

Equipment Engineering Capabilities Status Report

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Industry Response

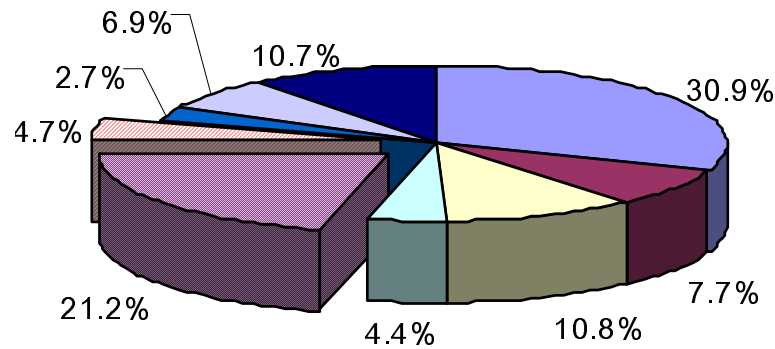
- Workshops on e-Manufacturing
 - Two workshops were held in Japan on e-Manufacturing in February and June on e-Diag and EEC/EES
 - Both were well attended
 - 200 and 155
 - “e-Manufacturing” has been very well promoted
 - Less confusion between e-Diag and EEC collaboration than at the time of SEMICON Japan 2000

MTTR Analysis

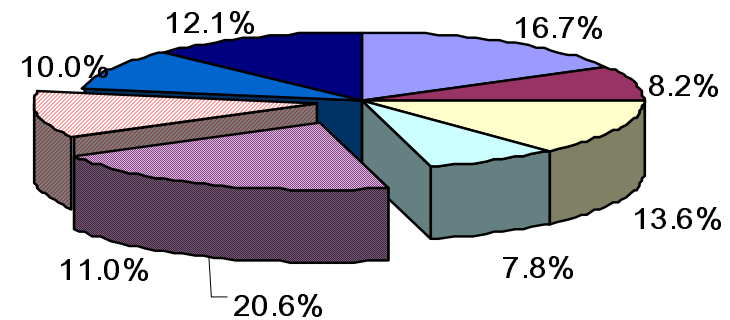
- **MTTR Analysis by device makers and tool suppliers**
 - **2/3 of MTTR is due to the non-process part of the tool**
 - **Device Maker's view and tool supplier's view match**
 - **More tool suppliers have started to investigate MTTR**
 - **seek for better OEE**
- **Next step for tool suppliers**
 - **Provide their own definite scenario to improve the situation**
 - **Tool suppliers to decide;**
 - **if more tool detailed data be used?**
 - **or, hire more service people and have more education?**
 - **Investigate how much and which resolution of tool data are necessary to effectively reduce MTTR**
 - **Tell device makers which data to be shared so as to reduce MTTR**

MTRR Analysis by Device Maker

Current Technology



New Technology



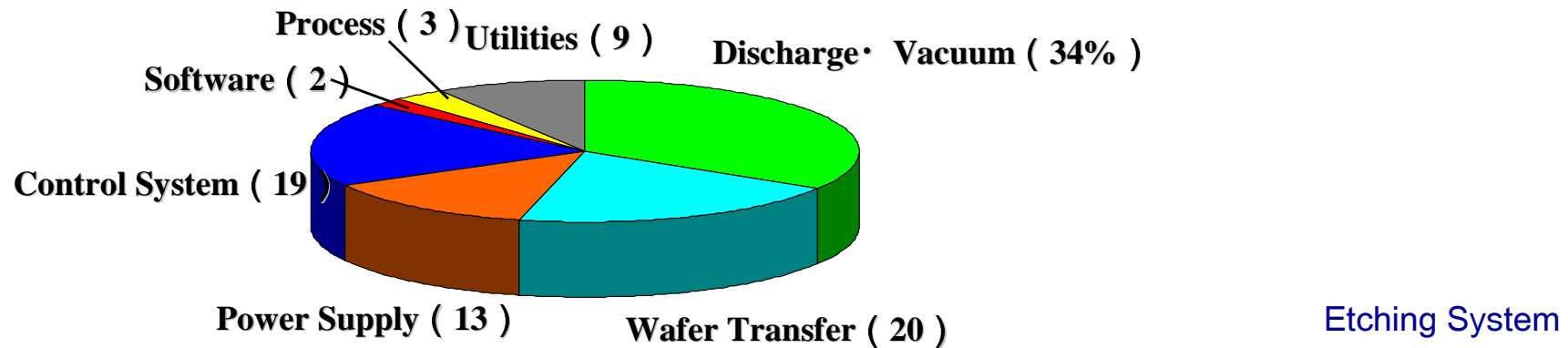
- Handling
- Gas
- Process Chamber etc
- Temp. Control
- Other
- Vacuum/ Exhaust
- Electric
- Particle
- Senser/ EPD

Data : FASL

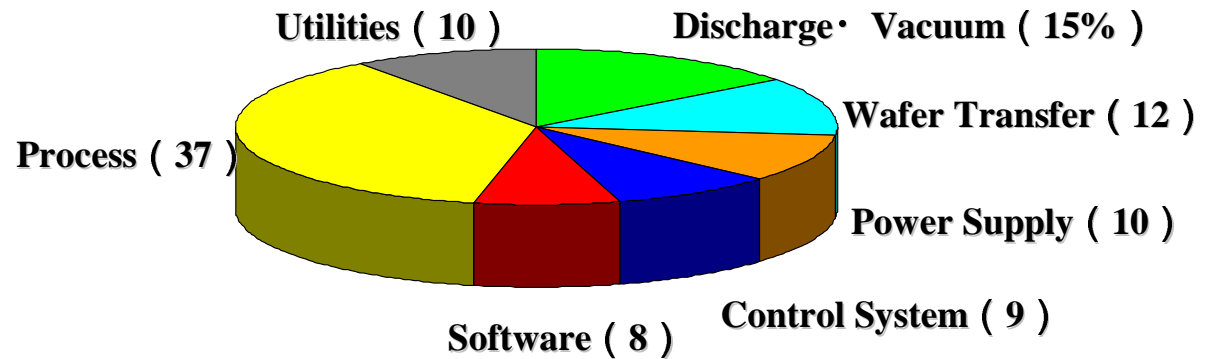
Source: "Device maker's Expectation to EES and e-Diagnostics" by Tadashi Kiriseko in SEMI Workshop on e-manufacturing & APC/FDC February 23, 2001

MTTR Analysis by Tool Supplier

Problem Category



MTTR per Category



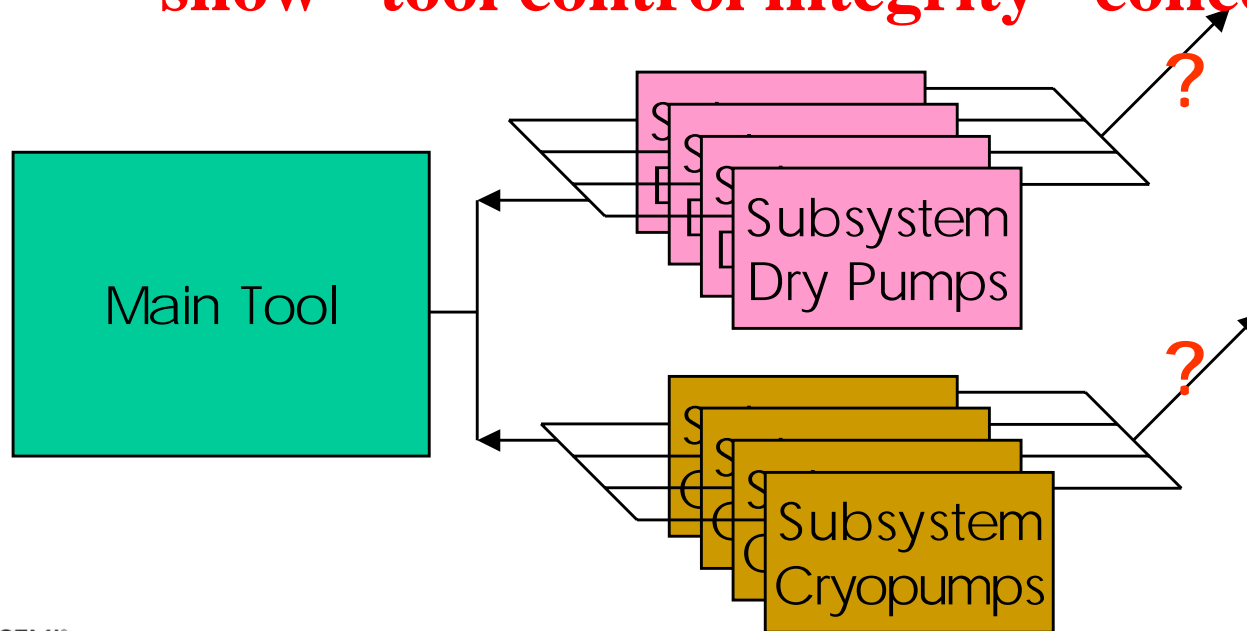
Source: "EES development status and direction of HITACHI" by Yasutsugu Usami Hitachi, Ltd. in SEMI Workshop on e-manufacturing June 7, 2001

EE Capabilities are becoming available

- **Some suppliers report EE Capabilities for EE improvement**
 - can be used locally and remotely
 - started with plain capabilities for daily EE operation in the fab
 - but these utilize detailed tool data
- **Still none of them are available with good interoperability**
 - of course we have no standard to do this yet
 - need to address implementation level requirement

EE Capabilities are becoming available

- Subsystem vendor introduces an issue
 - Can subsystem be hooked up directly to vendor’s centralized capability to provide improved service?
 - Device makers must provide
 - concrete “physical connection” guidance
 - show “tool control integrity” concept, too



Problems with EES

- **Business model has not been well addressed**
 - **Are device makers going to pay for EES?**
 - They may not pay for EES infrastructure, i.e., EE Data port
 - EE Capability applications do have values
 - ex. EES has value in rapid ramp up to both sides
 - **Both sides need to keep investigating**
- **Migration path needs to be addressed**
 - **Simple tools do not need strong data transmission capability**
 - Some systems have been proposed by software vendors
 - **Complex tools need phasing of EEC capabilities implementation in the tool**
 - Wrapper used in GEM300 may be the answer

Standardization is a must for better EE

- Minimize the burden to the industry so as to minimize the cost impact
 - Standardization is a must and is urgent
- The following need to be addressed
 - EES Logic Model (including Network Topology)
 - Define requirements for better EE operations
 - EES Communication model per OSI 7 Layer Model
 - Diagnosis
 - Process adjustment
 - FDC
 - Develop Dictionaries
 - EES Procedure
 - EES Message (including data security/ownership)
 - Data (including structure)
 - Terminology

Conclusions

- **EEC/EES is recognized as a required system both for suppliers and device makers**
- **Data sharing concept has been introduced**
 - **Tool suppliers are expected to propose the detailed plan of possible data sharing for higher OEE**
- **Standardization**
 - **Need industry's sincere effort**
- **International consortium activity**
 - **More consensus on EEC requirements be made**
 - **Help smooth migration to e-manufacturing**