The Engineering Design Cycle

Redesign and Iterate

Finally, we have arrived at the last stage of the engineering design cycle!

Now what?

How can we collect all the necessary feedback to making a good decision about how to move forward?
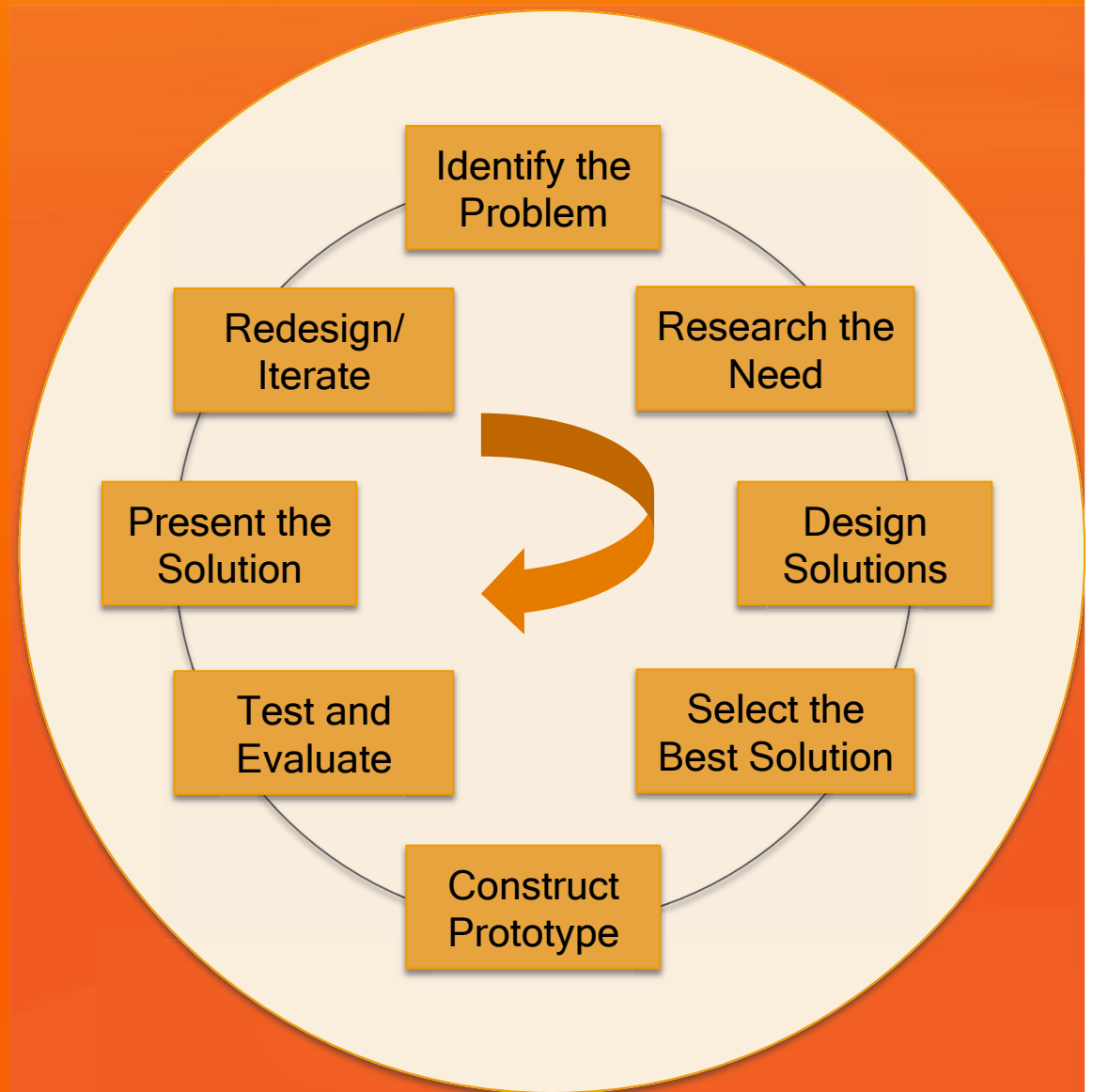
The Engineering Design Cycle

A problem has been identified and researched. The need to solve it has been proven with credible sources. A range of solutions have been identified and the best of the bunch has been selected. A prototype has been constructed, tested, evaluated, and presented. Now...

Redesign and Iterate

- A broad range of feedback should be collected and documented, both along the way of the design and during the presentation of the solution.

Identify the Problem

Research the Need

Design Solutions

Select the Best Solution

Construct Prototype

Test and Evaluate

Present the Solution

Redesign/ Iterate

Redesign & Iterate
What does the Design Say?

Redesign and Iterate

Collecting

Feedback

during the Engineering Design Cycle

Did the team meet the Design Specification?

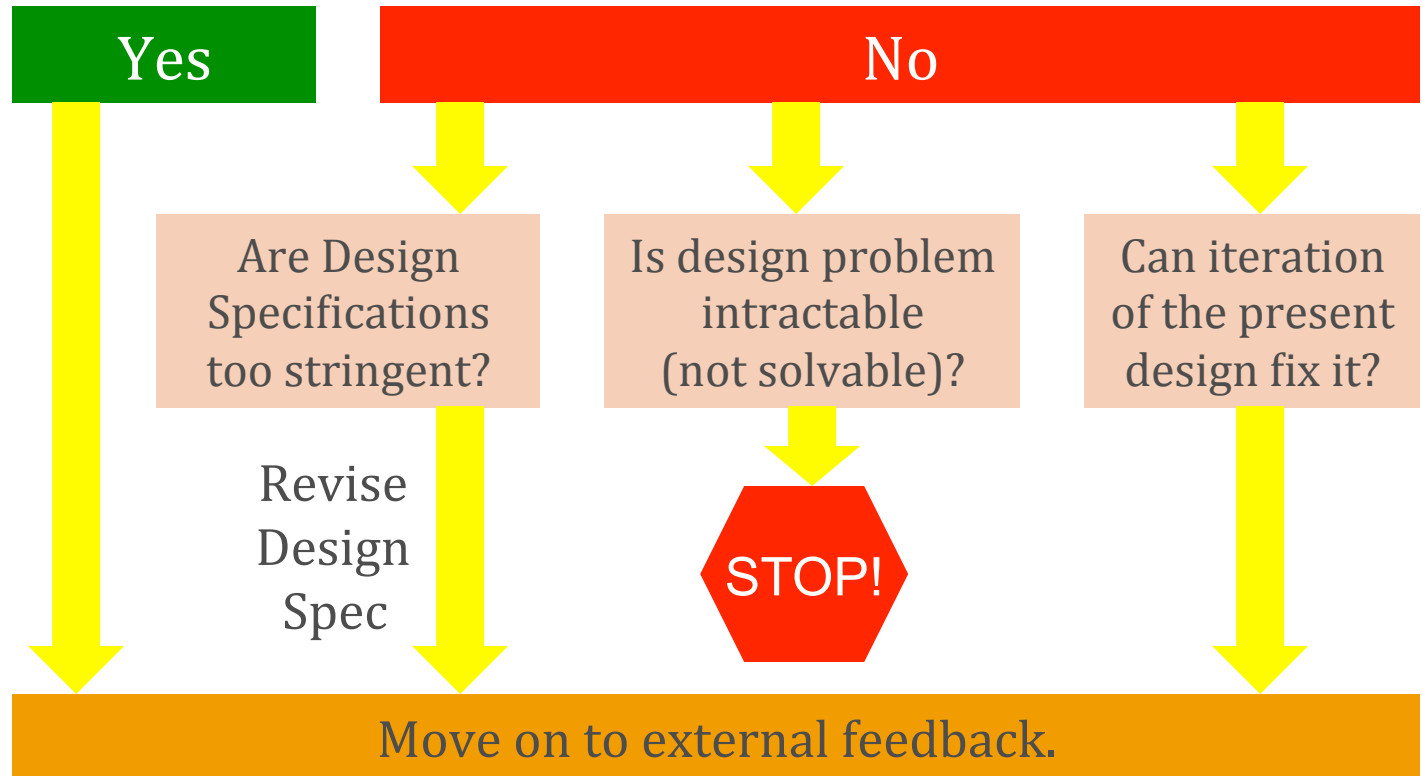| Yes	No

Are Design Specifications too stringent?

Is design problem intractable (not solvable)?

Can iteration of the present design fix it?

Revise Design Spec

STOP!

Move on to external feedback.

Collecting Feedback

Strategy
In the Moment

Redesign and Iterate

Collecting

Feedback

during the Engineering Design Cycle

- **Defer Judgment**
- **Separate the message from the messenger**
- **Listen, actively**
- **Refrain from showing emotion**
- **Take copious notes**

Redesign and
Iterate

Collecting

Feedback

during the
Engineering
Design
Cycle

Collecting Feedback

Defer Judgment
In the Moment

Allow others to speak --
- No matter how harsh, inappropriate, or lengthy - allow your audience to speak.
- View all feedback as a gift– to be sorted, distilled, and evaluated by your team … later

Collecting Feedback

Separate the Message
In the Moment

Don't take it personally--
- No matter what the delivery, treat the message as information only – not a personal attack
- View all feedback as a gift– to be sorted, distilled, and evaluated by your team ... later

Collecting Feedback

Listen, Actively *In the Moment*

Common Active Listening Techniques--

1. Pay Attention: look at the person, put aside other thoughts, avoid attending to others or electronic devices, observe and listen to the other's body language.
2. Express Listening: with nodding, smiling, attentive posture, and encouraging the other person to keep talking.
3. Reflect Listening: using such phrases as "What I hear you saying is...." to repeat what you have heard.
4. Avoid interrupting.

Collecting Feedback

Minimize Emotion
In the Moment

Leave emotions for later--

- Avoid showing - defensive, frustrated, angry, sad, demoralized, or other negative emotions.
- But, make space and time to experience and deal with emotions later, before the design team reconvenes to consider feedback.
- Stuffed emotions can color engineering decisions and impact relationships on the design team!

Collecting Feedback

Taking Notes
In the Moment

**Record, Describe,
Avoid Interpreting--**

- No matter how trivial or off-base you may consider some feedback, write it down or have another member of the team write it down.
- Take detailed notes on who said what and what their emotional state appeared to be while saying it.

Redesign & Iterate

Once the engineering design cycle is complete, it's time to collect feedback:

1. Respond appropriately to feedback when it is presented.

2. Gather as much feedback as possible.

3. Document feedback – not only what was said, but who said it, and how it was stated.