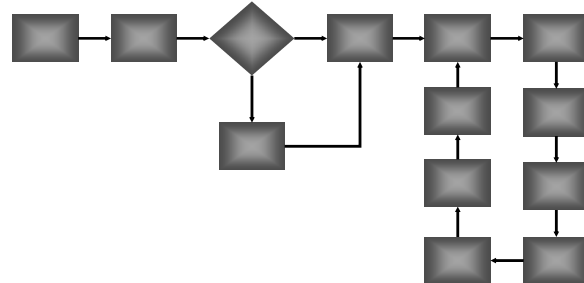




Process Mapping The Project Foundation (Green Belt)

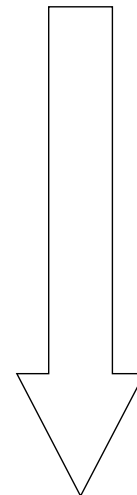


Types of Process Maps

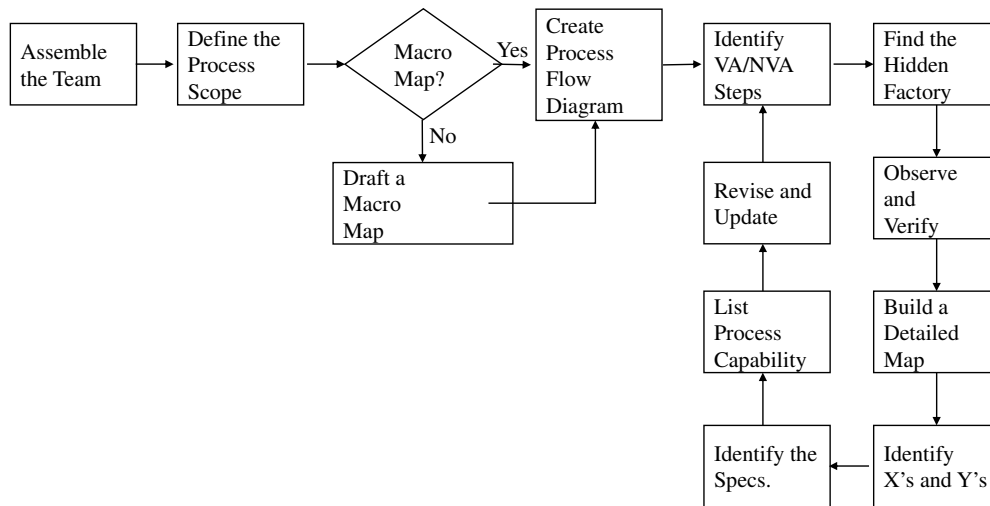


- ❑ Macro-map.
 - A macro-map is a high level process flow chart.
 - It usually shows several steps on both sides of the project scope.
- ❑ Process flow diagram (PFD).
 - A process flow diagram is a detailed map of every step in the process, including the hidden factory.
 - The process flow diagram uses standard symbols for readability and a common nomenclature.
- ❑ Detailed process map.
 - A detailed process map contains all of the process details: set points, input and output specifications, etc.
 - The detail also contains estimates of dpu, RTY, COPQ, cycle time, etc.

Increasing detail



A Process Map of Process Mapping



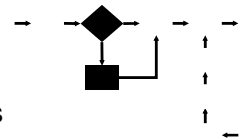
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The Macro-process Map



- ❑ Why use a macro map?
 - To show the big picture
 - To help narrow the focus of widely defined projects
 - To identify upstream sources of downstream defects
- ❑ Some elements of a macro map:
 - Major process steps
 - The target process highlighted



What does your macro-map look like?

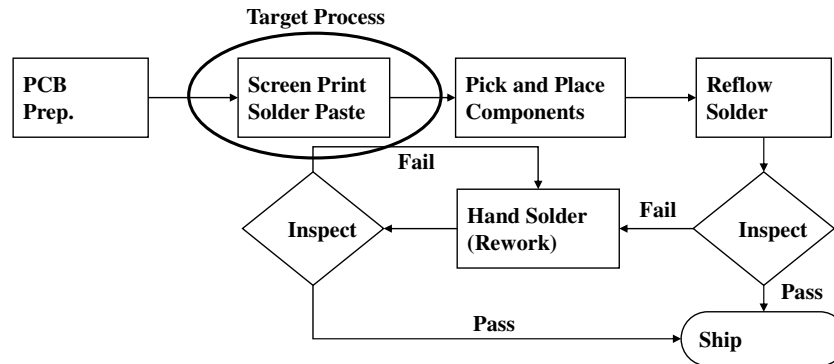
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A Simple Macro-Map



- ❑ Estimates of RTY, DPU, and Cpk should be added to this map.
- ❑ Product specifications should be added where applicable.



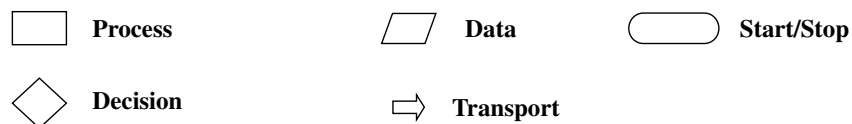
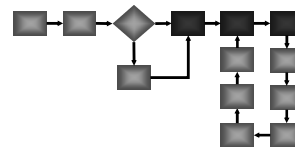
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The Process Flow Diagram (PFD)



- ❑ Elements of a 6 σ PFD:
 - All process steps including the *hidden factory*
 - Data collection points
 - Equipment / tooling used
 - Each step labeled value-added (VA) and non-value-added (NVA)
 - Controlling documents
- ❑ Use Standard Symbols for Process Flow:
 - Available in Microsoft Office™ or Visio™ or other products



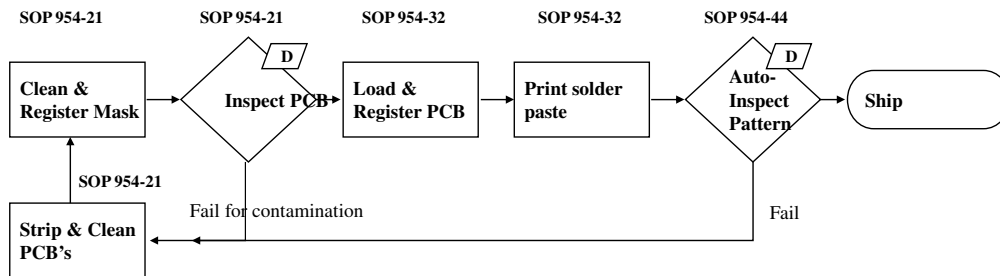
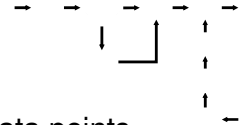
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PFD: Chart the Documented Process



- ❑ Map all tasks needed to produce a “good” product or service.
- ❑ List the controlling documents for each step.
- ❑ Include inspection, rework, transportation & data points.



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Mark Activities as “Value Added” & “Non Value Added”



Value Added Activity

- Transforms or shapes material, information or people
- And it's done right the first time
- And the customer wants it

Emphasize

Non-Value Added Activity – Necessary Waste

- No value is created, but cannot be eliminated based on current technology, policy, or thinking
- Examples: project coordination, regulatory, company mandate, law

Minimize

Non-Value Added Activity - Pure Waste

- Consumes resources, but creates no value in the eyes of the customer
- Examples: idle/wait time, inventory, rework, excess checkoffs

Eliminate

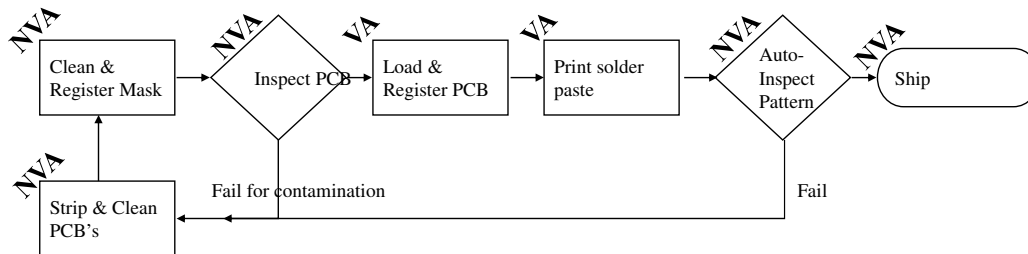
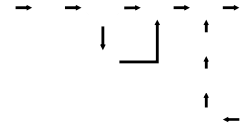
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Identify the Non-value-added Steps



- ❑ Label each process step as value-added (VA) or non-value-added (NVA).
 - A value added process changes the product in a way that is meaningful to the customer.



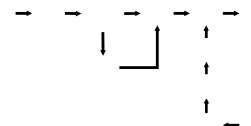
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The Detailed Process Map



- ❑ Elements of a 6σ Detailed Process Map:
 - Process or product outputs (Y's) and inputs (X's)
 - Specification limits and controlling documents
 - Equipment / tooling used
- ❑ Constructing a Detailed Map:
 - The detailed map must follow the process flow diagram. Updates to one must be mirrored in the other.
 - Use the latest revisions of all controlling documents.
 - Highlight the inputs and outputs of all hidden factory processes.



The process is thoroughly examined in the Detailed Map.

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Construct the Detailed Map



- Identify the X's and Y's, specs., C or N, capability and equipment.

Process Step	VA or NVA	SOP #	Inputs & Outputs	I/O Type	Specifications	C or N	Capability	Equipment
Strip & Clean PCB's	NVA	954-21	Cleaned PCB	Output	No visible contam.		IPY=92%	Ultra-Wash
			Solvent type	Input	IPA	C		
			Solvent Contam. Conc.	Input	< .05%	N		
			Soak Time	Input	300 s	C		
			Bath Temp.	Input	110 F	C		
			Scrub Brush Type	Input	Accord # 45	C		
			Scrub Brush Age	Input	< 5 weeks	N		
Print Solder Paste	VA	954-32	Bump Height	Output	450 ± 50 µm		Z Score=3.6	Smith/Olsen
			Bump Width	Output	Pad Size ± 50 µm		Z Score=4.5	
			Pattern Registration	Output	± 20 µm		??????	
			Paste Viscosity	Input	6.2 ± .1 cP	C		
			Room Humidity	Input	40 ± 2 %	N		
			Squeegee Material	Input	Neoprene	C		
			Squeegee Speed	Input	6 ± .2 inch/min	C		
			Screen Cleanliness	Input	No visible contam.	N		
			Screen Registration	Input	± 20 µm	C		
			PCB Registration	Input	± 20 µm	C		