

Set Based Design vs Build-Test-Fix

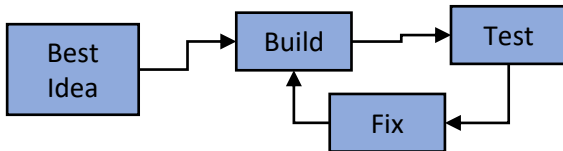
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Lets start with Build-Test-Fix

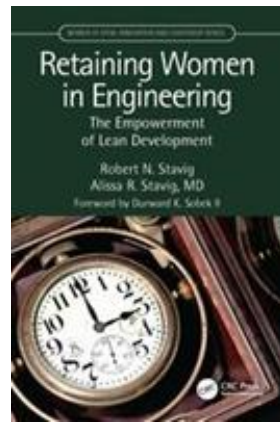
The words clearly define the engineering design approach ...

The designer(s),

- establishes what they believe is the best idea, from some list,
- they build their best idea,
- they test it against some requirements that are most relevant, to gain learnings,
- they then fix the best idea against those learnings,
- and repeat the build and process until the test is "as good as needed"



See figure 9.1 for more detail flow, Additional, pages 97 – 100 provide detail description



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Issues/Considerations of Build-Test-Fix

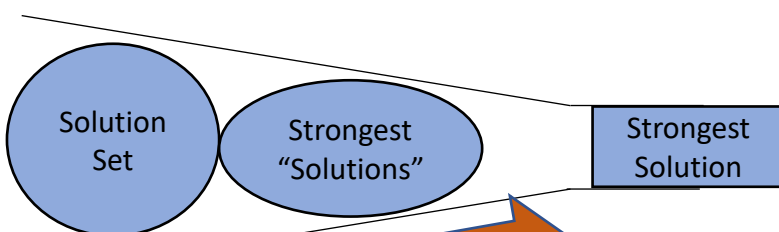
- Third graders are taught this method, see the Gray Box Story, (page 99) for a real example of this.
- You can do a internet search of "STEM Engineering Design Process Posters" for examples used to help elementary students understand this approach – which is exactly what they should be using.
- The best idea may be established in an environment that struggles with bias and the loudest or most confident indivual champions that idea.

It is designed to "redo" work with "loop-backs" designed into the learning process.

Set Based Design (SBD) Including Trade Off Curves

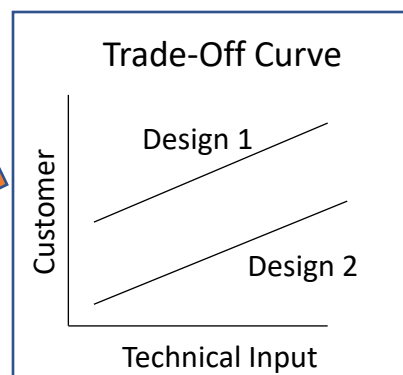
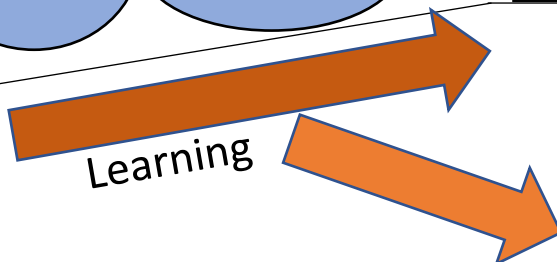
- Set based design starts with identifying a set of solutions that targets meeting the design requirements.
 - However, unlike Build-Test-Fix which might have bias that "constrains" the solutions in the set, Set Based Design is working to make the solution set as broad as possible.
- From the solution set the designer(s) identify the knowledge gaps and plans to address the knowledge gap for each of the identified solutions.
- From the knowledge gaps, the designer(s) work to identify the weakest solution and through and structured learning process methodically eliminates the weakest solutions, ending up with the strongest solution
- During the learning process, the development of Trade-Off Curves is a critical tool to characterize the design space. (Figures 9.2 and 11.2)

Set Based Design helps you find time in the development process to make better design decision.



Set Based Design

Takes less resources, cost less money, delivers faster decisions and better solutions Than Build-Test-Fix



For a detail focus on SBD see figures 11.1, 11.2, pages 127-132 and page 216