



F M E A

Failure **M**ode & **E**ffect **A**nalysis

潜在的失效模式及后果分析



FMEA types:

FMEA按其应用的领域分类有：

◆ **SFMEA——System (系统) FMEA**

◆ **DFMEA——Design (设计) FMEA**

◆ **PFMEA——Process (过程) FMEA**



- **FMEA overview.**
What's FMEA? 什么是FMEA?
Why perform FMEA?为什么要做FMEA?
Benefit of FMEA? FMEA 有什么好处?
- **How to perform FMEA? 怎么做FMEA?**
- **Routine / Tool (add a link)**



FMEA Overview

What's FMEA? 什么是FMEA?

FMEA is Failure Mode & Effect Analysis.

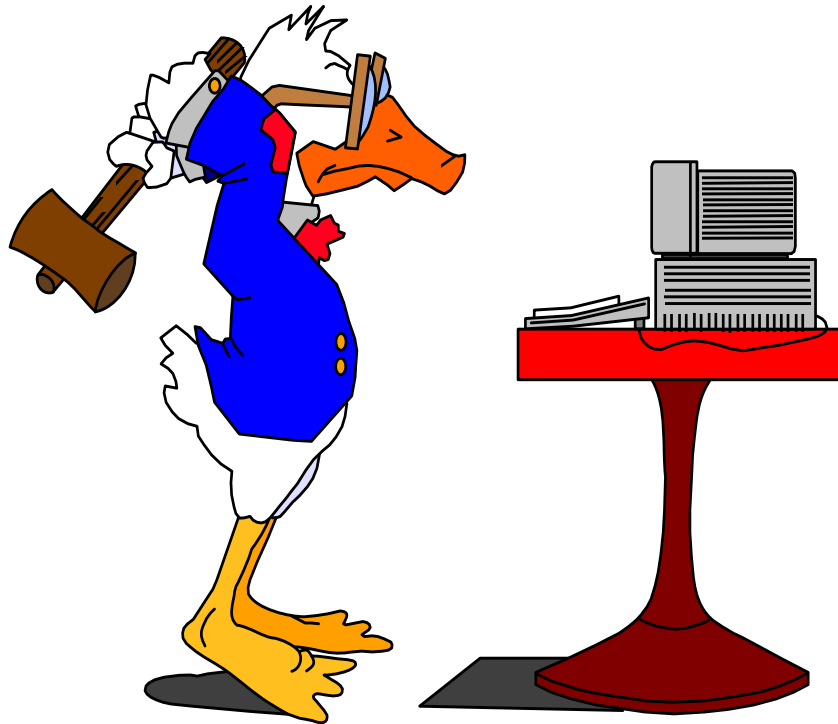
潜在失效模式及后果分析

Pro-active and systematic method of reducing the occurrence of quality and reliability problems **before reaching the customer**

- **一种系统方法, 用来:**

- 识别、分析、排序和记录潜在故障模式
- 确定故障模式对系统、产品和过程的影响
- 确定故障的可能原因
- 建立减少风险的行动

Find the failure before it appears!





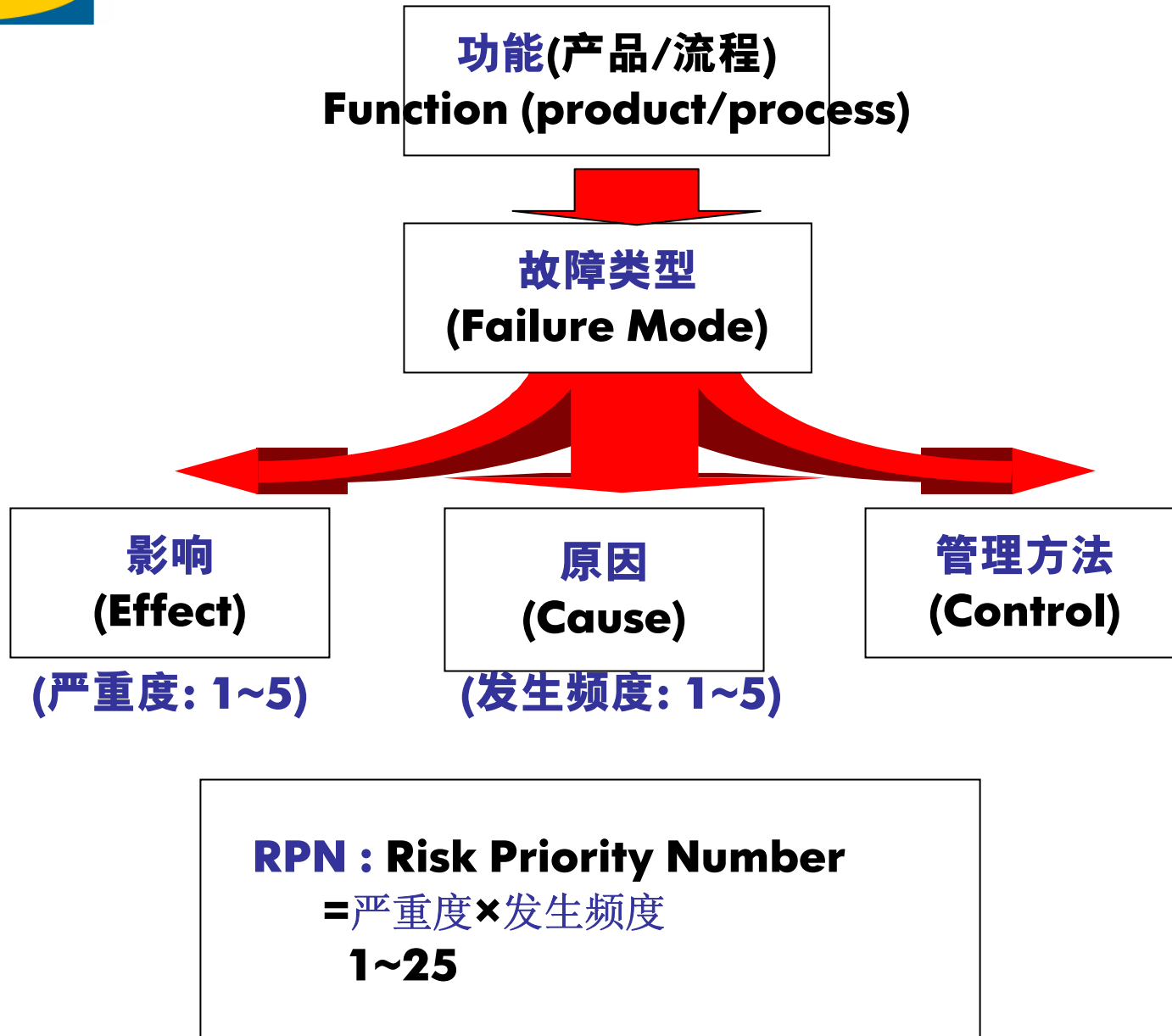
Because...so I have not been effected by....

”我先 所以沒有 ”

✉ 我先 看了氣象預報 所以沒有 淋成落湯雞

✉ 我先 設計電腦防火牆 所以沒有 被駭客入侵

有效運用 **FMEA** 可強化事先預防





FMEA History 的历史

- **A product of the aerospace industry in 1960's**
- **Formalized in MIL-STD-1629 (Nov 1977)**
- **首次正式应用FMEA是20世纪60年代中期航天工业的一种革新。**
- **进入70年代, 美国的海军和国防部相继应用推广这项技术, 在美军标-1629中正式化。**

70年代后期, FMEA被美国汽车工业界所引用, 作为设计评审的一种工具。
- **FMEA还被广泛应用于其他行业, 如: 粮食、卫生、运输、燃气等部门。**



FMEA Benefits:

- **Improves the quality, reliability and safety of products.**
提高产品的质量、产品的可靠性和安全性;
- **Helps increase customer satisfaction.**
帮助增加客户满意度;
- **Reduces product development timing and cost.**
减少产品开发时间和成本;
- **Reduces the amount of rework, repair and scrap.**
减少返工、维修和报废的数量;
- **Documents and tracks actions taken to reduce risks.**
记录并跟踪为减少风险而采取的行动;
- **Prioritizes deficiencies to focus improvement efforts.**
用来给各种努力排定优先顺序, 分配资源。

- **FMEA overview.**
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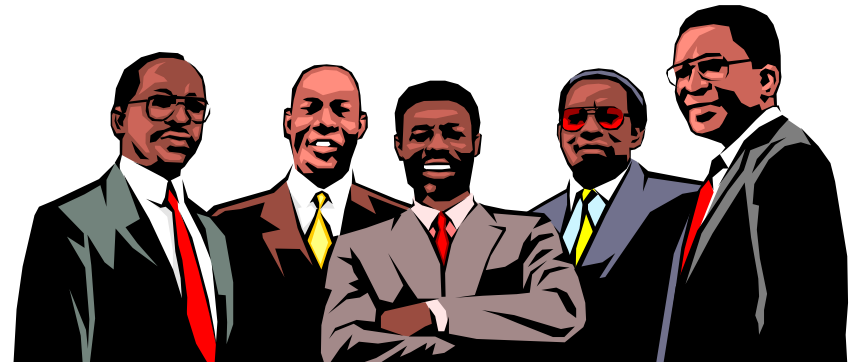


Who perform FMEA? 谁来做FMEA?

One team of 2 to 6 person (IKEA engineer, production and quality engineer from supplier or sub-supplier) who are familiar with the related process.

由负责制造,品质的工程师或工程师小组(二至六人)来负责。

要成功完成FMEA工作，必须依靠小组的共同努力，理想的FMEA团队小组应包括生产、质量控制、测试以及供货方等所有有关方面的代表。





When perform FMEA? 什么时候做FMEA?

FMEA is meant to be a “before the event” action, not an “after the fact” exercise

To achieve its greatest value, FMEA must be performed **before a design or process failure mode has been designed into the product**

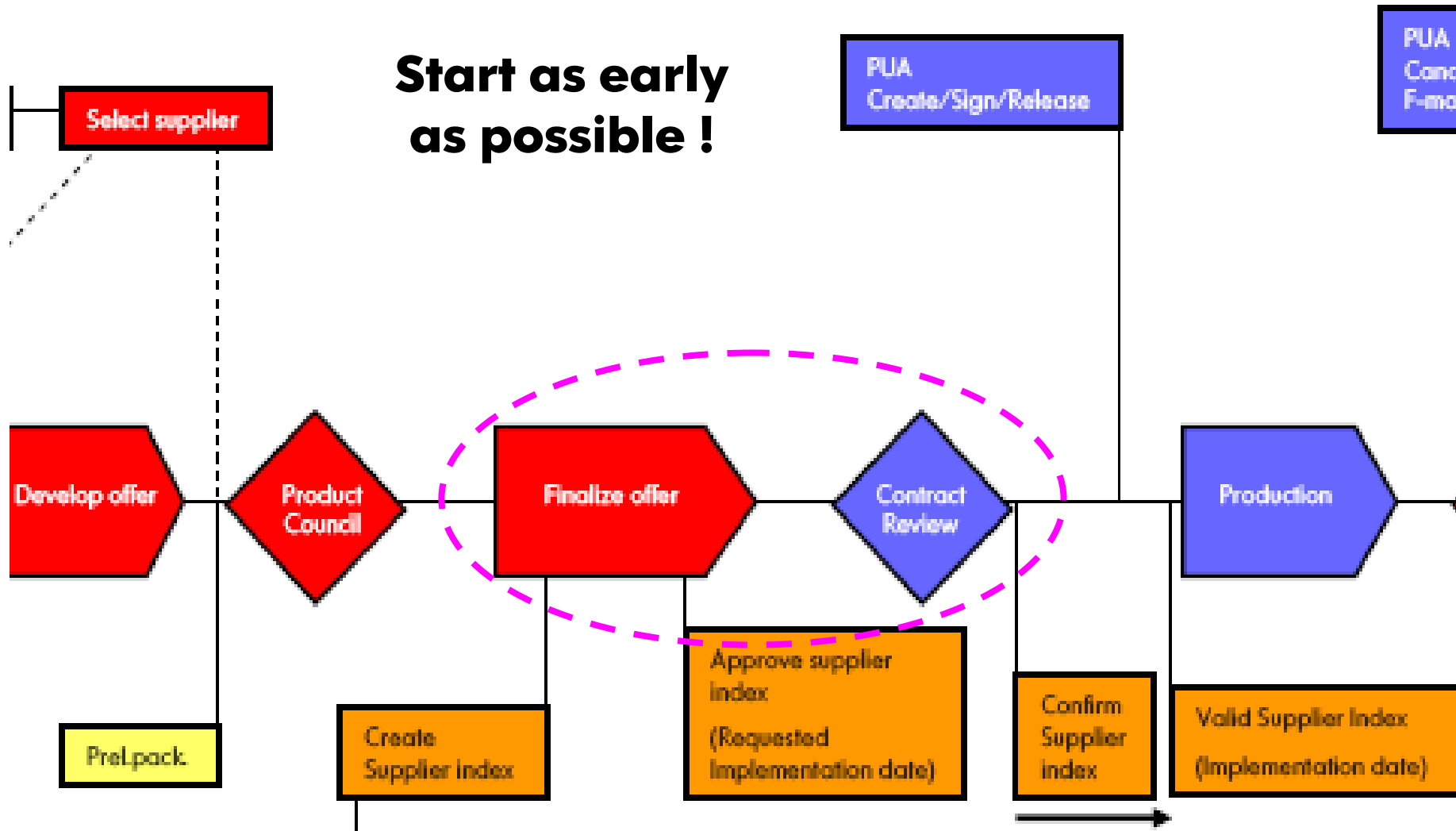
Time spent in doing an FMEA well at the beginning will ensure that product/process changes can be easily and inexpensively implemented

及时性是成功实施FMEA的最重要因素之一，它是一个“事前的行为”，而不是“事后的行为”。为达到最佳效益，FMEA必须在设计或过程失效模式被无意地纳入设计产品之前进行。

始于---可行性研究阶段或之前启动工装设计,生产前

When to do?

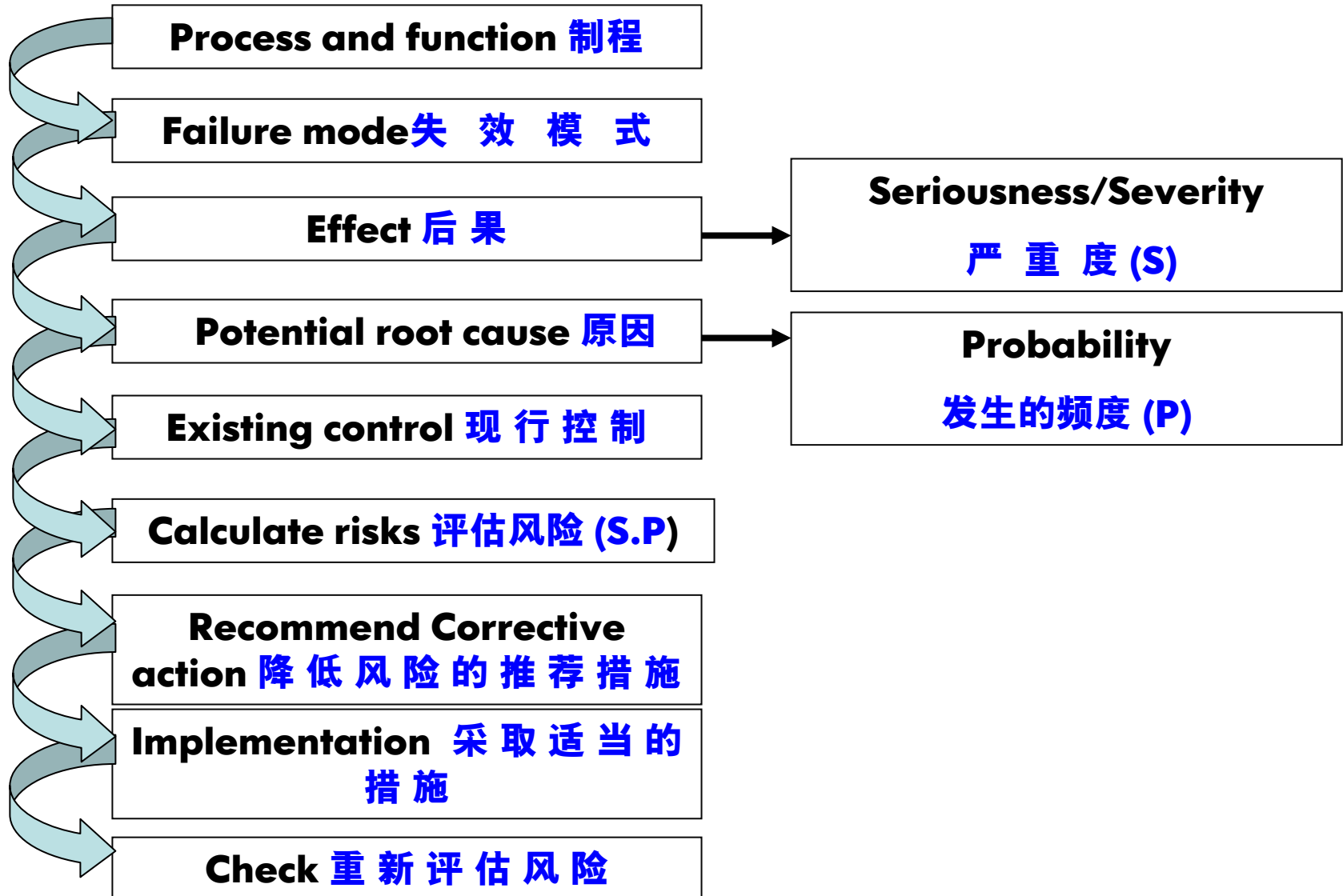
Start as early as possible !





How to perform FMEA

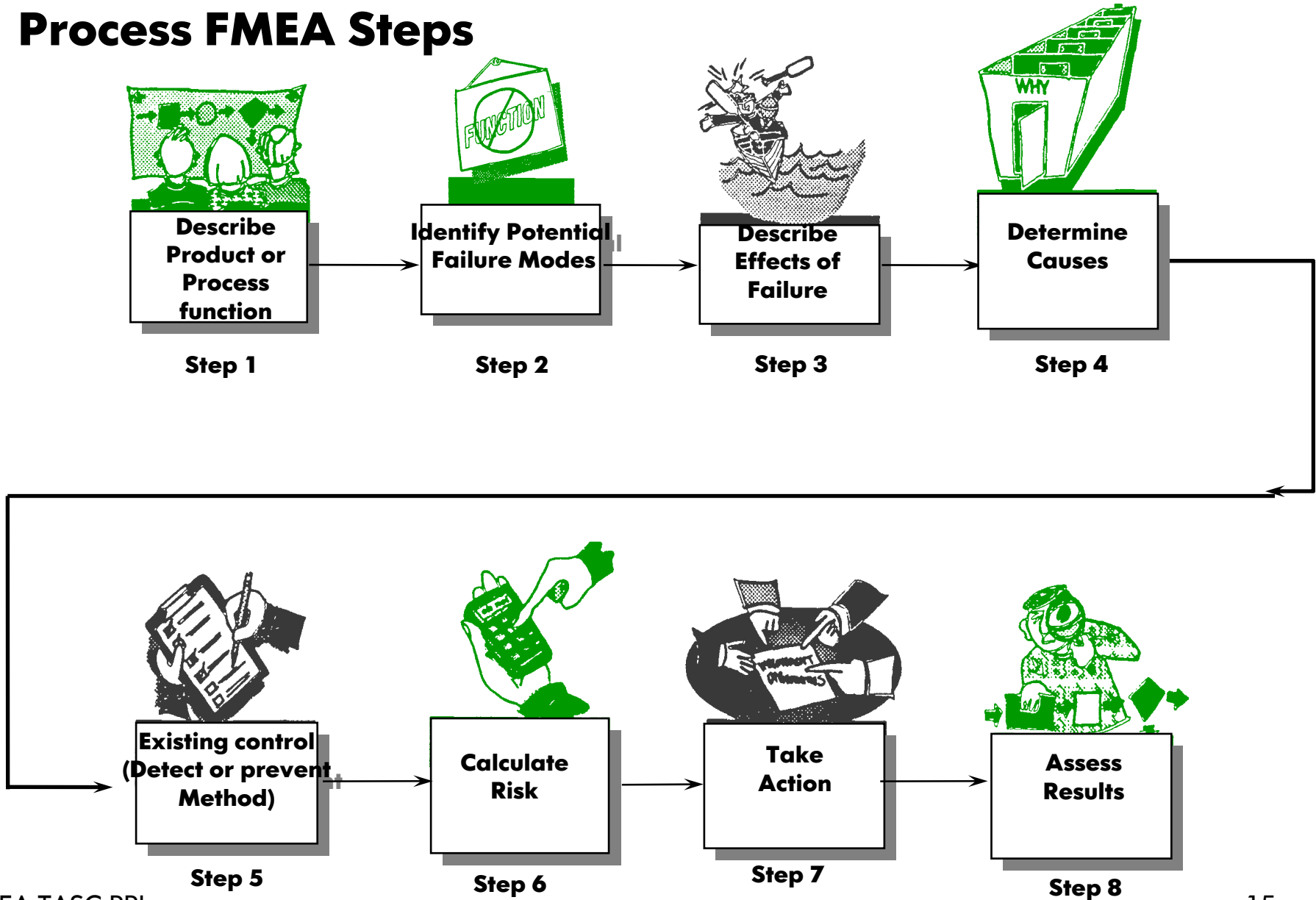
Process FMEA





How to perform FMEA

Process FMEA Steps





How to perform FMEA

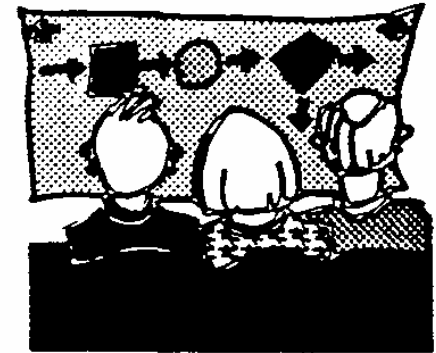
TASC FMEA LIGHT Risk analyze and preventive actions 风险评估及预防措施															0%	
Supplier: Yintong		Date: 16.May				55			Responsible: Jowen			5		-		
Article: Detolf		Edition: 1							Contributors: Laurent, Vali, Jet							
Description		Investigation				Value						Value				
Pos	Process(制程)	Failure mode失效模式	Effect后果	Root Cause原因	Existing control现行控制	S 严重度	P 发生频度	RISK 风险序数	Corrective actions改进措施	Resp 负责人	F. date完成日期	S 严重度	P 发生频度	RISK 风险序数	Verifie确认	
5	Glass preparation							0				0		0		
7	Cutting 切割	wrong size尺寸错误	can not assemble, claim	worker input wrong size in computer (manual load) 工人输入数据错误	first item approved. 首样确认. And inspection Report.	5	2	10	Use a program for each different version	LL	Jun 4,2007	5	1	5	On process	
8	Grinding磨边	sharp edge边缘锋利	Injury customer	machinery maintain not good enough保养不够	First item approved.Grinding process control by PQC per half hour.	5	1	5				5		0		
9		Uneven surface表面不平	Customer unhappy	Grinding tool broken磨边工具破裂	Check grinding tool before production every day. Mon. Wed. small maintain, Fri. big maintain	4	1	4				4		0		



Step 1: Describe Process

第一步:制程描述

- Illustrated Process Flow 流程图
- Process Description Sheets 制程描述
- Product Specifications (function at the related process) 加工标准

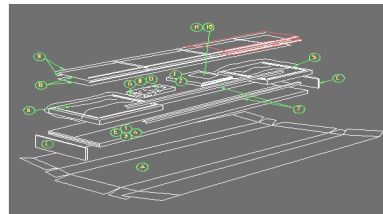


TASC FMEA LIGHT Risk analyze and preventiv

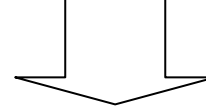
Supplier: Yintong		Date 16.May		
Article: Detolf		Edition 1		
Description		Investigation		
Po s	Process(制程)	Failure mode失效模式	Effect后果	Root Cause原因
	Glass preparation			
1	Cutting 切割	wrong size尺寸错误	can not assemble, claim 不能装配,索赔	worker input wrong size in computer (manual load) 工人输入数据错误
2	Grinding磨边	sharp edge边缘锋利	Injury customer 使用者受伤	machinery maintain not good enough保养不够



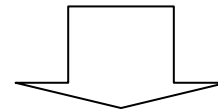
Flow Chart of Glass



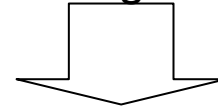
原片准备Glass



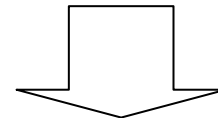
开介Cutting



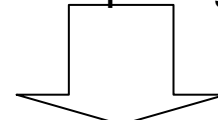
磨边和抛光边部
Grinding



清洗, 干燥处理
Cleaning and Drying



钢化
Tempering



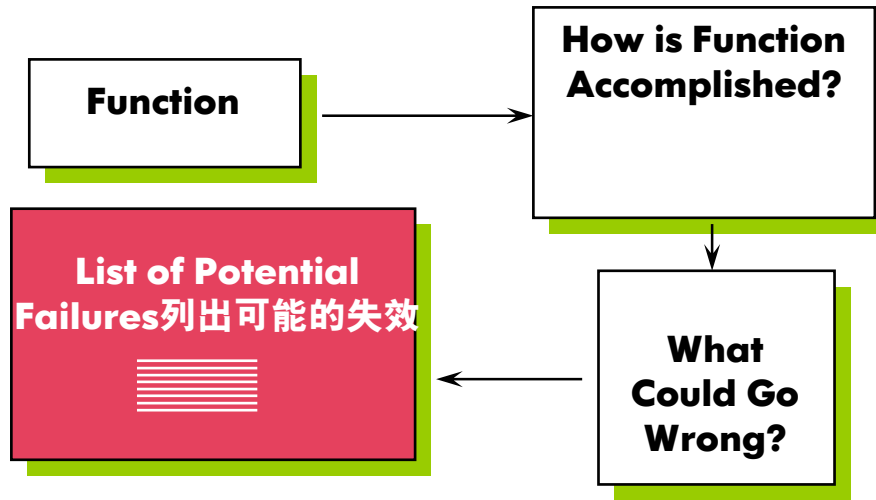
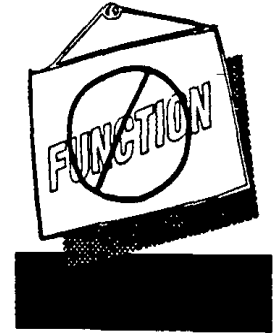
包装
Packing





Step 2: Identify Potential Failure Modes

第二步:识别潜在的失效模式



Describe potential failure
描述哪些方面可能出现的问题

TASC FMEA LIGHT Risk analyze and prevention

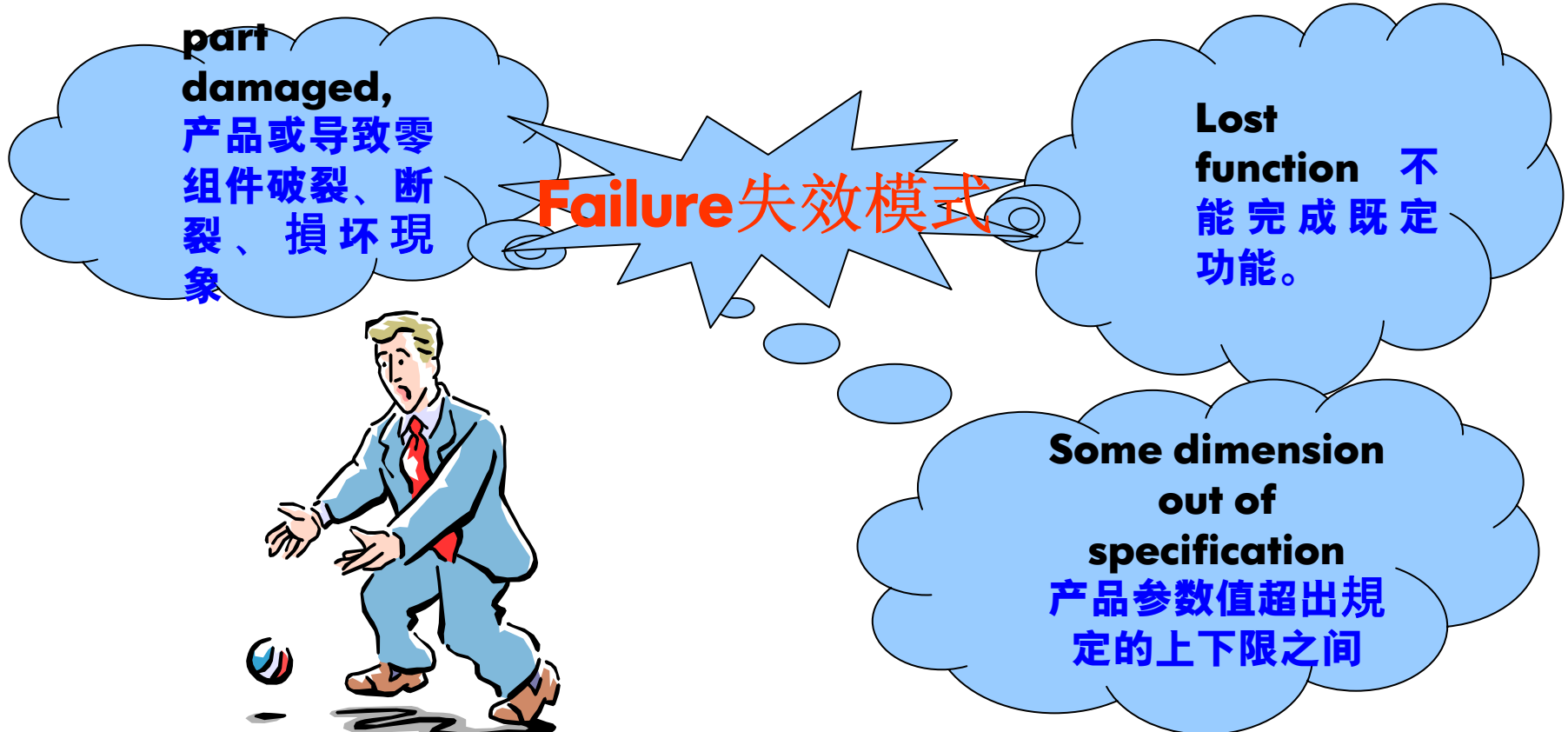
Supplier: Yintong		Date 16.May	
Article: Detolf		Edition 1	
Description		Investigation	
Po s	Process(制程)	Failure mode失效模式	Effect后果 Root Cause原因
	Glass preparation		
1	Cutting 切割	wrong size尺寸错误	can not assemble, claim 不能装配,索赔 worker input wrong size in computer (manual load) 工人输入数据错误



Step 2: Identify Potential Failure Modes 第二步:识别潜在的失效模式

A process fail any time it creates an unacceptable output (not match the requirement, customer will not accept it).

不符合规范,造成生产影响,物料报废,需要返工,或客户投诉退货。





(Sample)

Process	Failure mode
etching logo 印字	wrong etching 印错
	etching not clear, or smearing 印字模糊
	wrong position 位置错



Step 3: Describe Effects of Failure and its seriousness 第三步:描述故障影响及严重度

**In terms of what a customer/
client might notice**
就客户可能注意哪些方面而言:

- **How it affects the function**
故障如何影响功能
- **How it affects other systems, functions, parts, etc.**
故障如何影响其它系统、功能、部件等等
- **How it impacts customer experience**
故障如何影响客户感受
- **What is the impact beyond our own product**
除了我们自己的产品外, 还有什么影响呢
- **Performance degradation**
性能降低



GHT Risk analyze and preventive actions 风险评估及预防

Yintong	Date16.May			55		
Detolf	Edition1					
Investigation				Value		
Failure mode失效模式	Effect后果	Root Cause原因	Existing control现行控制	S严重度	P发生频率	RISK风险序数
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Definition of customer:

(1) IKEA Store or end user
宜家商场, 消费者





Definition of customer:

(2) Downstream process 下游工序





Reference for rating of the seriousness

Seriousness/后果	Rule of rank of seriousness 评定准则：后果的严重度	Rating
None/not notice able 无或很轻微	None or not noticeable effect to product or customer, some parts may be needed to be reworked at the original station 无影响或生产线破坏轻微,部分产品需要在生产线上原工位返工, 但很少顾客发现有缺陷	1
Low 低	Small failure in production, some parts needed be reworked, small effect to customer but will not return or claim. 生产线破坏较轻, 部分产品需要在生产线上其它工位返工, 产品配合、外观等项目不符合要求, 有顾客发现有缺陷,轻微报怨,不会退货或索赔	2
Medium 中等	Significant effect to production, many parts need be reworked. Noticeable effect to customer (but no return or claim) 生产线破坏不严重, 产品需要(较大比率)返工, 舒适性或方便性项目性能下降, 客户会投诉(但不会退货或索赔)	3
Serious 高	Serious failure and effect to production, most parts needed be reworked or scrapped. Clearly noticeable effect on customer, return or claim is a possible. 生产线破坏明显, 产品部分报废, 标准性能下降,客户会退货或索赔	4
Total 严重危害	Total failure in production, big scrap. May hurt the operator; may hurt the end user, main function lost. Or non-conformance to law, claim and stop production/shipment is a must. 生产线严重破坏, 较大比率产品得报废, 可能危害机器或装配操作者, 严重影响产品安全性或包含不符合政府法规.	5



Step 4: Determine the potential cause (1)

第四步:分析确定原因

GHT Risk analyze and preventive actions 风险评估及预防

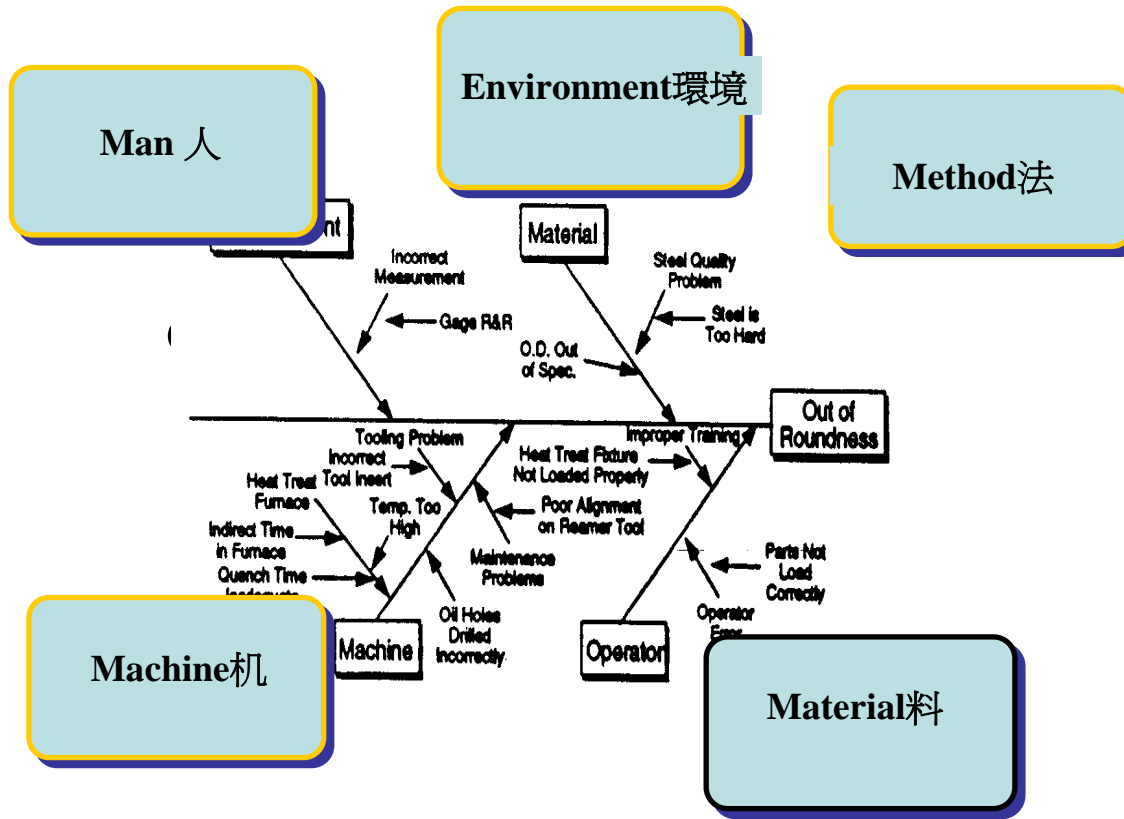
Yintong	Date16.May			55		
Detolf	Edition1					
Investigation				Value		
Failure mode失效模式	Effect后果	Root Cause原因	Existing control现行控制	S严重度	P发生频度	RISK风险序数
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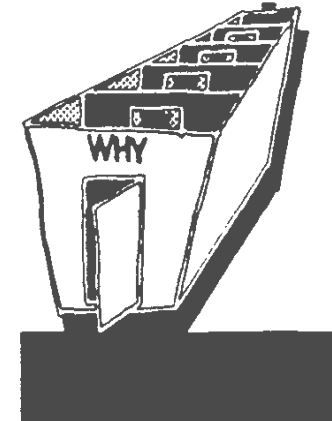
Potential causes that may result in occurring of the failure, the failure will be eliminated or controlled (defective parts have been screened out, not flow to downstream or end customer) if the cause is eliminated.

是指使失效模式发生的原因，这些原因的消除，可以使失效模式得到纠正或控制。

Generally, use C&E diagram (fish-bone) and 5-WHY for the analysis.
分析失效原因的办法，应使用现有类似过程的失效分析资料，同时应用工序上下的关系，应用“五个为什么？”方法，应用因果图等方法。

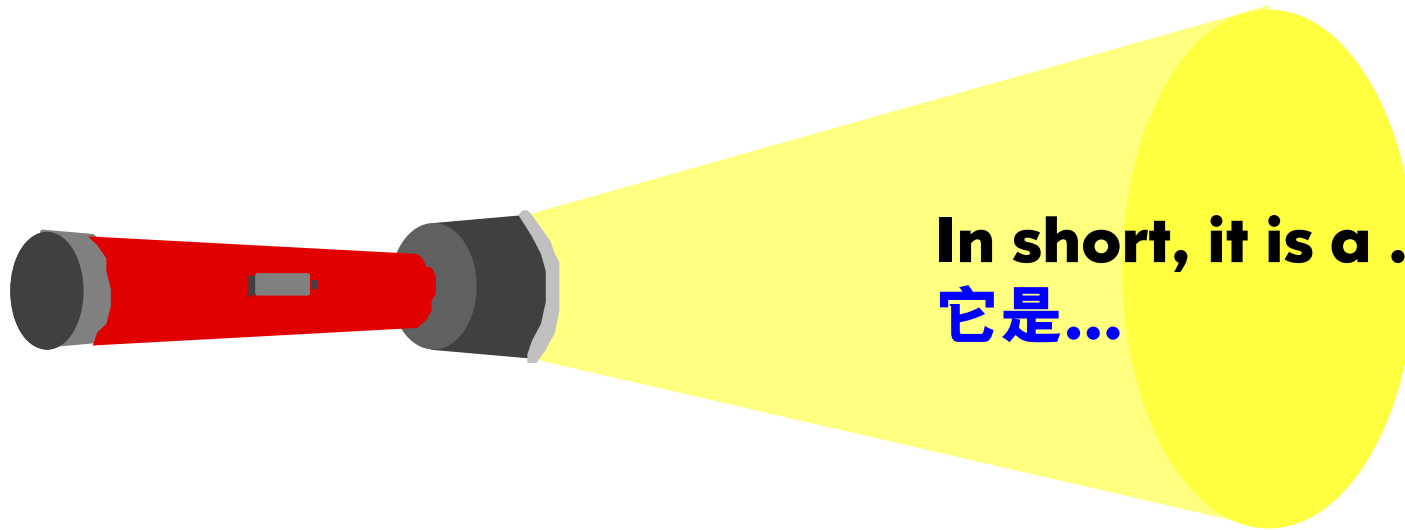


5-Why?????





5-Why?



In short, it is a ...
它是...

Problem
问题
Solving
解决
Tool
工具



What's 5-Why?

Why did this happen?
为什么会发生?

Symptom 1
迹象1

“why”

Symptom 2
迹象2

“why”

Symptom 3
迹象3

“why”

Symptom 4
迹象4

And more “why’s” → Probable Root Cause 可能的根本原因

Progressively becomes more difficult and a more thought provoking assignment.

Early questions are usually superficial, obvious; the later ones more substantive.
开始时提的问题一般会比较表面、肤浅，但是接下来的问题会变得比较深入实在。

Check the logic in reverse direction. 按逆反顺序检查其逻辑相关性。

- Probable root cause can cause symptom 4 to occur
- Symptom 4 can cause symptom 3 to occur
- Symptom 3 can cause symptom 2 to occur
- Symptom 2 can cause symptom 1 to occur
- Symptom 1 can cause failure



When to use 5-Why?

It should be used when:

- **The potential cause is not so apparent;**
- **By existing control solution, the failure recurred still in a higher frequency. 5-Why should be used to detect the root cause.**



Note : It SHOULD NOT be used when the cause is apparent. Do not waste resources to “reverse engineer” a 5-Why analysis from a known cause.

注：当原因很明显时不需要使用它，不要浪费资源去做“反向工程”。



5-WHY sample:

Problem: Machine is down 机器开不动了!

? **WHY: Machine down (stopped)? 为什么机器停了?**

-- Fuse burned. 保险丝断了。

?? **WHY: Fuse burned? 为什么会保险丝断?**

--Because overloaded, fuse burned. 因为负荷过大，保险丝断了。

??? **WHY: Overloaded? 为什么会负荷过大??**

-- Bearing not lubricated enough. 因为轴承部分不够润滑。

??? **WHY: Not lubricated enough?为什么不够润滑???**

-- Pump don't work well. 因为润滑油泵吸不上油。

???? **WHY: Pump don't work well? 为什么吸不上油????**

-- Nozzle worn and loosed. 油嘴磨损，松动了。

????? **WHY: Nozzle worn? 为什么磨损了?????**

Filter not installed, and then some dross entered to block it.

因为没有安装过滤器，粉屑进去了。

Install the filter... 安装过滤器



Step 4: Determine the potential cause (2)

第四步:分析确定原因

Probability of the failure
Due to each cause

GHT Risk analyze and preventive actions 风险评估及预防

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Reference for the rating of the probability

Probability 失效发生可能性	Potential percentage of failure 可能的失效率 *	Rating of probability 频度数
very low: Failure almost don't occur 极低：失效不大可能发生，几乎完全相同的过程也未有过失效	1/1000,000	1
Low: few occurrence 低：很少几次与相似过程有关的失效	1/20,000	2
Medium: Same failure occurred from time to time 中等：以前时有失效发生	1/1000	3
High (高：一般与以前经常发生失效的过程相似的工艺有关)	1/100	4
Very high (很高：失效几乎是不可避免的)	>10%	5

* - to be used as reference only, depends on industry...



Step 5: Existing control 第五步: 现控制方法

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Existing control 现行的控制

- **Existing control solution to eliminate or reduce the probability of the causes and failure from occurring; or identify and reject to screen out the failed part, don't transfer the failure to downstream process and end customer.**
- 是指目前采用的防止失效模式及其原因发生，或降低其发生的可能性，或在过程中查出这些失效模式以采取措施防止不合格品产生或流入下游工序的措施。



Three type of control solution

过程控制方法，有三种不同深度的方法：

- **First one:** Prevent or reduce the occurring of the causes and failure. Such as: applying Poka-yoke design to keep no wrong orientation of part on fixture. **第一种方法：防止失效原因/机理的发生，或减少其发生的可能性。如：采取有效的防错设计，防止错装、漏装**
- **Second one:** Detect the failure and cause, then find out corrective action. F.g: By analysis of initiate data to find the special cause of deviation then solution accordingly to make the process under control. **第二种控制方法：是找出失效的原因/机理，从而找出纠正措施。例如，通过初始过程能力研究，找出变差的特殊原因，从而采取措施，使过程受控。**
- **The third one:** Identify to detect the failure then screen out. F.g: final inspection to reject defective. **第三种控制方法：是查明失效模式。例如，利用产品的最终检验查出缺陷（即失效模式），再采取纠正措施。**



Poka-Yoke

- Whenever possible, Error-Proofing is the best Countermeasure.

任何时候，**防范错误**是最好的对策。

– Why?

- it is not human dependent for effectiveness.
不是单依赖人就能保证有效
- it can be designed to catch a simple mistake before it causes a defect/problem..

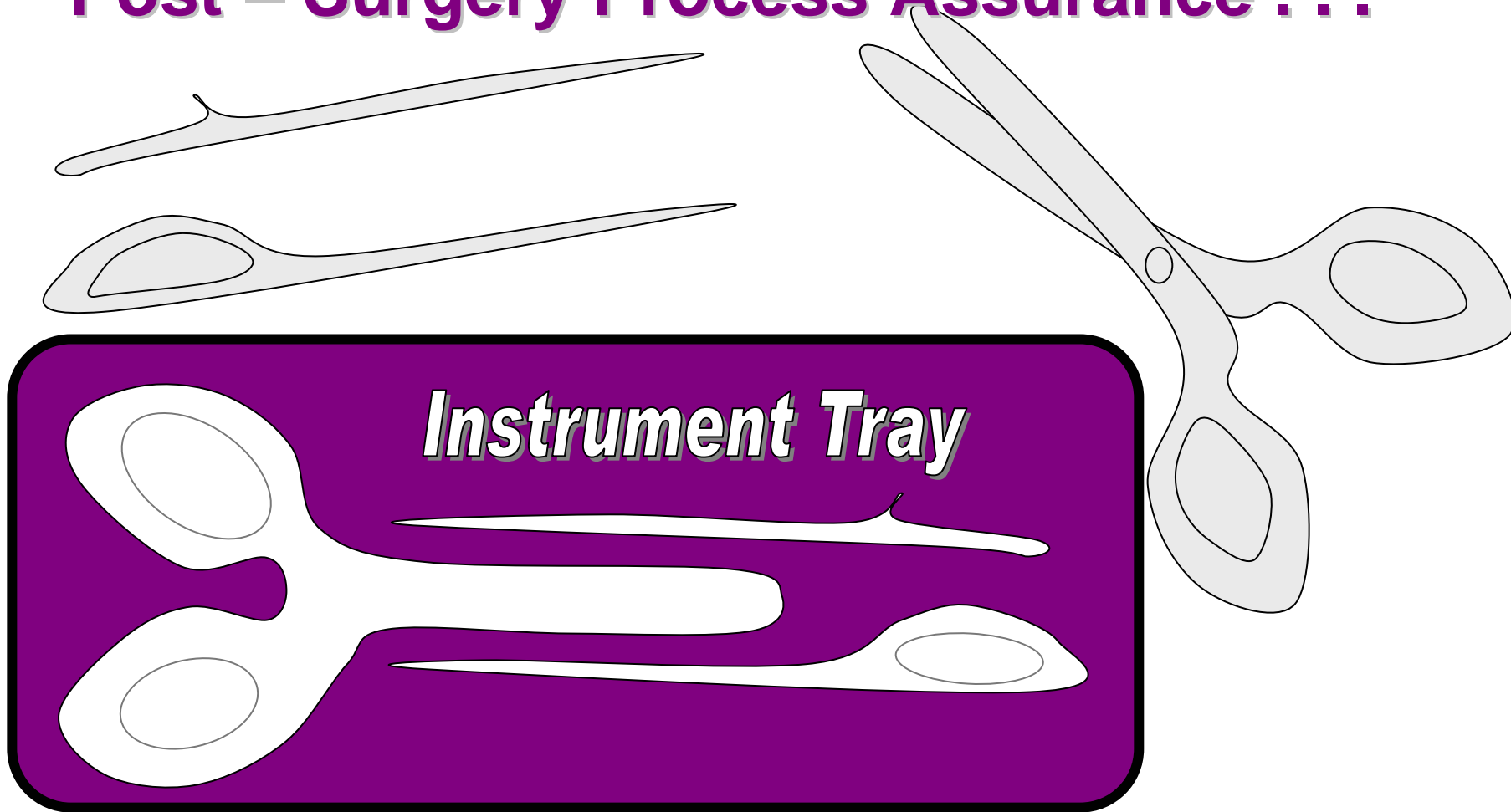
在缺陷/问题发生之前，肯定会有某个细微的错误





“Process” Mistake Proof Example

Post – Surgery Process Assurance . . .



More People Die In Hospitals *Due To Errors* Than Are Killed in Car Accidents!



“Application” Mistake Proof Example

Microsoft Excel - PivotTable

File Edit View Insert Format Tools Data Window Help

Arial 10 B

32.56

	A	B	C	D	E	F	G
1	Gap	Length	Width	Offset_PartX	Part_DeltaX	Part_DeltaY	Offset_PasteX
2	18	27	35	1.2086	C	6.4138	-4.85926
3	18	27	35	1.1315	C	5.7181	-4.70629
4	18	27	35	1.1314	C	5.7181	-4.69639
5	18	27	35	1.2086	C	6.4138	-4.69587
6	18	27	35	1.2086	C	6.4138	-4.6545
7	18	27	35	1.2086	C	6.4138	-4.6139
8	18	27	35	1.2086	C	6.4138	-4.56962
9	18	27	35	1.2086	C	6.4138	-4.54784
10	18	27	35	1.2086	C	6.4138	-4.42244
11	18	27	35	1.2086	C	6.4138	-4.40159
12	18	27	35	1.2086	C	6.4138	-4.37496
13	18	27	35	-0.0349	C	4.8511	-4.25825
14	18	27	35	0.7751	C	7.2341	-4.13681
15	18	27	35	1.5061	C	5.3944	-4.03969
16	18	27	35	1.5061	C	5.3944	-4.0288

Microsoft Excel

Do you want to save the changes you made to 'PivotTable.xls'?

Yes No Cancel

Application “Warns” User That He Is About To Lose Changes



Limit Switch
限位开关

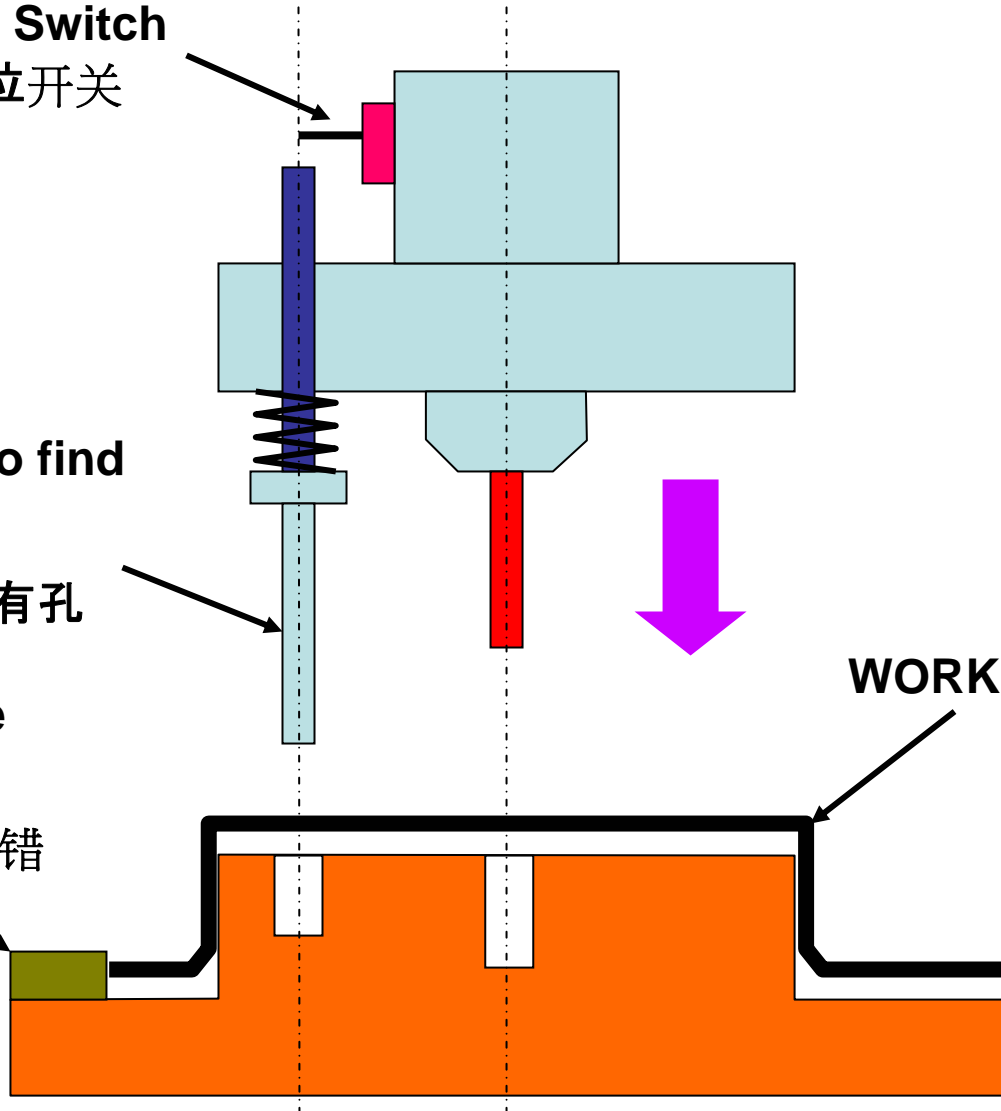
POKAYOKE to find
No Hole

防错:是否没有孔

POKAYOKE to be sure
Right Side & Left Side

防错:确保左边和右边不会错

WORK工件





Three type of control solution

过程控制方法，有三种不同深度的方法：

- **First one:** Prevent or reduce the occurring of the causes and failure. Such as: applying Poka-yoke design to keep no wrong orientation of part on fixture. **第一种方法：防止失效原因/机理的发生，或减少其发生的可能性。如：采取有效的防错设计，防止错装、漏装**
- **Second one:** Detect the failure and cause, then find out corrective action. F.g: By analysis of initiate data to find the special cause of deviation then solution accordingly to make the process under control. **第二种控制方法：是找出失效的原因/机理，从而找出纠正措施。例如，通过初始过程能力研究，找出变差的特殊原因，从而采取措施，使过程受控。**
- **The third one:** Identify to detect the failure then screen out. F.g: final inspection to reject defective. **第三种控制方法：是查明失效模式。例如，利用产品的最终检验查出缺陷（即失效模式），再采取纠正措施。**



How to perform FMEA

First one is the first option

The third one is the one when we can't exactly identify the root cause

三种方法中，优先采用第一种，其次第二种，最后采用第三种。

最差的是没有任何过程控制。

The worst one is no control for current process

Quality is produced but not inspected
高质量的产品是制造出来的，而不是检验出来的！



Step 6: Calculate the risk

第六步: 风险序数计算

$$\begin{array}{|c|} \hline \text{Seriousness} \\ \hline \text{Rating} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Probability} \\ \hline \text{Rating} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Risk} \\ \hline \text{Priority} \\ \hline \text{Number} \\ \hline \end{array}$$

严重度 故障概率 风险序数

Yintong	Date	16.May		55		
Detolf	Edition	1				
Investigation				Value		
Failure mode失效模式	Effect后果	Root Cause原因	Existing control现行控制	S严重度	P发生频度	RISK风险序数
						0
wrong size尺寸错误	can not assemble, claim不能装配,索赔	worker input wrong size in computer (manual load)工人输入数据错误	first item approved. 首样确认。 And inspection Report.	5	2	10
sharp edge边缘锋利	Injury customer使用者受伤	machinery maintain not good enough保养不够	First item approved.Grinding process control by PQC per half hour.首样确认,巡检	5	1	5



Higher numbers represent greater risk.

RPN 越高，意味着风险越大

- **The seriousness (**S**) of effects of the failure mode times the probability of occurrence (**P**) of the failure mode due to the cause times the effectiveness.**

风险顺序数是S、P的综合，将它们连乘，得到所谓的风险顺序数 RPN (Risk Priority Number)

It will provide the priority for different failure mode of different process

它可以提供给我们对问题的轻重缓急进行排序，从而为我们确定了解决问题的优先顺序提供参考。对RPN大的失效模式优先采取纠正措施，以减少它的风险。

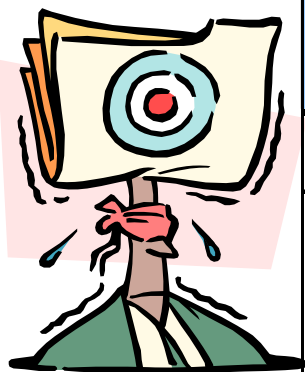


Step 7: Corrective action

第七步: 改善措施

Refer to the rating of risk to take corrective action to decrease the risk for appropriate process. And should determine the responsibility and target implementation date. And give the new rating of S,P.

按分数由高到低, 给相关制程及失效模式找出整改措施. 要定出负责人及计划完成日期重新评分.



Existing control 现行控制	S 严重度	P 发生 频度	RISK 风险序 数	Corrective actions 改进措施	Res p负 责人	F. date完 成日期	S 严重 度	P 发生 频度	RISK 风险 序数
			0				0		0
first item approved. 首样确认。And inspection Report.	5	2	10	Use a program for each different version	LL	Jun 4,2007	5	1	5
First item approved.Grinding process control by PQC per half hour.首样确认,巡检	5	1	5				5		0

Matrix for reference:

S e r i o u s n e s s	5	10	15	20	25
	Should be prevented	Must be prevented	Must be prevented	Must be prevented	Must be prevented
	4	8	12	16	20
	Should be prevented	Must be prevented	Must be prevented	Must be prevented	Must be prevented
	3	6	9	12	15
	Acceptable	Should be prevented	Must be prevented	Must be prevented	Must be prevented
	2	4	6	8	10
	Acceptable	Acceptable	Should be prevented	Must be prevented	Must be prevented
	1	2	3	4	5
	Acceptable	Acceptable	Acceptable	Should be prevented	Should be prevented
P r o b a b i l i t y					



Step 8: Verify

第八步: 改善措施的确认

Assess the result to see if the corrective action is effected or not, will re-analyze to find right solution if not effective. Then document the solution in appropriate procedure, work instruction or quality control plan.

如果RPN满足要求，则应将采用的措施反映到质量控制计划及有关的文件中；如果仍未满足要求，则要考虑新一轮的建议措施，重复上述步骤，直到可接受为止

Corrective actions改进措施	Res p负责人	F. date完成日期	S 严重度	P 发生频度	RISK 风险序数	Verifie确认
			0		0	
Use a program for each different version	LL	Jun 4,2007	5	1	5	On process
			5		0	



When to update FMEA?

The FMEA should be reviewed and updated immediately in the case:

在如下情况下,要及时审核并更新:

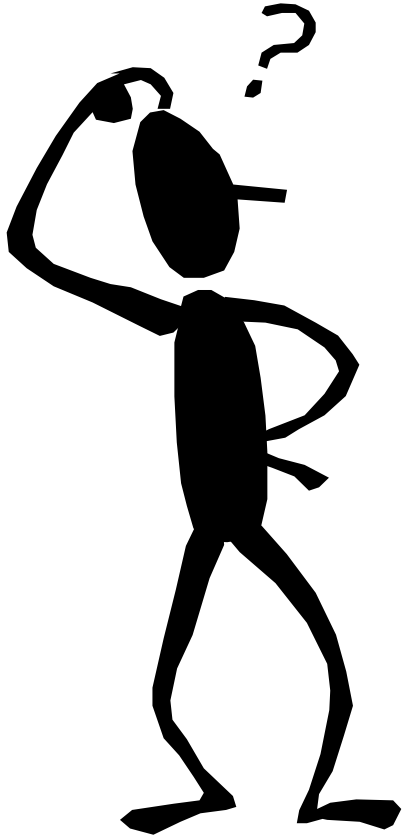
- **Product (including material) or process changed;**
产品或制程更改时;
- **Same failure reoccurred in high frequency;**
同样的失效重复发生时;
- **Big complaint or claim from customer;**
客户有大的投诉或退货,索赔;
- **Sudden or obvious drop of production pass yield;**
生产合格率明显下降;
- **New failure occurred which has not be covered in existing FMEA.**
新问题出现.

Update if any changes **只要有变化就更新!**



Summary -- Keys To Success 成功的关键

- **Identify purpose...BE SPECIFIC!**
识别目的...具体!
- **Understand effects...INVOLVE CUSTOMERS, IOS, & SUPPLIERS!**
理解影响...把顾客、客户和供应商考虑进来!
- **Link to the process flow. 与过程图联系**
- **Use to prioritize efforts, allocate resources.**
用来给各种努力排定优先顺序, 分配资源。
- **Use as a risk assessment/prioritization tool based on predicted impact.**
作为一种在预测的影响基础上的风险评估/风险排序的工具。
- **Use to build consensus on prioritization.**
用来在关于优先问题上达成一致意见。
- **Encourage creativity...TEAMWORK!**
鼓励创新...团队工作!



Question

问题?



- **FMEA overview.**
What's FMEA? 什么是FMEA?
Why perform FMEA?为什么要做FMEA?
Benefit of FMEA? FMEA 有什么好处?
- **How to perform FMEA? 怎么做FMEA?**
- **Routine / Tool FMEA :**
FMEA light finalv2.xls
- **QUIZZ**





W. Shop : What do you think of this FMEA?

2007/04/24

PROCESS CONTROL - Risk Analysis and Preventive Actions

Supplier Name: ~~W. Shop (Hoi Yang) Plastic Ltd.~~

Date: 8/2/2007

Responsible: ~~Yau Chi Kit~~

Made by: Yau Chi Kit

Description		Investigation				Value			Correct
No	Process	Failure mode	Cause	Existing control	Effect	P	S	Risk	Corrective action
1	Pre-cut & Pre-form	Break or mis-form	Operation skill	Manual	Waste	2	1	2	training , operation instruction
2	SMT Process	Glue missing, lacking	Glue opening blocked or dry	Cleaning & maintenance	Component drop -> function failure	1	3	3	training , operation instruction
3	SMT Process	Too much (glue)	Stencil design or wear out	Pre-testing & Maintenance	Reliability -> function failure	1	2	2	training , operation instruction
3	SMT Process	Wrong component	Worker misplace/misuse	100 % Inspection and ICT	function failure	1	2	2	training , operation instruction
4	SMT Process	component missed	machine problem (sucking power not enough)	machine maintenance & inspection	function failure	1	2	2	machine maintenance & inspection
5	Drying	Time too long	Wrong setting	operation instruction, recording & inspection	damage board & components -> function failure	1	3	3	training , operation instruction
6	Drying	Time too short	Wrong setting	operation instruction, recording & inspection	Component drop during wave soldering process	1	3	3	training , operation instruction
7	Drying	Temperature wrong	Wrong setting or machine failure	operation instruction, recording, inspection & regular calibration	Component drop during wave soldering process	1	3	3	training , operation instruction

PROCESS CONTROL - Risk Analysis and Preventive Actions

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6	Drying	Time too short	Wrong setting	operation instruction, recording & inspection	Component drop during wave soldering process	1	3	3	training , operation instruction
7	Drying	Temperature wrong	Wrong setting or machine failure	operation instruction, recording, inspection & regular calibration	Component drop during wave soldering process	1	3	3	training , operation instruction

Does this work to control??

Usually only training can't solve everything?

So lower risk, and it is under control, no need corrective action!

2007/04/24



QUIZZ

- Individual answering to 10 questions
- 10' answering time
- target is to see your understanding about FMEA

FMEA Quiz

Answer to following questions by ticking (V) one of the options 1), 2), ...

Q1 What's FMEA?		Yr. answer
	1) FMEA is a corrective action after quality problem reaching to customer (feedback from customer).	
	2) FMEA is to find the failure after it appears!	
	3) FMEA is to find the failure before it appears.	



- ***Totally, FMEA is an effective and systematic solution for preventing failure from occurring for product design and manufacturing process***
 - ***一种运用于产品设计和过程控制的有效预防方法!***