INTRODUCTION

METI “WORK & LIFE OF ENGINEER IN 21ST CENTURY” RESEARCH

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TOSHIBA SEMICONDUCTOR & STORAGE PRODUCTS COMPANY
CO-CHAIR : WORK & LIFE OF ENGINEER RESEARCH PROJECT, METI
Population of the Engineers in Japan

**All industries**

- 2.5M Engineers @year 2000

**Manufacturing industry**

- 0.6M Engineers @year 1995

2.5M engineers in Japan @ year 2000

Begin to decline now

Committee : ‘Life and Work of Engineer’ 2014
Work & Life of Engineer Research Project, METI

Trigger

- Engineers are recognized to be quite valuable resources in Japan
- As a fact, many engineers in semiconductor industry is now loosing their jobs and facing difficulties to find reasonable next place. These bad trend has to be recognized as ‘Nation level damage’

Objectives

- Analyze ‘What has happened on semiconductor engineers’
- Analyze and discuss ‘Environment around the engineers’ and ‘Preferable ways of individual engineer’s growth’.
- Define ‘Effective directions to improve current situation’

Activities (2014 Jan - Mar)

- Discussion among the committee members
- Conduct Interviews and questionnaire toward management & individual engineers
- 1st Report will be compiled till end of the March 2014
Position Of Japanese Semiconductor Industry

US M$

Sales Global  Sales Japan  Share of Japanese IDM

Share Of Japanese Semiconductor still going down
Challenges/Changes toward ‘Engineers’

- Business target itself of the company changes in short period.
- Technology itself changes and progress every year. Each technology area is something like ‘Deep-Well’
- Above two trend enforce ‘Engineers’ to change, improve their capability in relatively short period.
- Current Japanese environment around ‘Engineers especially at the company’ is not so comfortable

Because

- No sufficient structure to get education for those engineers
- Basically Japanese engineer is bundled by the each companies
- No sufficient time to learn new area because of lack of time
- There are still various barriers to change companies
Discussion with people who is now studying ‘Engineers’ @ foreign countries

Is there any new challenges about ‘Engineers life and work’ in your own countries ?

Environment around ‘engineers’

- Is there any good service to provide for growth of the engineers who has experience to work for companies as an engineer. DIF at France ?

- How difficult to find out new ideal work place for the engineer when something occurred on their current organization/company ?

- Is there any governmental activities to improve engineers circumstances ?
Our View (Value is shifting)

Legacy Factors to keep competitive industry
- Mass production capability itself
- Minimum Cost, Shorter schedule
- Quality, Support
- Employee(Engineers)’s performance for clear/visible target

Value is shifting
Engineers has to shift also

New Value Factors to keep competitive industry
- What to provide into demanding market
- Unique idea
- ‘Innovator’ rather than ‘Innovation’
- Employee(Engineers)’s performance for invisible target and ability to collaborate with other people/industry
Who is ‘Innovator’?

Innovation

- Innovative each result that was created by innovative persons
- There are ‘Process innovation’ and ‘Product/Service innovation’
- For the engineering field, ‘Inventions’ are treated as innovation

Innovator

- People who can integrate many existing capabilities and innovations for realizing new product or services
- Innovator is more like ‘Producer’ with unique vision and enthusiasm.
Individual Engineer is Vertically bundled
Reasonable model for manufacturing oriented companies

Committee: ‘Life and Work of Engineer’ 2014
Field of ‘Common’ for the engineer is required to fit new trends.
Tentative idea (Committee now in discussion)

Better functions or services which enable individual engineers to use existing knowledge/skills more

Better functions or services to improve engineers skill in industry both current area and new area.

Do something against ‘Rigid culture’ on industries and engineers

- From ‘How’ culture to ‘What’ culture
- More Individual triggered act rather than organization-wise visible target
- Tolerance to handle other cultures and ideas

Social barriers (If any)

- Annuity system, etc
## Engineers In Japan

### Table 1: Changes in the number of natural scientists, engineers and all other workers

**A) All industries**

<table>
<thead>
<tr>
<th>Year</th>
<th>All other workers</th>
<th>Index</th>
<th>Natural Scientists and engineers</th>
<th>Total</th>
<th>Index</th>
<th>Engineers</th>
<th>Natural scientists</th>
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<tr>
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<td>1,824,045</td>
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<td>1,729,536</td>
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<td>243</td>
<td>2,140,612</td>
<td>142,485</td>
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</tr>
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</table>

Approx 2.5M engineers in Japan (All Industries)
Population of Engineers decline after year 2000

Committee : ‘Life and Work of Engineer’ 2014
## Engineers In Japan

### B) Manufacturing industry

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<tr>
<th>Year</th>
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<th>Index</th>
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<th>Total</th>
<th>Index</th>
<th>Engineers</th>
<th>Natural scientists</th>
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<td>569,666</td>
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Source: Population Census (Statistics Bureau of MIC)

Approx 0.6M engineers in Japan (Manufacturing)  
Population of Engineers decline after year 1995  

Committee : ‘Life and Work of Engineer’ 2014
Biography  Takashi Yoshimori

- Master Degree (Osaka Univ. Computer Science) 1982
- Join Toshiba Semiconductor in 1982
- EDA development (Static Timing Analysis) 1983
- RTL design for Toshiba midrange computer 1984
- DFT (Scan, JTAG) 1985
- Project Leader for many ASIC/SoC in TOSHIBA (Mainly computer related LSI) 1986 – 1998
- Senior Manager of IP development section in TOSHIBA 1999
- TOSHIBA corporate IP center at TSB hq. 2000
- CTO of IPTC (IP Trade Center) 2000 – 2001
- TOSHIBA semi. General Manager System LSI Design Div. 2002
- Technology Executive (SoC Design) 2003 -
- Assistant chief Technology Executive 2009 -