November 5th, 2015

The 3rd Japan-Indonesia Rectors' Conference

In search for "Collaborative Innovation" : Osaka University's Engagement

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Osaka University

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Brief History

- **Our roots** — The places of scholarship
  - 1724 Kaitokudo
  - 1838 Tekijuku

The epigraph of Kaitokudo (left) and Tekijuku.
Tekijuku is designated as Japanese National Historical landmark & important cultural asset.

- **Foundation**
  - 1931 Osaka Imperial University
  - — The 6th Imperial University in Japan
  - — founded through strong demand from the business and government sectors of Osaka, as well as the people of Osaka

- **Recent & Future**
  - 1949 **Osaka University** — Reborn as a national University
  - 2007 Osaka University merged with Osaka University of Foreign Studies
  - 2031 **The 100th anniversary** — from the foundation of Osaka Imperial University

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Facts & Figures

■ Organization

11 Schools

Letters
Human Sciences
Law
Economics
Science
Medicine
Dentistry
Pharmaceutical Sciences
Engineering
Engineering Science
Foreign Studies

16 Graduate Schools

Letters
Human Sciences
Law and Politics
Economics
Science
Medicine
Dentistry
Pharmaceutical Sciences
Engineering
Engineering Science
Language and Culture
International Public Policy
Information Science and Technology
Frontier Biosciences
Law School
Child Development

27 Research Institutes and Centers

Research Institute for Microbial Diseases
The Institute of Scientific and Industrial Research
Institute for Protein Research
Institute of Social and Economic Research
Joining and Welding Research Institute
Research Center for Nuclear Physics
Cybermedia Center
Institute of Laser Engineering
Immunology Frontier Research Center (IFReC)
etc.

2 University Hospitals

University Hospital
University Dental Hospital

25 We are proud to offer 25 language majors
(merged with Osaka University of Foreign Studies in 2007)

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Facts & Figures

■ Number of Students, Staff, and Researchers

15,535
Undergraduate students

4,641
Graduate students (Master's courses)

3,465
Academic staff

3,245
Graduate students (Doctoral courses)

2,898
Non-academic staff

2,094
International students

908 (FY2014)
International researchers

Partnerships with Indonesia

- **MoU – 3 Inter-University / 12 Inter-Faculty**
  - Universitas Indonesia (UI) (2015)
  - Universitas Gadjah Mada (UGM) (2011)
  - Institut Teknologi Bandung (ITB) (2007)
- **83 International Students** (as of May 1st, 2015)
- **JSPS – Bilateral Programs with VAST**
  - Prof. Masanori OZAKI, GS of Engineering with ITB (2007-2010)
  - Prof. Hideaki KASAI, GS of Engineering with ITB (2008-2011)
- **Double Doctoral Program in Engineering with ITB** (2014)

Signing Ceremony at Graduate School of Engineering, Osaka University in December 2014

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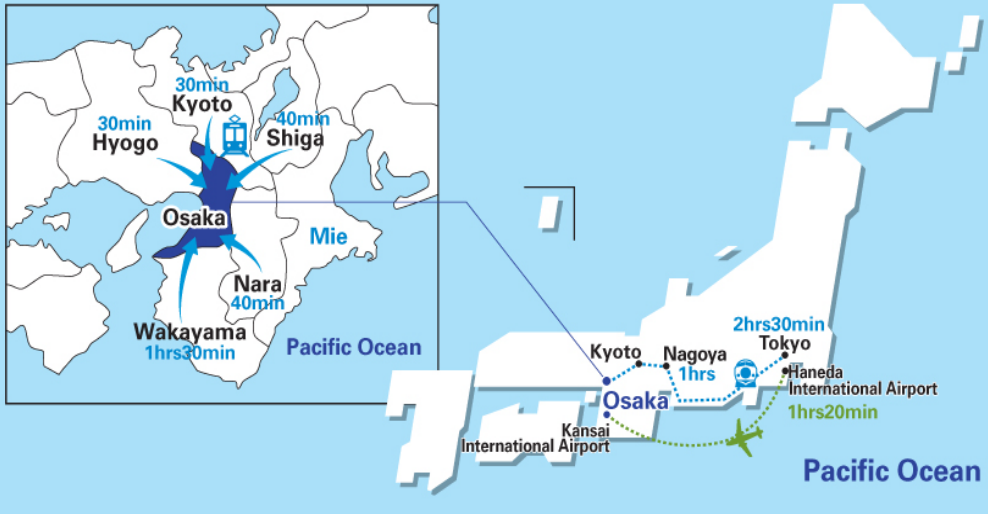
Osaka – Vibrant and Dynamic

- Population: 8.8 million
- Ratio of foreign resident: 10%, second to Tokyo, **mostly for study and intellectual/international affairs**
- Sharing 20% of Japan's gross domestic products (**2nd largest**)
- **70%** of total import and export businesses are with Asia

Entertaining & Industrialized

Friendly & Open

Once the political and economic center of Japan and now **the 2nd largest urban area**



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No. 1 Innovative University in Japan

18th in the world by Reuters Top 100 Innovative Universities 2015

Excellence in Research

Highly cited papers

Those numbers are in Japan based on Essential Science Indicators ™

No. 1 in Immunology

3rd in Chemistry, Biology, Biochemistry and Molecular Biology&Genetics

Research and Innovation

-Patents: **1,244** (overseas **445**)

-Collaboration with industry: **7,470**

(Corporations)
Mandom, Panasonic, Kaneka, Shimadzu, Daikin, Komatsu, Kawasaki, Ajinomoto, Mitsubishi Electric

Dynamic University-Industry Collaboration

A leading role in Japan

New form for university-industry collaboration

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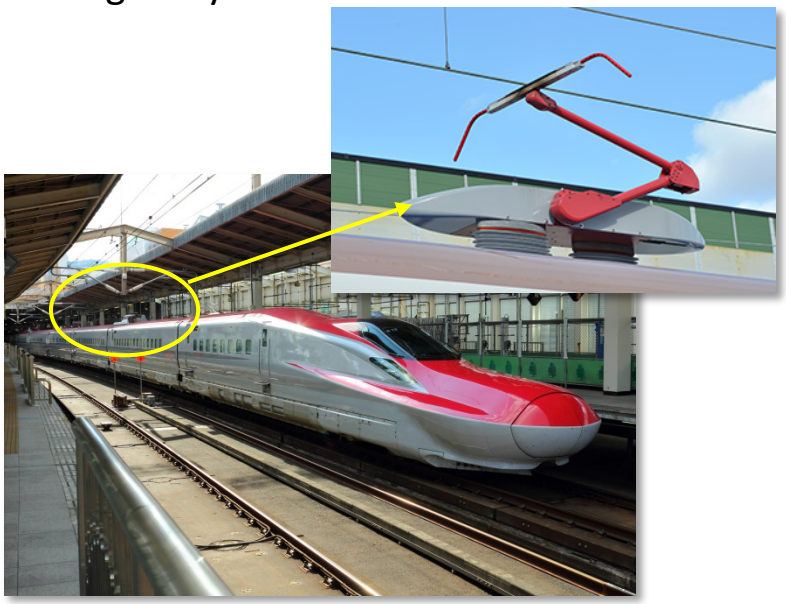
Technologies developed at Osaka University

Conversion-efficiency Eco-Bulb

Automatic gate system

Solar cell made with
transparent nanofiber paper



Pantograph (current collector)

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Research Collaboration Topics between OU & Universities in Indonesia

Advanced Recycling of Agriculture Wastes (Rice Husks) for Biomass Energy & High-purity Silica Materials

-Agricultural and Chemical Engineering-

Novel Joining & Welding Technology and Computer Science by Simulation on Complex Welded Products

-Materials Science and Engineering-

Research Collaborations in Indonesia

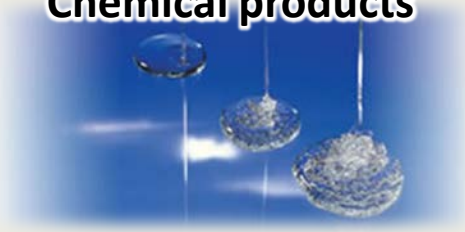
- **STRONG AGRICULTURE** in Indonesia - Advanced Recycling of Rice Husks to produce “Biomass Energy” & “High-purity Silica Materials”

Husks; ～4,200 kcal/kg
(cf. coal; 6,000 kcal/kg)

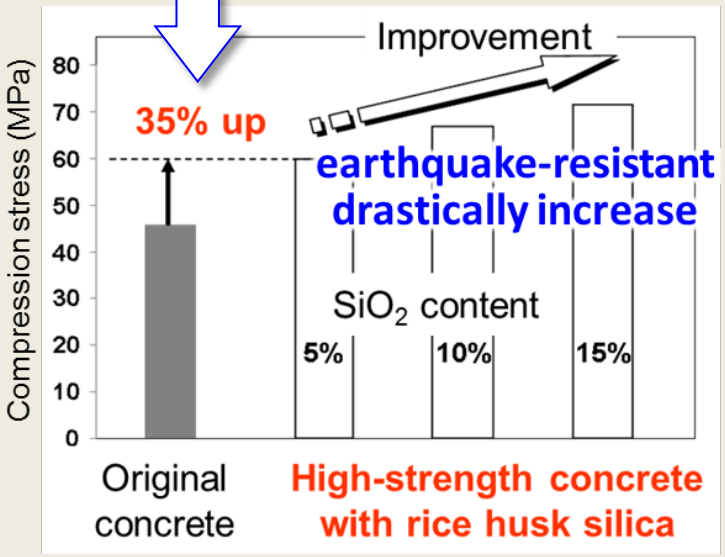
＋

❶Semi-conductor
❷Chemical products
❸Cosmetic & foods
❹Concrete use

Safety & Reliable constructions



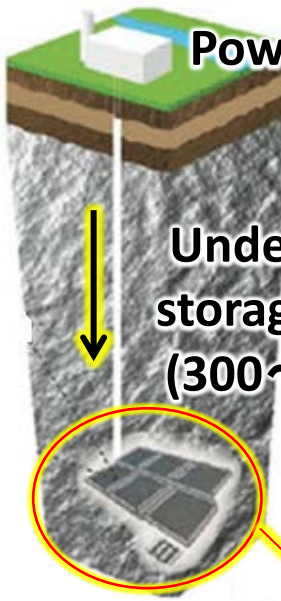
High-purity silica used as raw materials for high-value added products



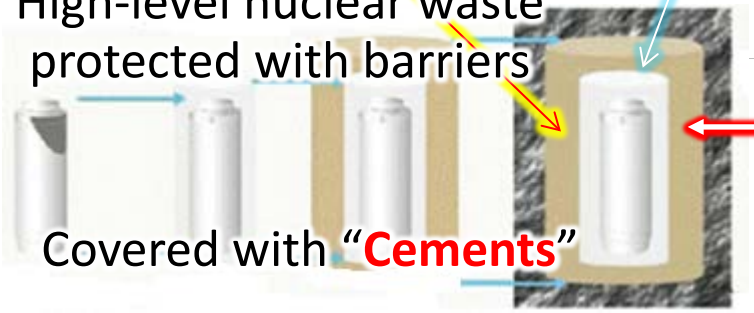
Research Collaborations in Indonesia

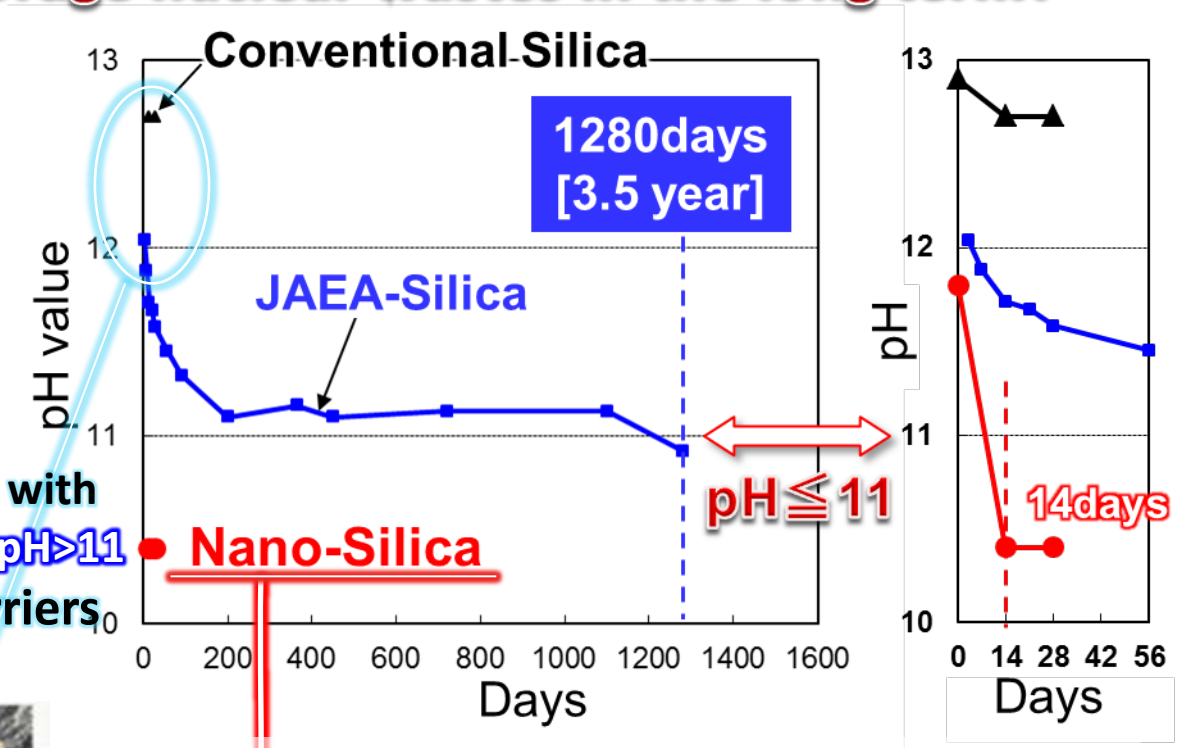
- **STABLE ENERGY SUPPLY** in long-term by nuclear power generation to establish "High-level nuclear waste storage facility" using **rice husk silica**

How to safely storage nuclear wastes in the long term?



Ground water with strong alkaline pH>11 damages barriers





"Low-alkaline cement created with rice chaff effective to nuclear waste disposal"

http://english.kyodonews.jp/news/2015/10/377883.html

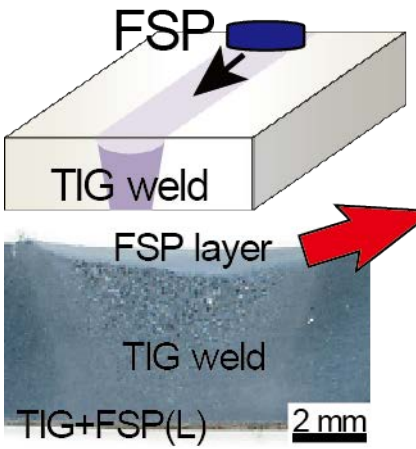
Nano-Silica originated from rice husks effective to prevent any damages on barriers by pH value reduction (pH<11)

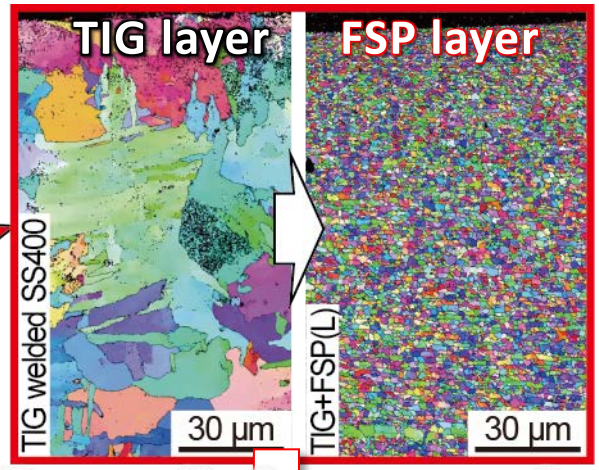
Research Collaborations in Indonesia

- **INCREASE FATIGUE STRENGTH/LIFE** in welded joints of construction machines and marine ships

Construction machine & parts consists of many weld members

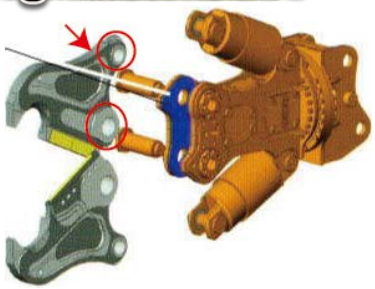
From PT Komatsu Indonesia





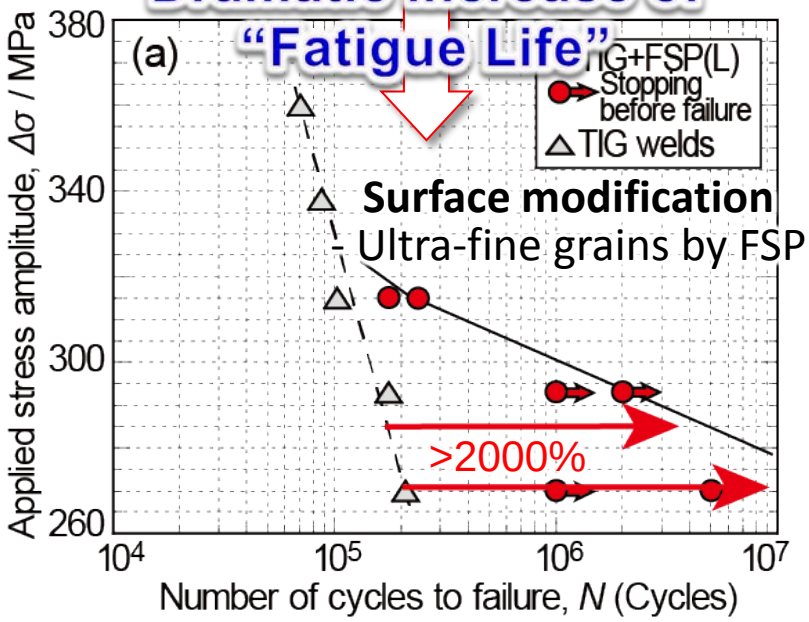
Crushing members

Filet welds



From NPK brochure

Dramatic increase of "Fatigue Life"



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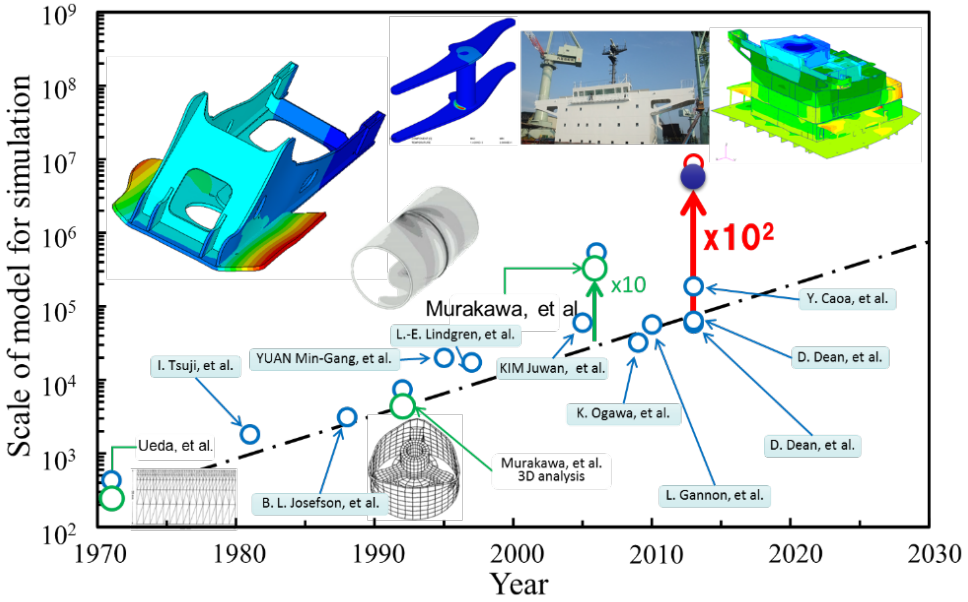
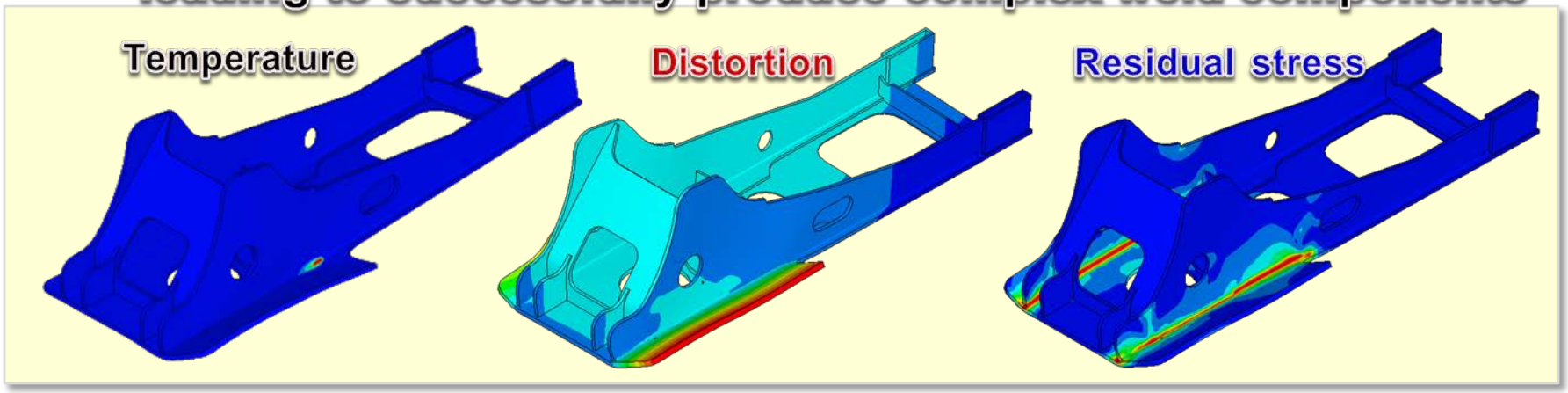
Research Collaborations in Indonesia

- **HIGH PRODUCTIVITY & QUALITY CONTROL based on Computer Science in Joining & Welding Process**



"JWRIAN" enables LARGE-SCALE welding simulation, leading to successfully produce complex weld components



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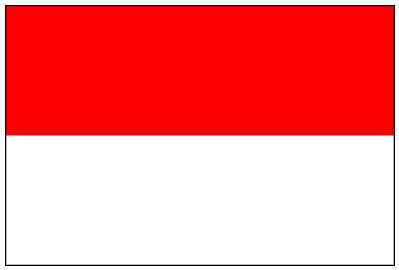
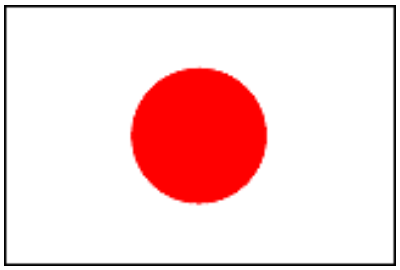
Thank you for your kind attention!





TERIMA KASIH!

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