DeMaMech 2005
Exchange Student Report

Kentaro WATANABE

Home Univ: The University of Tokyo
Host Univ: Technical University of Berlin

summary

Schedule

28.08.2005-02.11.2005 TU Delft in Holland (for lectures)
02.11.2005-02.02.2006 TU Berlin in Germany (for research)

Research Theme: **"DESIGN IMPROVEMENT BY FMEA AND ITS INFLUENCES ON INCREASING THE RELIABILITY OF MECHATRONIC SYSTEMS"**

During my stay in EU, I learned and felt many things.
Many things that changed my way of thinking…

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Research at TU Berlin

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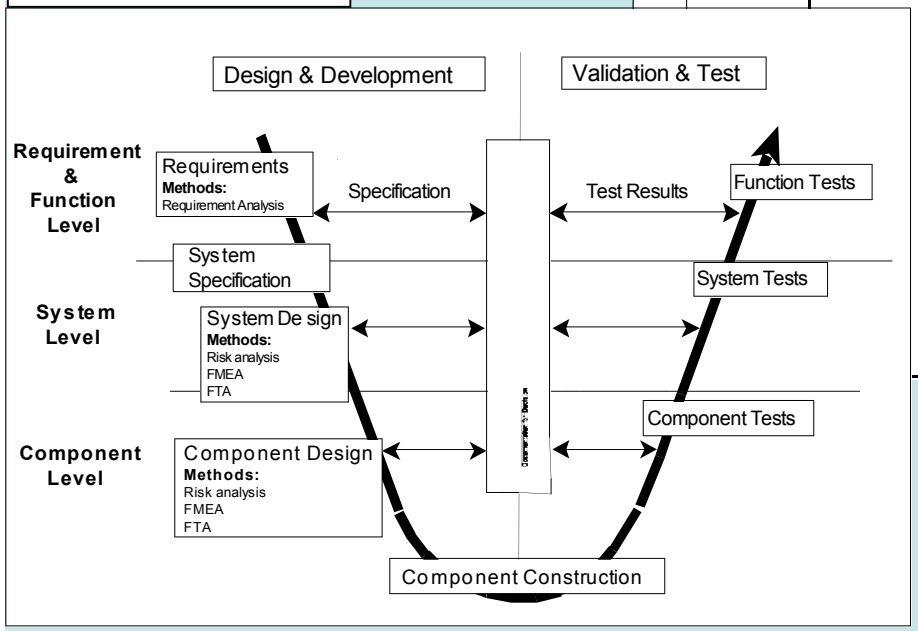
Theme: "Design Improvement by FMEA and Its Influences on Increasing the Reliability of Mechatronic Systems

Product Development Process

V-cycle model



FMEA

No.	Subsystem	Component	Failure mode	Potential cause	Possible effect: Subsystem	Possible effect: System	Possible effect: Function	Possible effect: Human	(S)	(O)	(D)	RPN
1	Heating subsystem	1.1 gas pipe	(1). blem	1) contact 2) defective material	insufficient function	nothing	nothing	nothing	1	7	5	35
			(2). leakage of gas from pipe	1) defective preservation 2) corrosion	does not work	possibility of detriment	cannot achieve	possibility of detriment	9	9	4	325
			(3). leakage of gas from joints	1) defective weld 2) corrosion	ditto	possibility of detriment	cannot achieve	possibility of detriment	9	7	4	252

RPN ≠ Reliability

Needs to Know Improvement of Reliability

Occurrence (O) ⇒ Reliability ??

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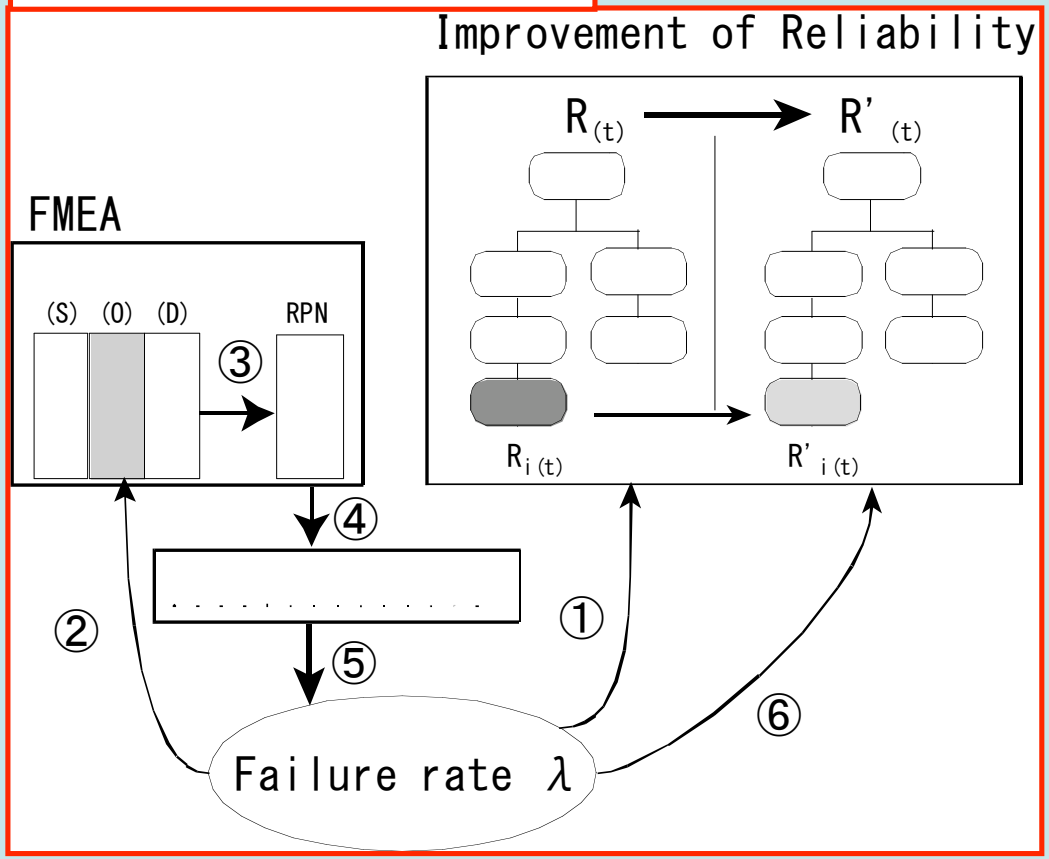
Key is “Failure Rate”

Occurrence (O)	State	Failure rate λ [%/1000h]
10	Very high: Failure is almost inevitable	> 50, (greater than 1 in 2)
9		33, (1 in 3)
8	High:Repeated failures	12.5, (1 in 8)
7		5, (1 in 20)
6	Moderate: Occasional Failures	1.25, (1 in 80)
5		0.25, (1 in 400)
4		0.05, (1 in 2000)
3	Low: Relatively few failures	0.00667, (1 in 15,000)
2		0.00067, (1 in 150,000)
1	Remote: Failure is unlikely	<= 0.00067, (1 in 1,500,000)

Proposed Method



THE UNIVERSITY OF TOKYO

TU Delft

Exchange Student Life!!

Friends, Study, Parties…!!

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