

# PROGRAM

## Plenary Sessions

### (1) Making EcoDesign Practical

Date: Dec. 9 (Tue.), 17:00 - 18:00

Place: Room A

#### PL-1: EcoDesign and Global Compliance: the Role of Virtual Teams

*Andrew Sweatman, ESHconnect, USA*



#### ABSTRACT :

The production and consumption of manufactured goods across regions and markets has reached a new level of complexity. At a time when products are designed in one region, manufactured in another, and then sold throughout the world, issues of environmental compliance and risk management, have become critical design considerations. Product-oriented regulations are being implemented at a rapid rate with substantial implications for design. This is presenting significant challenges for those companies eager to maintain high levels of corporate responsibility and low levels of environmental risk and impact.

Through productive collaboration with industry associations and specialist consultants, ESHconnect has successfully developed a suite of web-based tools that inform and resource companies and their product developers. Our content and methodologies, help ensure that EcoDesign becomes a robust business process that maximizes trouble-free market access. This necessarily demands an intimate knowledge of regulations that might impact on new products and their life cycle performance.

Mindful of cultural factors, legislative complexity and differing time zones, our approach involves personnel based in multiple locations around the world coming together as virtual teams to build, and deliver value-added knowledge covering EcoDesign, Product Stewardship, hazardous wastes, restricted substances, energy efficiency and environmental labelling.

The paper describes the process and experiences of establishing a global ecodesign compliance system, including the inherent socio-cultural factors, which can determine success or failure.

### (2) EcoDesign and WEEE & RoHS

Date: Dec. 10 (Wed.), 13:00 - 15:30

Place: Room A

#### PL-2 WEEE&RoHS and Trends in the Environmental Legislation in European Union

*Michelle O'Neill, Government Relations Manager Europe, Honeywell*



#### ABSTRACT :

For over 30 years the European Union has developed a comprehensive body of environmental legislation, which has proven innovative and successful in many respects. However, a drawback has been a lack of implementation and enforcement. The imperatives to obey EU environmental law are increasing but are still not good enough. Industry and other stakeholders hope for brighter days when those who avoid complying are punished and basic regulatory tools such as business, risk and environmental impact analyses are carried out with increased vigor. The infamous WEEE and ROHS directives brought many of weaknesses of the EU environmental legislation under the spotlight but it also highlighted some new principles that are cause for optimism. Looking to the future and the enlargement of the E.U., legislators are looking at new and better ways to legislate. Industry and other stakeholders have an important role to play in providing constructive criticism. For global companies this role has gathered increasing importance as other regions around the world look to the EU as the trend setter for environmental policy.

**PL-3 An Industry Vision on the Implementaion of WEEE and RoHS**  
*Ab Stevels, Phillips, Delft University of Technology, The Netherlands*



**ABSTRACT :**

The European Directive on Waste of Electronic and Electrical Equipment has now been approved by the European Parliament and by the Council of Member States and is now in the process of transportation into national laws. Parallel to this, terms and conditions have to be formulated on basis of which practical implementation of the legal texts should take place.

On European level a Technical Advisory Committee (TAC) consisting of representatives of Member States is operating towards this end.

In Industry, working groups of Orgalime (representing the metal and electro industry), EICTA (specifically representing the electronics industry (consumer electronics, IT and telecom)) and CECED (household appliances) are active towards this end.

In this paper the most pressing issues as regards WEEE implementation will be highlighted and solutions how to tackle these will be proposed. The basis for proposing such solutions is that the environmental intent of the WEEE should be primarily served while keeping overall costs for society as low as possible. Another basic idea is that solutions which might deviate from the current juridical framework are allowed if (better) ecological and economic performance warrant these.

**Panel Discussion**

**Thinking EcoDesign at the Crevice of Business, Culture, and Politics --- Taking WEEE and RoHS as Examples**

**Panelists (tentative)**

*Haruhiko Yamamoto, General Manager, Technology Center, Fujitsu Limited*

*Terrence J. McManus, P.E. DEE, Intel Fellow, Director EHS Technologies*

*Michelle O'Neill, Government Relations Manager Europe, Honeywell*

*Ab Stevels, Phillips, Delft University of Technology, The Netherlands*

*Yuji Noritake, Ricoh Company*

*Bi Ke-Yun, Vice President, China Academy of Electronics and Information Technology*

*Martin Charter, the Centre for Sustainable Design, UK*

**(3) Significance of EcoDesign**

Date: Dec. 11 (Thu.), 11:30 - 12:30

Place: Room A

**PL-4 Ideas for Eco-Design Market Development: A New Evaluation Methodology**

*Kazutomi Mita, Chair. of Sustainable Management Forum, Japan*



**ABSTRACT :**

Without a good rating in the market, a business cannot truly succeed long-term, even if it is an eco-business. And also, consumers have no way to make decisions about companies or goods without some tools. Therefore the rating of companies with objective criteria is needed by consumers. Companies that get good ratings can get good market share. It's the same about eco-design. So, I developed new rating system named the Mita-Model in 2000. Now SMF(SMRI) is engaging the 3-round practice to evaluate Japanese famous green companies.(80 big groups) Actually, it will be the catalyst for a sustainability dialogue and so help to realize a sustainable world.

## Friendship Party

Date: December 9 (Tue.), 18:15 - 20:30

Place: Reception Hall

Ecodesign 2003 provides all attendees with the opportunity to exchange EcoDesign activities and make a friendship each others.

## Special Session

### Opening Ceremony

Date: December 9 (Tue.), 9:30 - 10:00

Place: Room A

#### *Message from Organizer*

Prof. Yuji Furukawa, Co-Chair of Organizing Committee

#### *Message from METI*

**METI's Policy on EcoDesign – Industrial Contribution for Global Environmental Problem –**

Mr. Hirotohi Kunitomo, METI

### Award Presentation & Closing

Date: December 11 (Thu.), 16:30 - 17:30

Place: Room A

#### *Award Presentation*

Dr. Naoe Hosoda, Chair of Award Committee

Mr. Ryuji Era, Mitsubishi Estate Co.

#### *Closing Remark*

Prof. H. G. Greise, Co-Chair of Organizing Committee

#### *(Awards)*

Awards will be given for the best papers and the best poster presented at EcoDesign2003. Ten papers and one poster will be selected by the awards committee. Authors will receive their awards and a plaque at the EcoDesign2003 award ceremony on the 11<sup>th</sup> of Dec 2003. The plaques are made from 80 year old pine pylons that were the subterranean supports for the Marunouchi Building. The plaques were designed and made by the renowned wood artist Mr. Masayuki Ogino. This award is sponsored by Mitsubishi Estate Co. and Mitsubishi Jisho Sekkei Inc.



The recovered pine pylons at the redevelopment site of the Marunouchi Building.

## Internet Room (Central Building, Room 103)

We are planning to prepare Internet connection facilities. To connect Internet, please bring your own computer and Ethernet cable (10/100 Base T). Please note that this service will not be available without notice. Also, we will prepare original prints of all the final papers of EcoDesign 2003 here instead of print service. Please come to this room if you would like to photocopy the paper(s) by yourselves.

## Youth Events

### – An EcoDesign Workshop “The Role of a City Park – Environment and Crime –”

Date: Dec.8 (Mon.), 13:00 - 17:00

Place: Room 401

A city park contributes to environmental improvement of its region, but there is danger of crime during the nights also.

In this workshop, there are lectures by supervisor and a researcher of a park & safety.

And we will present a field investigation result of a park in Setagaya-ku. City Park Designing will be held with participants in this workshop. This workshop is directed by 3 student parties voluntarily and supported by “EcoDesign2003”.

### – Sustainable Evidence “Ecomaterial works” – Designing lifestyle for a sustainable society –

Date: Dec.8 (Mon.), 13:00 - 18:00

Place: Room 402

Considering lifestyle for a sustainable society, detailed and conceptualized products with ecomaterials and artwork will be designed and exhibited.



# PRESENTATION PROGRAM

Small letters before session names represent the category of the session.

**Session Categories:**

- a: Sustainable Society
- b: Environmentally Conscious Business
- c: Environmentally Conscious Product & Services
- d: Environmentally Conscious Processes

## Tuesday, December 9

### 9:30 Opening Ceremony

#### d: LCA for Process I

10:15	1A-1	<b>Environmental Impacts Evaluation of Electricity Grid Mix Systems in Four Selected Countries Using A Life Cycle Assessment Point of View</b> .....	29
		<i>A. Widiyanto<sup>1</sup>, S. Kato<sup>1</sup>, N. Maruyama<sup>1</sup>, A. Nishimura<sup>1</sup>, S. Sampattagul<sup>2</sup>, <sup>1</sup>Mie Univ., Japan, <sup>2</sup>Chiang Mai Univ., Thailand</i>	
10:40	1A-2	<b>A Study on the Evaluation of Environmental Impacts Caused by Technology Developments</b> .....	31
		<i>T. Fujiwara, R. Suwa, Y. Matsuoka, Kyoto Univ., Japan</i>	
11:05	1A-3	<b>Balancing Design Strategies and End-of-Life Processing</b> .....	33
		<i>J. Huisman<sup>1</sup>, A. Stevels<sup>2</sup>, <sup>1</sup>Delft Univ. of Technology, <sup>2</sup>Philips Consumer Electronics, The Netherlands</i>	

#### b: Recycling Business

10:15	1B-1	<b>An Experimental Approach to the Recycling Market</b> .....	35
		<i>N. Nishino<sup>1</sup>, S.H. Oda<sup>2</sup>, K. Ueda<sup>1</sup>, <sup>1</sup>The Univ. of Tokyo, <sup>2</sup>Kyoto Sangyo Univ., Japan</i>	
10:40	1B-2	<b>Remanufacturing in Developing Countries Concentrated at Leasing or Selling - A Case Study of Indonesia -</b> .....	37
		<i>H. Hanafiah, L.-Y. Chen, H. Narita, H. Fujimoto, Nagoya Inst. of Technology, Japan</i>	
11:05	1B-3	<b>Network Agents for Life Cycle Support of Mechanical Parts</b> .....	39
		<i>H. Hiraoka, N. Iwanami, Y. Fujii, T. Seya, H. Ishizuka, Chuo Univ., Japan</i>	
11:30	1B-4	<b>Development of the Method to Calculate Economic Benefits from the Eco-friendly Product</b> .....	41
		<i>H. Hatano, Ricoh, Co., Ltd., Japan</i>	

#### a: Sustainable Methodologies

10:15	1C-1	<b>A Framework for Analysing Sustainability by Using the Rewriting System</b> .....	43
		<i>K. Kakimoto, T. Taura, Kobe Univ., Japan</i>	
10:40	1C-2	<b>A Proposal for Service Modeling</b> .....	45
		<i>Y. Shimomura<sup>1</sup>, K. Watanabe<sup>1</sup>, T. Arai<sup>1</sup>, T. Sakao<sup>2</sup>, T. Tomiyama<sup>3</sup>, <sup>1</sup>The Univ. of Tokyo, <sup>2</sup>Mitsubishi Research Inst., Inc., Japan, <sup>3</sup>Delft Univ. of Technology, The Netherlands</i>	
11:05	1C-3	<b>A New Eco-Design Strategy to Assess Sustainable Environmental Innovations</b> .....	47
		<i>S. Jofre, K. Tsunemi, T. Morioka, Osaka Univ., Japan</i>	
11:30	1C-4	<b>Electronics Ecodesign Research Empirically Studied</b> .....	49
		<i>O. Pascual, C. Boks, A. Stevels, Delft Univ. of Technology, The Netherlands</i>	

#### c: Life Cycle Design

10:15	1D-1	<b>Simulation of Closed-loop Manufacturing Systems Focused on Material Balances</b> .....	51
		<i>M. Soma, S. Kondoh, Y. Umeda, Tokyo Metropolitan Univ., Japan</i>	
10:40	1D-2	<b>Product Life Cycle Design Based on Product Life Control</b> .....	53
		<i>N. Sakai, G. Tanaka, Y. Shimomura, The Univ. of Tokyo, Japan</i>	
11:05	1D-3	<b>Proposal of Decision Support Method for Life Cycle Strategy by Estimating Value and Physical Lifetimes</b> .....	55
		<i>T. Daimon, S. Kondoh, Y. Umeda, Tokyo Metropolitan Univ., Japan</i>	
11:30	1D-4	<b>Idea Generation and Risk Evaluation Methods for Life Cycle Planning</b> .....	57
		<i>H. Kobayashi, Toshiba Corp., Japan</i>	

**d: EcoDesign Process**

11:05	1E-1	<b>An International Study on Utilization of Design for Environment Methods (DfE) – A Pre-Study</b> .....	59
		<i>M. Ernzer<sup>1</sup>, M. Lindahl<sup>2</sup>, K. Masui<sup>3</sup>, T. Sakao<sup>4</sup>, <sup>1</sup>Darmstadt Univ. of Technology, Germany, <sup>2</sup>Univ. of Kalmar, Sweden, <sup>3</sup>NEDO, <sup>4</sup>Mitsubishi Research Inst., Japan</i>	
11:30	1E-2	<b>Extraction of Cypress Oil and Small-sized Biomass System</b> .....	61
		<i>H. Sakamoto<sup>1</sup>, K. Amimoto<sup>1</sup>, Y. Nishimura<sup>1</sup>, Y. Nagahashi<sup>2</sup>, J.R. Grace<sup>3</sup>, <sup>1</sup>Kochi Univ. of Technology, <sup>2</sup>Kochi National Technology College, Japan, <sup>3</sup>Univ. of British Columbia, Canada</i>	

**d: LCA for Process II**

13:30	1A-4	<b>An Inspection Policy for a Stochastically Failing Single-Unit System</b> .....	62
		<i>S. Okumura, N. Okino, Univ. of Shiga Prefecture, Japan</i>	
13:55	1A-5	<b>LCA-NETS Tool for Environmental Design of Natural Gas-fired Power Generation Systems in Thailand</b> .....	64
		<i>S. Sampattagul<sup>1</sup>, S. Kato<sup>1</sup>, T. Kiatsiriroat<sup>2</sup>, N. Maruyama<sup>1</sup>, A. Widiyanto<sup>1</sup>, <sup>1</sup>Mie Univ., Japan, <sup>2</sup>Chiang Mai Univ., Thailand</i>	
14:20	1A-6	<b>Ecological Loss Function: Preliminary Basis for Environmental Evaluation and Design of Techniques</b> .....	66
		<i>A. Halog, M. Sagisaka, A. Inaba, AIST, Japan</i>	

**14:45 - 15:10 Break****d: LCA for Process III**

15:10	1A-7	<b>Integration of CAD Models with LCA</b> .....	68
		<i>H.E. Otto<sup>1</sup>, F. Kimura<sup>1</sup>, F. Mandorli<sup>2</sup>, M. Germani<sup>2</sup>, <sup>1</sup>The Univ. of Tokyo, Japan, <sup>2</sup>Univ. of Ancona, Italy</i>	
15:35	1A-8	<b>Life Cycle Assessment of Municipal Solid Waste Landfill: A Case Study in Thailand</b> .....	70
		<i>W. Wanichpongpan, S.H. Gheewala, King Mongkut's Univ. of Technology Thonburi, Thailand</i>	
16:00	1A-9	<b>On The Effect of Sorting Out Construction Byproducts in Building Construction Process</b> .....	72
		<i>Y. Nachi, T. Miyazaki, Shimizu Corporation, Japan</i>	

**b: LCA, EMS**

13:30	1B-5	<b>Is Environmental Management System ISO 14001 Improving Corporate Environmental Performance? Longitudinal Analysis of Manufacturing Companies in the US</b> .....	74
		<i>M. Szymanski, S. Ikeda, Univ. of Tsukuba, Japan</i>	
13:55	1B-6	<b>Towards an Operationalization of the Proposed European Directive on EcoDesign (Design for Environment) of Electronic Products (EuP)</b> .....	75
		<i>A. Stevels, Philips Consumer Electronics, The Netherlands</i>	
14:20	1B-7	<b>Measuring Implementation and Performance of Ecodesign in the Electronics Sector</b> .....	77
		<i>O. Pascual, A. Stevels, C. Boks, Delft Univ. of Technology, The Netherlands</i>	
14:45	1B-8	<b>Framework for Systematic Evaluation of Life Cycle Strategy by means of Life Cycle Simulation</b> .....	79
		<i>S. Takata<sup>1</sup>, T. Ogawa<sup>1</sup>, Y. Umeda<sup>2</sup>, T. Inamura<sup>2</sup>, <sup>1</sup>Waseda Univ., <sup>2</sup>Tokyo Metropolitan Univ., Japan</i>	

**15:10 - 15:25 Break****15:25 - 16:45 SPECIAL SESSION: What is the next generation EcoMaterial?**

- 1. What is a target of EcoMaterials Center at National Institute for Materials Science in Japan?**  
*Kohmei Halada, EcoMaterials Center, National Institute for Materials Science, Japan*
- 2. Nanostructured materials for environmental purification**  
*Hirohisa Yamada, Yujiro Watanabe, Shuichi Shimomura, Kenji Tamaura, EcoMaterials Center, National Institute for Materials Science, Japan*
- 3. Vanadium-based membranes for hydrogen purification - A challenge for high performance using materials with low environmental burden -**  
*Chikashi Nishimura, Masao Komaki and Yi Zhang, EcoMaterials Center, National Institute for Materials Science, Japan*
- 4. New Photocatalysts for Hydrogen Production and Environment Purification**  
*Junwang Tang, Tetsuya Kako, Zhigang Zou, Jinhua Ye, EcoMaterials Center, National Institute for Materials Science, Japan*
- 5. Interconnect EcoDesign**  
*Naoe Hosoda and Tadatomu Suga, EcoMaterials Center, National Institute for Materials Science, Japan*

6. **Development of Lead-free Solder Alloy for Flip-chip Application**  
*Yoshiharu Kariya, EcoMaterials Center, National Institute for Materials Science, Japan*
7. **Ecomaterial applications of the fullerene nanowhiskers**  
*Kunichi Miyazawa, EcoMaterials Center, National Institute for Materials Science, Japan*
8. **Nano structural control for energy and environmental application**  
*Toshiyuki MORI, Yarong WANG, Chikashi Nishimura, EcoMaterials Center, National Institute for Materials Science, Japan.*
9. **Other research topics of ecomaterials**

#### a: Economics in Social System

- 13:30 1C-5 **A Holistic Approach to Reverse Supply Chain Planning for Remanufacturing** ..... 81  
*A. Ahmed, TATA Consultancy Services Japan, Japan*
- 13:55 1C-6 **A Study on the Marketability of Environmentally Friendly Refrigerators in China and Japan – I. Analysis of the Present Market** ..... 83  
*P.-J. Tsai<sup>1</sup>, S. Nagasawa<sup>2</sup>, <sup>1</sup>Ritsumeikan Univ., <sup>2</sup>Waseda Univ., Japan*
- 14:20 1C-7 **A Study on the Marketability of Environmentally Friendly Refrigerators in China and Japan –II. Practicability of the Concept of Marketability** ..... 85  
*P.-J. Tsai<sup>1</sup>, S. Nagasawa<sup>2</sup>, <sup>1</sup>Ritsumeikan Univ., <sup>2</sup>Waseda Univ., Japan*
- 14:45 - 15:10 **Break**

#### a: IT in Social System

- 15:10 1C-8 **Macroscopic Analysis of Effect of Information Communication Sector on CO<sub>2</sub> Emission Reduction** ..... 87  
*J. Nakamura<sup>1</sup>, T. Origuchi<sup>1</sup>, K. Honjo<sup>1</sup>, Y. Ibata<sup>1</sup>, S. Nishi<sup>1</sup>, S. Furukawa<sup>2</sup>, M. Sashida<sup>2</sup>, I. Hagiwara<sup>2</sup>, <sup>1</sup>NTT Corporation, <sup>2</sup>NTT Data Inst. of Management Consulting, Inc., Japan*
- 15:35 1C-9 **Eco Design of IT Society – An Analysis of the Environmental Effects of IT Diffusion by Using a CGE Model** ..... 89  
*M. Matsumoto<sup>1</sup>, Y. Irie<sup>1</sup>, J. Fujimoto<sup>2</sup>, <sup>1</sup>NEC Corporation, <sup>2</sup>The Univ. of Tokyo, Japan*
- 16:00 1C-10 **The Key to Success [e-Environmental Solution]** ..... 91  
*T. Kunii, R.J. Chen, IBM Japan, Ltd., Japan*

#### c: Upgradable Design

- 13:30 1D-5 **Upgrade Planning for Upgradable Product Design** ..... 92  
*A. Matsuda<sup>1</sup>, Y. Shimomura<sup>1</sup>, S. Kondoh<sup>2</sup>, Y. Umeda<sup>2</sup>, <sup>1</sup>The Univ. of Tokyo, <sup>2</sup>Tokyo Metropolitan Univ., Japan*
- 13:55 1D-6 **Development of a Design Methodology for Upgradability Involving Changes of Functions** ..... 94  
*Y. Ishigami<sup>1</sup>, H. Yagi<sup>1</sup>, S. Kondoh<sup>1</sup>, Y. Umeda<sup>1</sup>, Y. Shimomura<sup>2</sup>, M. Yoshioka<sup>3</sup>, <sup>1</sup>Tokyo Metropolitan Univ., <sup>2</sup>The Univ. of Tokyo, <sup>3</sup>Hokkaido Univ., Japan*
- 14:20 - 14:45 **Break**

#### c: Modular Design

- 14:45 1D-7 **Universal Cellular Phone Housing for Profitable Remanufacturing** ..... 96  
*G. Seliger<sup>1</sup>, S.J. Skerlos<sup>2</sup>, B. Basdere<sup>1</sup>, M. Zettl<sup>1</sup>, <sup>1</sup>Technical Univ. Berlin, Germany, <sup>2</sup>Univ. of Michigan, USA*
- 15:10 1D-8 **Life Cycle Modularity Metrics for Product Design** ..... 98  
*P.J. Newcomb, D.W. Rosen, B. Bras, Georgia Inst. of Technology, USA*
- 15:35 1D-9 **Modular Design Supporting System with a Step-by-Step Design Approach** ..... 100  
*K. Aoyama, Y. Uno, The Univ. of Tokyo, Japan*
- 16:00 1D-10 **Life Time Optimisation of Audio Systems by Modular Design** ..... 102  
*A. Stevels, Philips Consumer Electronics, The Netherlands*

#### c: Industrial Design

- 13:30 1E-3 **Dynamic Magnetic Field Analysis and Optimum Design of Small-sized Wind Power Generator** ..... 104  
*H. Sakamoto<sup>1</sup>, S. Migiwa<sup>1</sup>, S. Nouda<sup>1</sup>, T. Asai<sup>2</sup>, <sup>1</sup>Kochi Univ. of Technology, <sup>2</sup>ELF Co., Japan*
- 13:55 1E-4 **Designing an Information Tool Media Concept for a Sustainable Consumption** ..... 105  
*E.S. Ueda, Chiba Univ., Japan*
- 14:20 1E-5 **Analysis on the Potential of Eco-Materials, from the “Design” Perspective** ..... 107  
*H.H. Yanagisawa, F. Masuda, K. Suzuki, M. Suzuki, open house inc., Japan*

14:45 - 15:10 Break

**c: Strategy for EcoDesign Product**

15:10	1E-6	<b>Selecting Product EOL Strategy via Case-based Reasoning</b> ..... 109 <i>L.-H. Shih, Y.-H. Chang, National Cheng Kung Univ., Taiwan</i>
15:35	1E-7	<b>A Study on the Trace of Appropriate Ecodesign Strategies -Applying "Instep-DfE" and "IZM-EE toolbox" on a PDA-</b> ..... 111 <i>J. Chung<sup>1</sup>, H. Lee<sup>1</sup>, A. Middendorf<sup>2</sup>, K.H. Zuber<sup>2</sup>, <sup>1</sup>Eco-Frontier Co., Korea, <sup>2</sup>Fraunhofer IZM, Germany</i>
16:00	1E-8	<b>Saving Product Lives in Global and Local Remanufacturing Networks: A Scientific and Commercial Work Report and an Outlook</b> ..... 113 <i>R. Steinhilper<sup>1</sup>, A. Brent<sup>2</sup>, <sup>1</sup>Univ. of Bayreuth, Germany, <sup>2</sup>Univ. of Pretoria, South Africa</i>

16:25 - 17:00 Break

**Plenary Session**

17:00		<b>Making EcoDesign Practical</b> (see page ii)
	PL-1	<b>EcoDesign and Global Compliance: the Role of Virtual Teams</b> ..... 1 <i>Andrew Sweatman, ESHconnect, USA</i>

**Wednesday, December 10**

**d: Process, Products, Recycle, Disassembly**

9:25	2A-1	<b>Research on Material Recycling Processes Assessment Method of Waste Products</b> ..... 117 <i>H. Huang, Z. Liu, G. Liu, S. Wang, W. Guo, Hefei Univ. of Technology, China</i>
9:50	2A-2	<b>Design for Environment in the Electronics Industry, Possibilities and Limitations: A Discussion and Evaluation of Product Metrics</b> ..... 119 <i>M.H. Nagel, A.L.N. Stevels, Delft Univ. of Technology, The Netherlands</i>
10:15	2A-3	<b>The Eco-Check in Relation to Target Costing in Ecodesigning - The Resource-Based View</b> ..... 121 <i>H. Kurunsaari<sup>1</sup>, H. Okano<sup>1</sup>, F. Roevekamp<sup>2</sup>, <sup>1</sup>Osaka City Univ., <sup>2</sup>Sumitomo Bayer Urethanes, Japan</i>
10:40	2A-4	<b>Utilizing EcoDesign Data for Recycling Quotas Complying Disassembly</b> ..... 123 <i>C. Herrmann, M. Ohlendorf, J. Hesselbach, Technical Univ. Braunschweig, Germany</i>

**d: Process Technology in Recycling**

9:00	2B-1	<b>Inspection Method for Used Roller Parts</b> ..... 125 <i>R. Sakita, O. Nakayama, T. Kamada, Ricoh Company, Ltd., Japan</i>
9:25	2B-2	<b>Nail Pulling Resistance of Substitute Lumbers Molded from Fiber Wastes</b> ..... 127 <i>S. Hatta<sup>1</sup>, T. Kimura<sup>1</sup>, H. Gonno<sup>1</sup>, K. Kadokura<sup>2</sup>, <sup>1</sup>Kyoto Inst. of Technology, <sup>2</sup>Kadokura Trading Company CO, LTD, Japan</i>
9:50	2B-3	<b>Thermal Conductivity of Substitute Lumbers Molded from Fiber Wastes</b> ..... 129 <i>S. Hatta<sup>1</sup>, T. Kimura<sup>1</sup>, S. Yamamoto<sup>1</sup>, K. Kadokura<sup>2</sup>, <sup>1</sup>Kyoto Inst. of Technology, <sup>2</sup>Kadokura Trading Company CO, LTD, Japan</i>
10:15	2B-4	<b>Chemical Recycling Bisphenol A Type Epoxy Resin Based on Degradation in Nitric Acid</b> ..... 131 <i>K. Dilafruz, M. Kubouchi, W. Dang, H. Sembokuya, K. Tsuda, Tokyo Inst. of Technology, Japan</i>

**a: LCA in Social System**

9:00	2C-1	<b>LCA Evaluation of Reuse / Recycle Impact for Environmental Conscious Industrial Products</b> ..... 133 <i>Y. Sadamichi<sup>1</sup>, Y. Kimura<sup>2</sup>, A. Widiyanto<sup>1</sup>, S. Kato<sup>1</sup>, N. Maruyama<sup>1</sup>, A. Nishimura<sup>1</sup>, <sup>1</sup>Mie Univ., <sup>2</sup>Fuji Electric Co., Ltd., Japan</i>
9:25	2C-2	<b>Evaluation of Effects of Lightening Trucks on Environment by LCA</b> ..... 135 <i>T. Suzuki, T. Hukuyama, H. Zushi, T. Origuchi, J. Takahashi, The Univ. of Tokyo, Japan</i>
9:50	2C-3	<b>Inverse Manufacturing at Electrolux or Recycling at Local Facilities? - A Comparison from Environmental and Economic Perspectives</b> ..... 137 <i>E. Sundin, S. Tyskeng, Linköping Univ., Sweden</i>
10:15	2C-4	<b>Application of Eco-Efficiency Factor to Mobile Phone and Scanner</b> ..... 139 <i>K. Fuse<sup>1</sup>, Y. Horikoshi<sup>2</sup>, T. Kumai<sup>1</sup>, T. Taniguchi<sup>3</sup>, <sup>1</sup>Fujitsu Ltd., <sup>2</sup>Fujitsu Laboratories Ltd., <sup>3</sup>PFU Ltd., Japan</i>

10:40	2C-5	<b>NICE III Computer Program and Its Application in China</b> .....	141
		<i>B. Wei, H. Yagita, M. Kobayashi, A. Inaba, M. Sagisaka, AIST, Japan</i>	
<b>c: Ecodesign Method I</b>			
9:00	2D-1	<b>The Assessment of the Environmental Sustainability</b> .....	143
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