car

Vehicle dynamics (modeling, robust control) / Driver's expectation and motion sensitivity (maneuverability and stability, ride comfort) / Vehicle dynamics integrated management (steering control, braking / traction control)

[Lecturers] Mr. Yoshikazu Hattori (Toyota Central R&D Labs., Inc.), Mr. Daisuke Yamada (ibid.), Dr. Masatoshi Hada (ibid.), Prof. Yoshikazu Hayakawa (Nagoya Univ.)

5 Safety Engineering for the Prevention of Accidents

Driving-assist system / Modeling of driving behavior / Prediction of driving behavior / Recognition of environment / Innovative safety concept

[Lecturers] Mr. Yousuke Akatsu (Nissan Motor Co., Ltd.), Prof. Tatsuya Suzuki (Nagoya Univ.)

6 Crash Safety

Occupant protection / Crash worthiness / Restraint system / Impact biomechanics

[Lecturers] Mr. Koichi Kamiji (Honda R & D Co., Ltd.), Assoc. Prof. Masahito Hitosugi (Dokkyo Medical Univ.), Assoc. Prof. Koji Mizuno (Nagoya Univ.)

7 Automotive Embedded Computing Systems

Applications of automotive embedded systems / Automotive embedded operating systems / In-vehicle network / Image processing for automotive systems

[Lecturer] Prof. Hiroaki Takada (Nagoya Univ.)

8 Communication Technologies in ITS

Inter-Vehicle and Road-to-Vehicle Communications / Navigation Systems / Traffic Information Systems

[Lecturers] Dr. Hiroyuki Kumazawa (Mitsubishi Electric Corp.), Prof. Masaaki Katayama (Nagoya Univ.)

9 CAE Activity in the Vehicle Development

Computer-aided engineering / Crash and safety / Strength and reliability / Noise and vibration / Vehicle dynamics / Computational fluid dynamics

[Lecturers] Mr. Masaaki Okamoto (Toyota Motor Corp.), Prof. Toshiro Matsumoto (Nagoya Univ.)

10 Energy Saving Technology for Automobiles

Hybrid electric vehicles / Electric vehicles / Energy regeneration / Mobility for the next generation / Motors / Automotive power supply & batteries

[Lecturers] Mr. Tatsuo Teratani (Toyota Motor Corp.), Prof. Shigeru Okuma (Nagoya Univ.)

11 Fuels and Automobile Catalysts for Environmental Friendly Cars

Exhaust purification / Automobile catalysts / Fuels and Oil Refinery / Biomass utilization

[Lecturer] Prof. Atsushi Satsuma (Nagoya Univ.)

12 Recycling

End-of-life vehicle / Automobile shredder residue / Life cycle design.

[Lecturers] Mr. Jun Sato (Toyota Motor Corp.), Mr. Shigenori Yoshida (ibid.), Prof. Toshiharu Fujisawa (Nagoya Univ.)

13 Traffic Flow Characteristics

Microscopic traffic flow characteristics / Mechanism of traffic congestion / Shock wave analysis

[Lecturer] Prof. Hideki Nakamura (Nagoya Univ.)

14 New Manufacturing System in Car Industry

Denso manufacturing system

[Lecturer] Mr. Hiroshi Furuhashi (Denso Corp.), Mr. Kunihiro Kodama (Denso Corp.), Assist. Prof. Rei Hino (Nagoya Univ.)

15 Presentation of Individual Research Projects

At the end of the program each overseas student is to give a presentation jointly with an NU student based on a project of interest.

Evaluation:

Attendance & participation: 20%

Written reports for seminars (14 reports): 20%

Presentation of group project work: 30%

Report of group project work: 30%

2. Japanese (3 credits)

2.1 Elementary Japanese

Approximately two hours per day for 6 weeks (total 45 hours)

Designed for students who have little or no knowledge of Japanese, this level aims to acquire the most essential language patterns for everyday life, and be able to express intentions in uncomplicated

adult-level Japanese.

2.2 Intermediate / Advanced Japanese

Approximately two hours per day for 6 weeks (total 45 hours)

One instructor will flexibly teach students with intermediate and advanced level Japanese.

3. Automobile industry factory and laboratory visits

4. Cultural excursions

Including Kyoto (one day trip), Inuyama (Meiji-mura Museum) and Nagoya city.

Eligibility

- Applicants **MUST** be enrolled in universities having concluded academic exchange agreements with Nagoya University at the inter-university or with the Graduate School of Engineering at the inter-school level.
- Applicants **MUST** be of senior undergraduate or graduate status during the NUSIP period (including junior undergraduates who are completing their junior program).
- Applicants **MUST** enclose a resume and brief statement of purpose with the program application materials. Application may be downloaded.
- Applicants who are non-native speakers of English should possess a TOEFL score of 550 <CBT=213; iBT=79>, TOEIC score of 730, an IELTS overall band score of 5.5, or the equivalent, and should attach a copy of the official score record to the application.

Application Procedures

Students applying to participate in the Nagoya University Summer Intensive Program (NUSIP) must submit the following application forms to Nagoya University by the closing date stipulated below:

- NUSIP Application Form
- Statement of Purpose
- Health Certificate
- (Non-native English Speaker) Supporting Documents of English Proficiency (i.e., TOEFL, TOEIC, IELTS or the equivalent)
- Three identical photographs (3.0 cm x 4.0 cm), signed on the reverse side, one of which should be attached to the 'NUSIP Application Form'.

Application Deadline

Completed application forms must reach the Student Affairs Office, School of Engineering by the following date:

Saturday, 28 February 2009

Inquiries & Applications

International Office of your University

Contact Address

Students should send their applications to:

Student Affairs Office
School of Engineering
Nagoya University
Furo-cho, Chikusa-ku, Nagoya, 464-8603 Japan

Tel: 81-52-789-3603/3563

Fax: 81-52-789-3979

E-mail: nusip@engg.nagoya-u.ac.jp

Website: <http://www.engg.nagoya-u.ac.jp/en/nusip/>

Notification of Results

The results of document screening, as conducted by Nagoya University, will be made available to students by the end of March 2009.

Appendix 3 : Participants



- | | | |
|---------------------------|------------------------------------|-----------------------|
| 1 Prof. Kazuyoshi Tatsumi | 15 Prof. Mehrdad Panahpour Tehrani | 29 Cheng-Hsien Wu |
| 2 Prof. Yukio Ishida | 16 Daniel Bellers | 30 Chamdeep Grewal |
| 3 Zeinab Sadoughi | 17 Chang-ping Lee | 31 Juanri Juanri |
| 4 Evelyn Woen | 18 Chirag Panjwani | 32 Anthony Budzinski |
| 5 Janani Viswanathan | 19 Chirag Daswani | 33 Jeffrey Duperret |
| 6 Eric Wen | 20 Kevin Zaseck | 34 Patryk Mastela |
| 7 Albert Duong | 21 Gyu Jin Ahn | 35 Joshua Hoemke |
| 8 Carlo Peng | 22 Bernard Murphy | 36 Tedore Tragas |
| 9 David Sinnaduray | 23 Robert Rasmusson | 37 Joe Bisognani |
| 10 Wanxiao Shao | 24 Selma Lee | 38 Masatomo Yamaguchi |
| 11 Yamaga Shinichiro | 25 Jason Geathers | 39 Shinji Saito |
| 12 Loretta Kwan | 26 Shinji Kajiuira | 40 Romain Fanchini |
| 13 Prof. Tsutomu Nomizu | 27 Katsutoshi Nishimoto | 41 Antoine Navarro |
| 14 Prof. Hiroki Tanikawa | 28 Sean Rosenfeld | 42 Ogura Hidehiro |

Review and Acknowledgement

The summer program "NUSIP" started in 2008 aims to promote educational exchange of students between foreign universities and Nagoya University. This program was the first attempt of the Department of Engineering of Nagoya University.

At first time we had a little worry about the number of applicants from abroad and Nagoya University, since it was our first experience. Last year, we could accept 12 students from foreign prestigious universities and 25 students from Nagoya University. And this year, we accepted 30 oversea students from three countries and 20 students from Nagoya University. It was our great pleasure to see friendly and courteous inter-communication among all the participants throughout the program. Moreover, the presentations done by the small group projects were excellent and have shown a better level than we expected.

The great success of NUSIP 2008 and 2009 owes to the dedication of many people. First, we would like to express our sincere gratitude for the intellectual lecturers joined from automobile companies and from Nagoya University. Especially, we are grateful for the researchers from the automobile companies who confronted the very difficult contradicting problems while keeping the privacy and gave some lecturers on the latest technology. We are also grateful to the people who kindly explained their factory facilities. We received many voices from participants with a highly appreciation for the content of the lectures. Further, we would like to thank teachers of Japanese language course who accepted a very hard work of teaching Japanese to the participants in a very short duration of NUSIP.

Lastly, we strongly hope that the participants of this program would contribute the further development of technology and we also hope it would blaze a new trail towards the ethics of the future which forms the foundation for a future of peace. We hope it does!

December, 2009

NUSIP Committee