

Areias Systems, Inc.

Electro-mechanical Design, Prototyping, and Manufacturing

The engineer's impact on product cost and success in business

Helping increase your capabilities

Beginning

- I don't give presentations to large audiences and this is a new experience to me
- As long as we are here, use the time wisely and ask questions



Areias Background

- Founded 1999 and located in Scotts Valley, CA
 - Started with \$2,000.00 in my garage
- Due to a strong relationship with our customers, we have experienced excellent sales growth in the last few years
- Contract design and manufacturing for the following industries:
 - Capital Equipment
 - Instrumentation
 - Industrial Electronics
 - Medical Electronics



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Helping increase your capabilities

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ISO 9001

Areias Systems, Inc.
Scotts Valley, CA

My background

- Born and raised in Brazil
- Came to US in 1986 on a surf trip
- Graduated from Cal-Poly SLO with a BS in Aero in 1993
- Attended MSME program at SJSU until 1999
- Married, 2 children
- Still surf a bunch



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ISO 9001

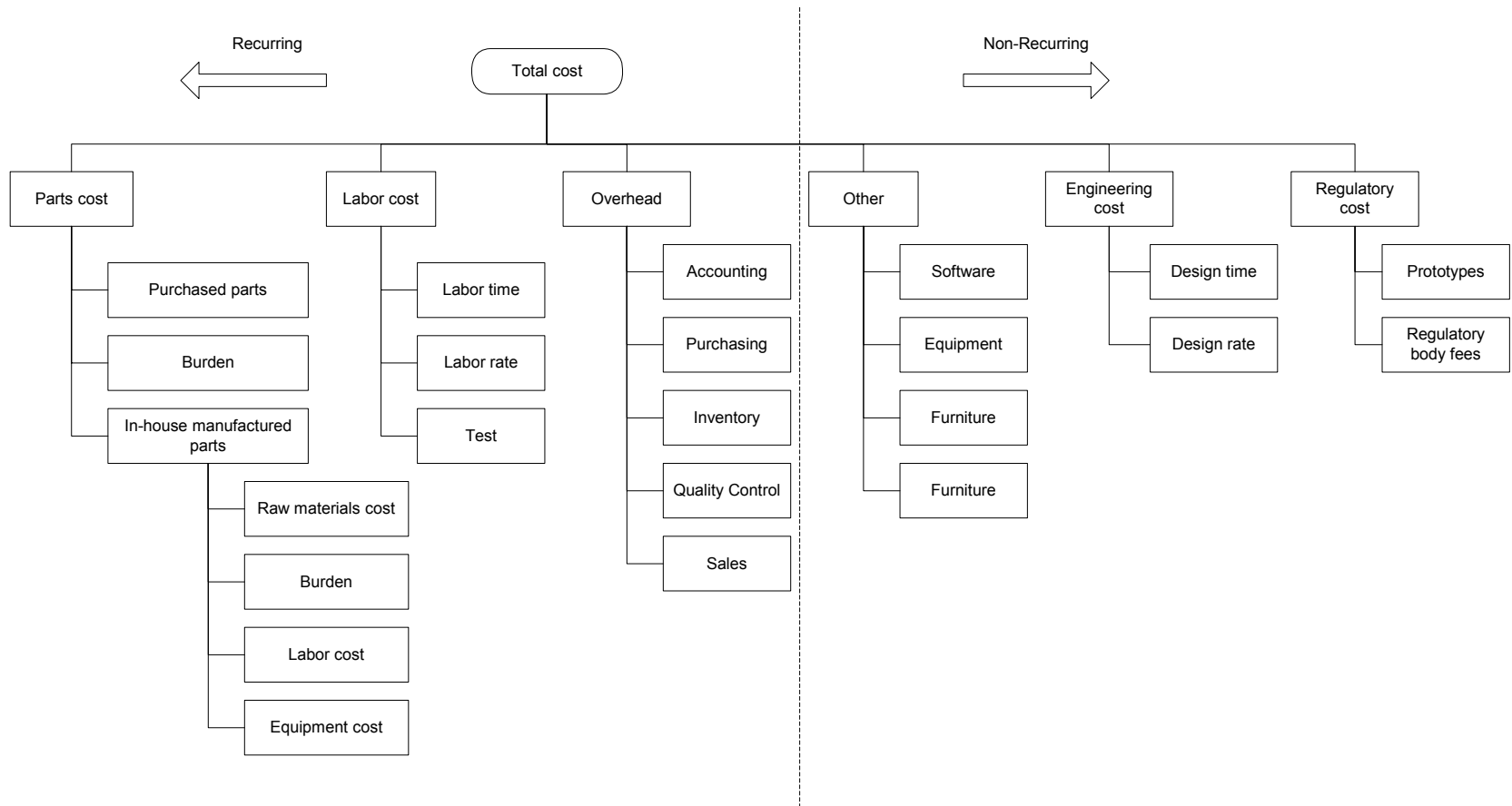
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- I'm here to discuss
 - How an engineer helps reduce product costs.
 - How one figures out what it will cost to take a product from prototype into production.
 - How to manage these costs so that you can make a profit as a business.



Costing a product

- Product costs are based on:



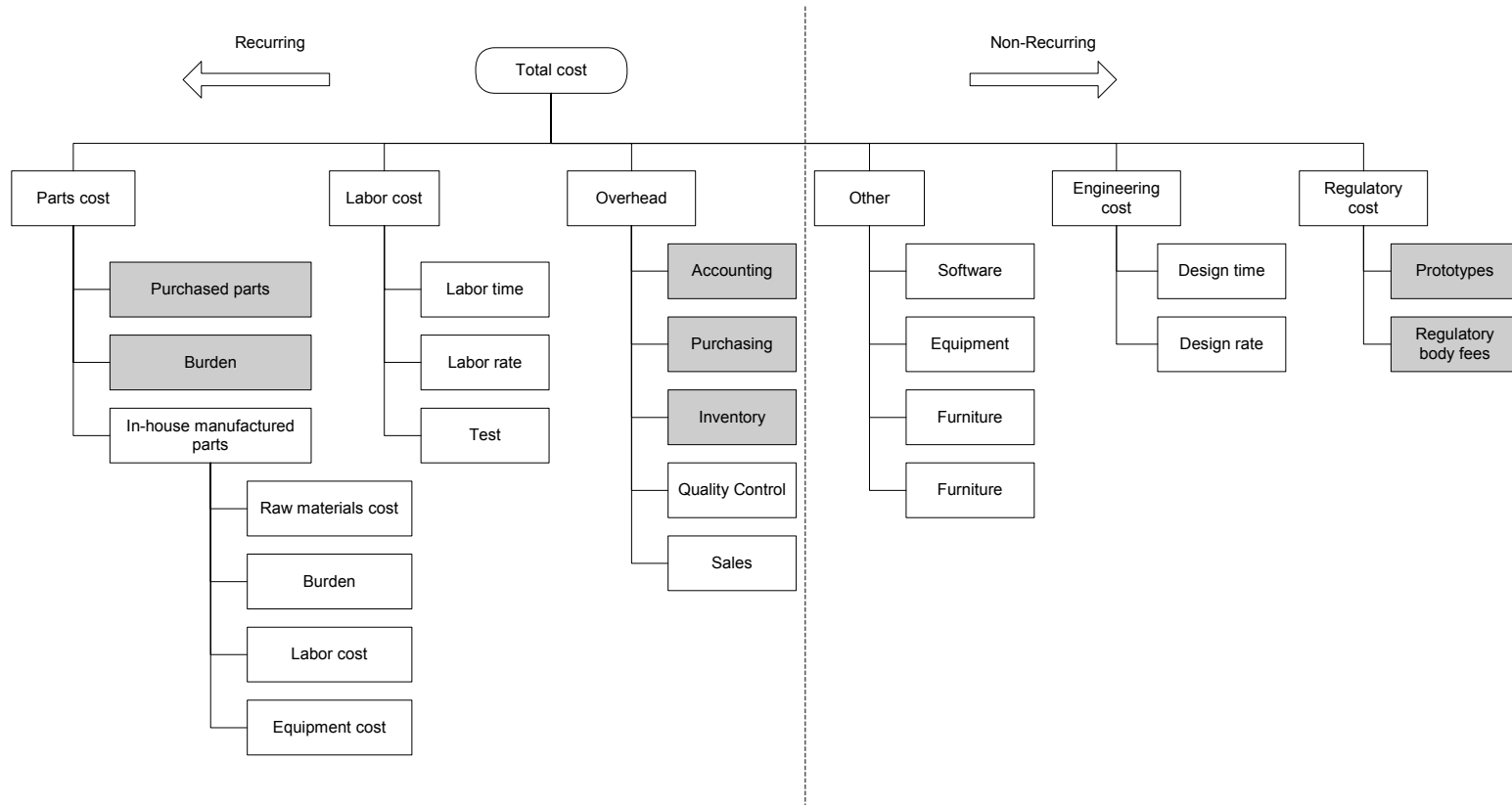
Costing a product

- Engineer's influence on costs
 - Specifying easy to obtain parts
 - Designing easy to manufacture parts
 - Becoming efficient at software



Engineer's influence on costs

- Specifying easy to obtain parts



Engineer's influence on costs

- Specifying easy to obtain parts, cont.
 - Purchased parts: if easier to find, they should be cheaper.
 - Burden: if parts are easier to find, they will be easier to buy, which will reduce the cost of bringing them in.
 - Accounting: the more suppliers accounting has to deal with the more expensive it is to manufacture the product.
 - If a part is easier to find, the more likely that a current supplier will have it.



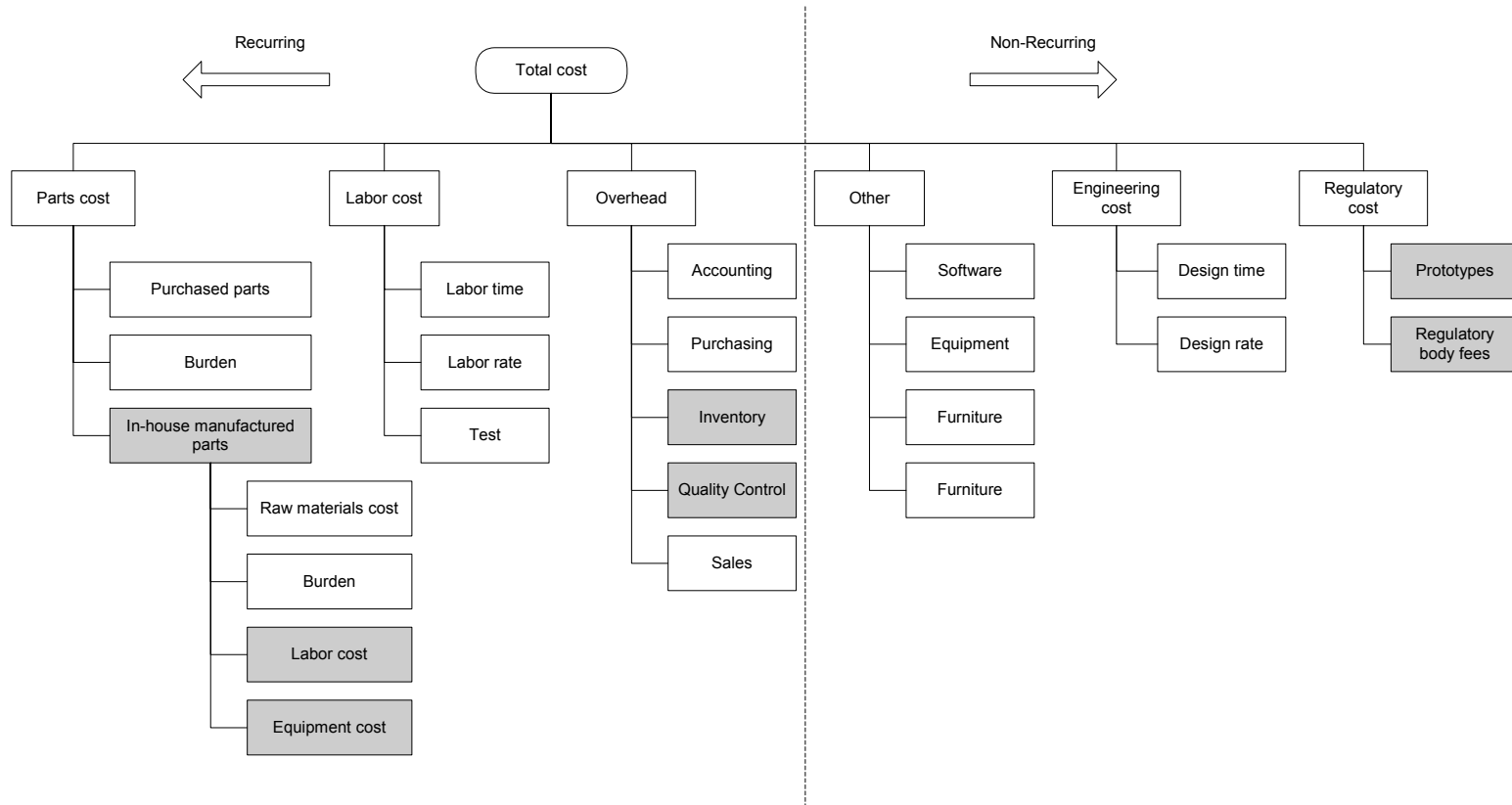
Engineer's influence on costs

- Specifying easy to obtain parts, cont.
 - Purchasing: same as accounting.
 - Inventory: if multiple suppliers have the part, there isn't a need to maintain minimum inventory, which in turn reduces cash outflow.
 - Prototypes: same as purchased parts
 - Regulatory body fees: if the part is easily available, it is likely that the regulatory body has already tested it thus reducing the project time.
 - UL
 - CE
 - FDA
 - FCC



Engineer's influence on costs

- Designing easy to manufacture parts



Engineer's influence on costs

- Designing easy to manufacture parts, cont.
 - Labor Cost: if it is easier to manufacture it should take less labor, thus reducing labor costs.
 - Equipment cost: if easier to manufacture, it is likely it will take simpler equipment.
 - Inventory: if easier to manufacture, there less likely it is that minimum inventory will be needed, thus reducing cash outflow.



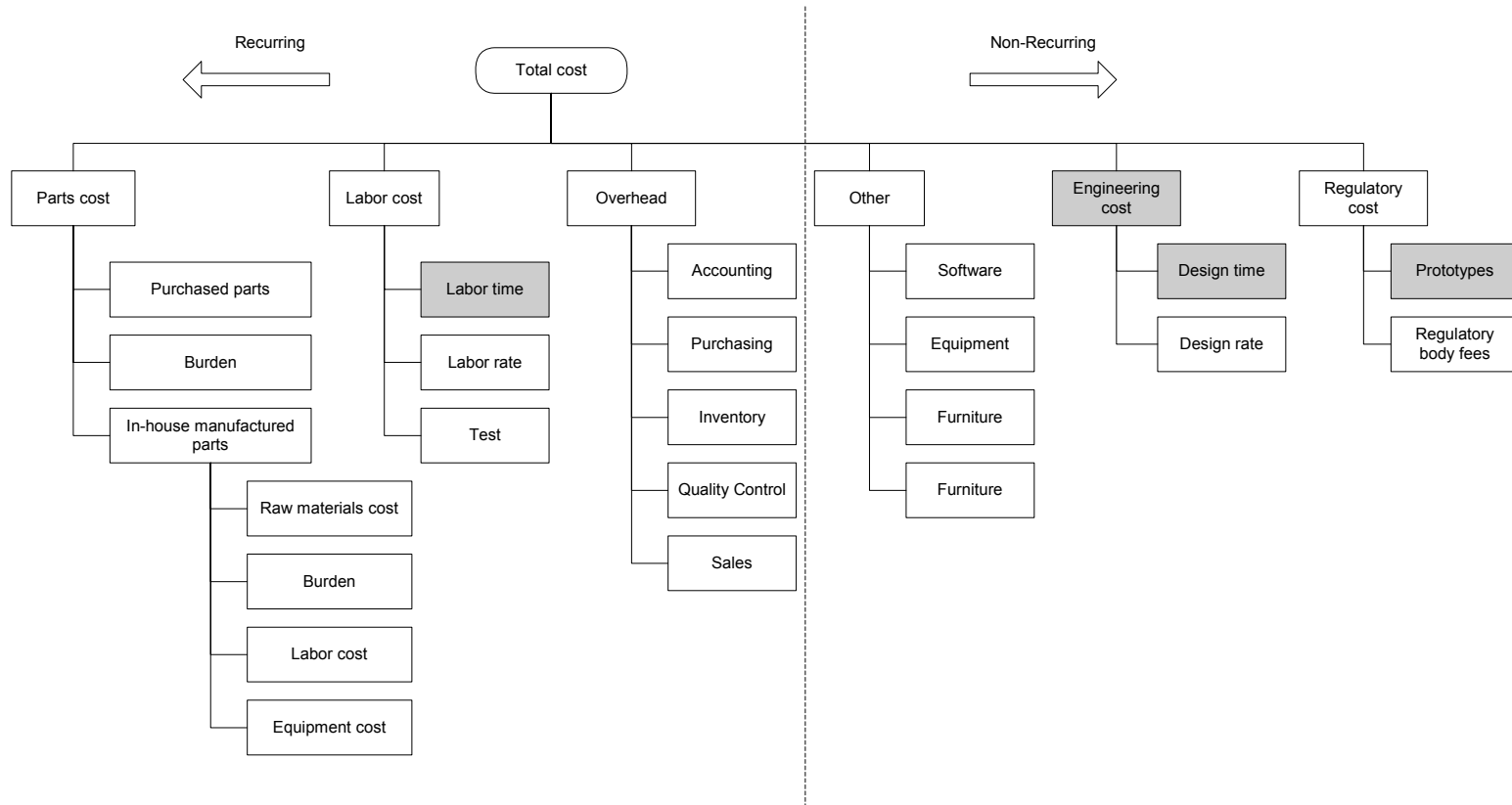
Engineer's influence on costs

- Designing easy to manufacture parts, cont.
 - Prototypes: a combination of labor cost and equipment cost.
 - Regulatory body fees: the regulatory body members are also engineers.
 - The simpler the part, the easier it is for them to understand, thus the shorter the project time.



Engineer's influence on costs

■ Becoming efficient at software



Engineer's influence on costs

- Becoming efficient at software, cont.
 - Labor time: an assembler needs properly written assembly instructions. The expectation is that every detail is shown on the print.
 - Design time: the more efficient one is at software, the shorter the design time.
 - Prototype: with proper software usage, one can send files to prototyping without having to detail prints.

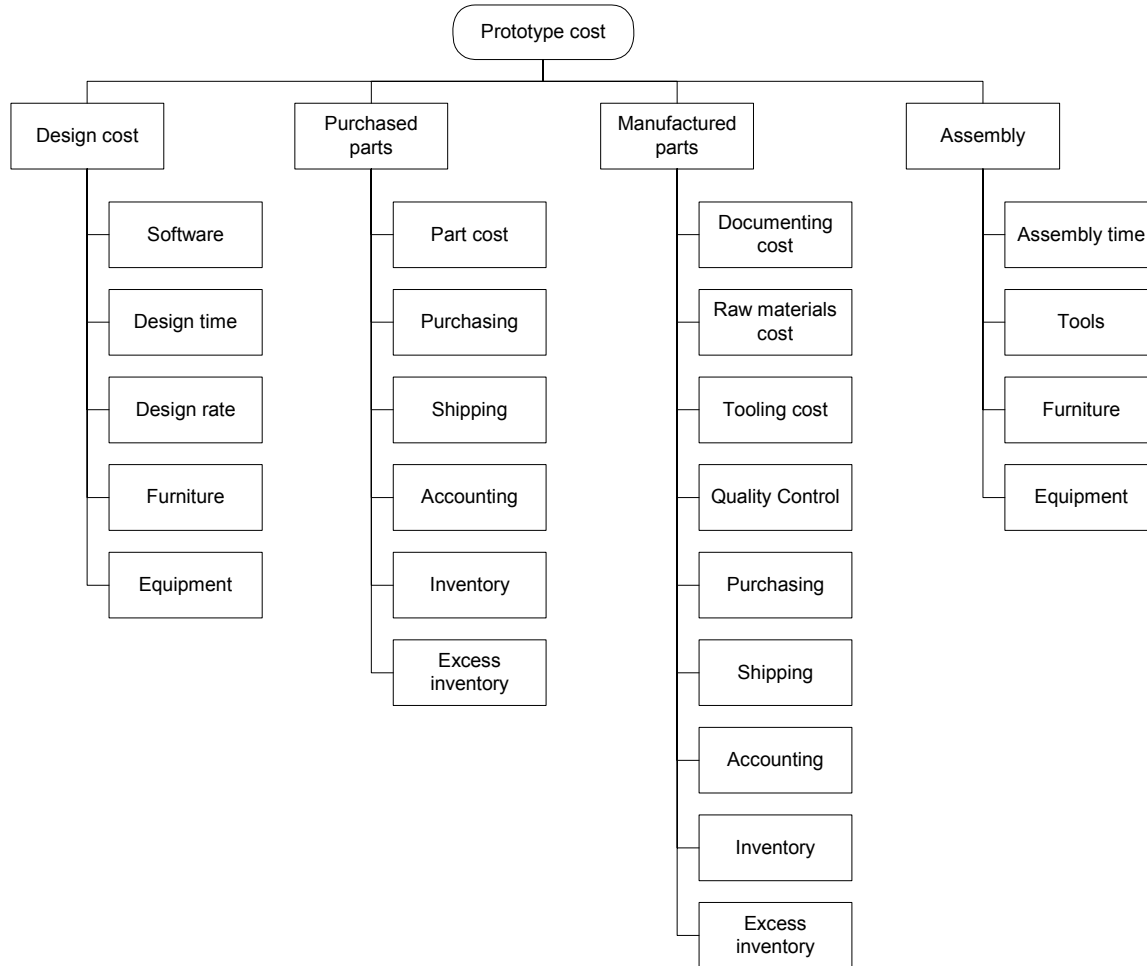


Engineer's influence on costs

- Becoming efficient at software, cont. (side note)
As an Engineer/CEO I regularly use the following
 - Solidworks
 - Solid modeling
 - Autocad
 - Work instructions
 - Wiring diagrams
 - Word
 - Proposals
 - Documents
 - Excel
 - Cost analysis
 - Company performance
 - MRP software
 - Material requirement planning (BOM)
 - Access databases
 - Generate simple database
 - Crystal reports
 - Write my own reports to extract data from database
 - OrCad schematic software
 - PowerPoint
 - Presentation



Prototype cost



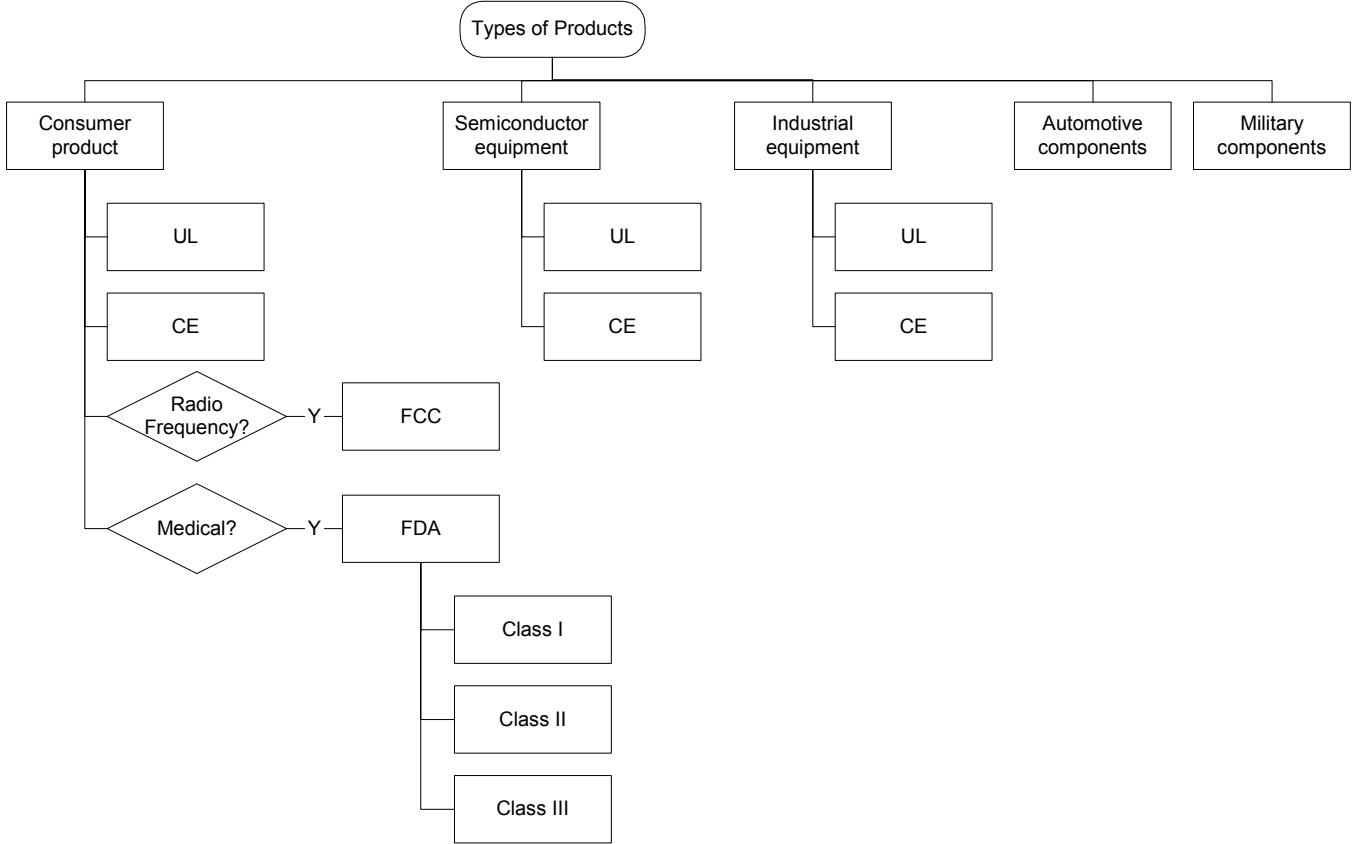
Prototype cost

- There are a couple of ways to generate a prototype (not limited to)
 - Have an idea, build a company and then build a prototype.
 - Expensive and more likely to fail
 - Depending on complexity of product it is the only way to do
 - Have an idea, build a prototype and then build a company.
 - Takes a different kind of person
 - Long work hours
 - Risky
 - No deep pockets (usually)
 - Limited complexity
 - Idea person usually moves on from product design to company management



Moving to production

(this is when things get complicated)



Engineering concerns when moving to production

- Consumer product
 - All consumer products need to be tested by the proper testing agency prior to sale.
 - Once the product is approved, there is a need to find:
 - Manufacturer
 - In-house
 - Need to develop infrastructure
 - Outsource
 - Whole
 - Sub-assemblies
 - Outsource overseas (volume dependent)
 - Whole
 - Sub-assemblies
 - Marketing
 - Distribution channels



Engineering concerns when moving to production

- Good communication skills

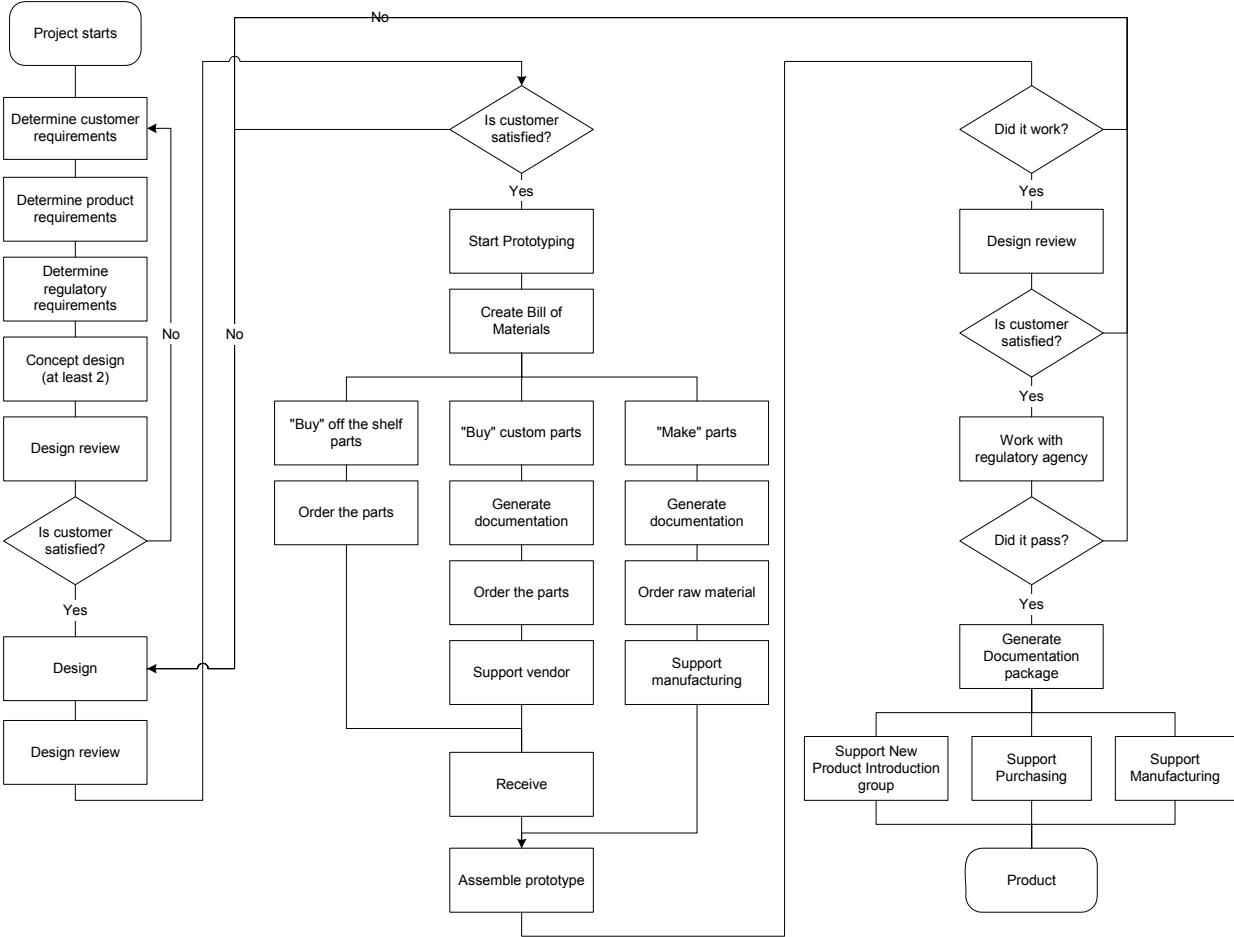
- Good documentation generation skills
 - Complete Bill of Materials (BOM)
 - Understandable drawings
 - Understandable assembly instructions

- Good problem handling and solving skills
 - Parts out of tolerance
 - Parts not available and need to find a replacement
 - Poor craftsmanship
 - Assembly times



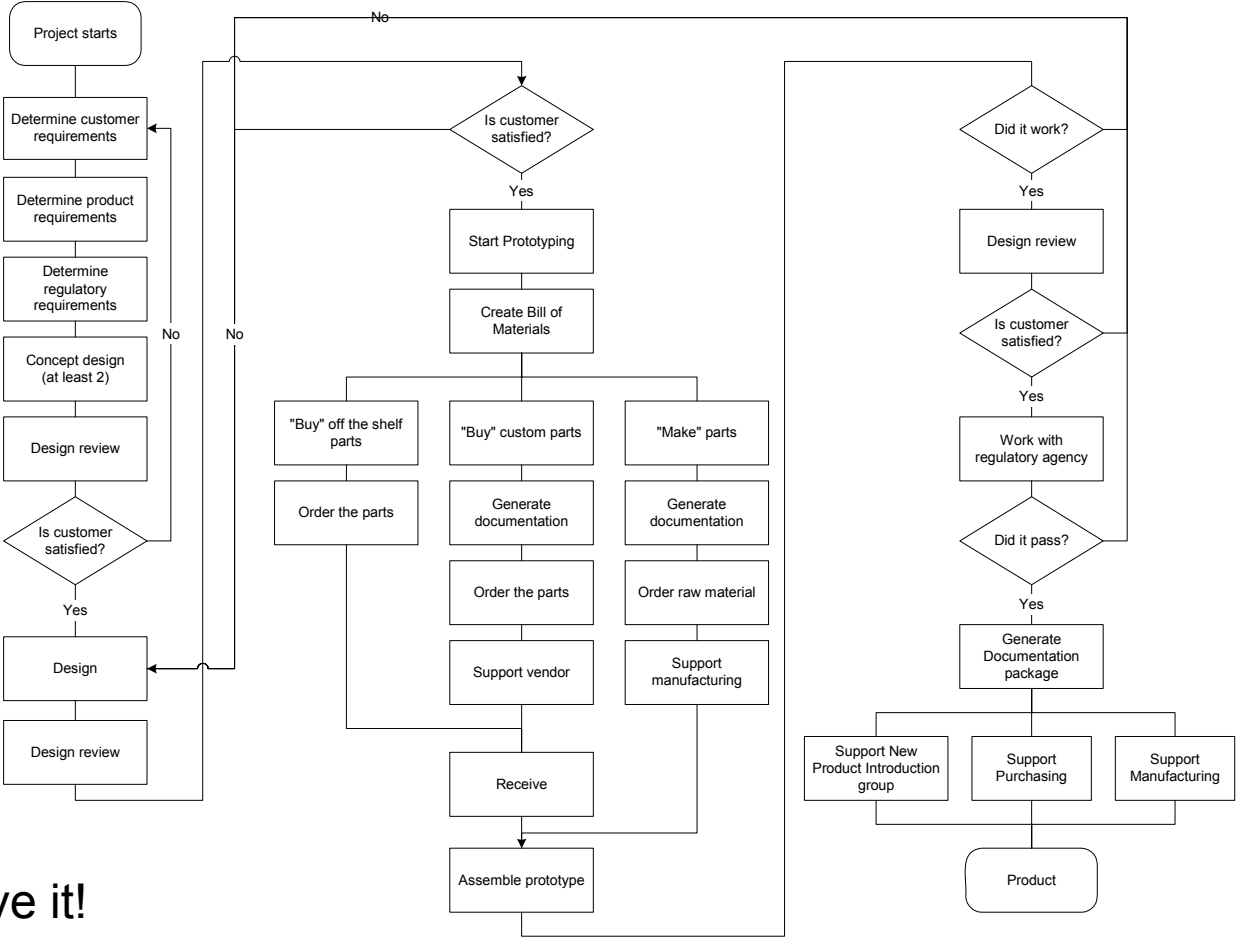
Conclusion

- “Engineering” is not only design it is



Conclusion

- “Engineering” is not only design it is



...and I love it!