Um... didn’t we, like, umm... do this in 101?

Fix these words of mine in your hearts and minds; tie them as symbols on your hands and bind them on your foreheads. Teach them to your children, talking about them when you sit at home and when you walk along the road, when you lie down and when you get up. Write them on the doorframes of your houses and on your gates

- Dt 11:18-20
A model for the engineering Design Process

- Is an (iterative) process
- To create
- A system, component, process, or product
- To meet desired need(s)
- In which science, math, and engineering principles are applied
- To convert scarce resources
- Optimally
- To meet stated objectives

Dym & Little (2004)
### Decisions and Tradeoffs

<table>
<thead>
<tr>
<th>Weights:</th>
<th>30</th>
<th>20</th>
<th>35</th>
<th>15</th>
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<td></td>
<td>Cost</td>
<td>Time to Market</td>
<td>Safety</td>
<td>Durability</td>
</tr>
<tr>
<td>Solution A</td>
<td>30</td>
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<td>2</td>
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<tr>
<td>Solution B</td>
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<td>Solution C</td>
<td>15</td>
<td>12</td>
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<td>13</td>
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</tbody>
</table>

Do I have all the criteria?  
Are the weights appropriate?  
Does this look different for a Christian?
What the Design Norms are NOT

• “The” Christian way to do engineering – one of several
• “The” answer – they’re questions
• “The” question – they’re a set of possible questions
What are the Design Norms?

- Cultural appropriateness
- Transparency
- Stewardship
- Integrity
- Justice
- Caring
- Trust
- Humility
Cultural appropriateness

Fits in with the general human socioeconomic order. Alleviates human burdens, but preserves what is good in the culture. Guided by love, respect and a value of diversity.
Transparency

Full disclosure both in the design process and to the public, regarding options, effects, defects, and tradeoffs.
Conservation of finite economic, human, and environmental resources
Preservation/enhancement of character
Minimizing degradation of environment
Integrity or delightful harmony

- Completeness
- Harmony of form and function
- Promote human values and relationships
- Pleasing and intuitive to use
Justice

Design ought to respect the rights of all persons. Consider all stakeholders, not just users.

photos from www.independencenow.com
Caring

• show genuine love and concern in the design group, in fabrication
• The design ought to show due care for persons
• Take into account effect on individuals – physically, socially, psychologically
• Promote loving caring relationships in use
Trust

- Design should be trustworthy
- Dependable, reliable
- Avoid conflicts of interest
Humility

Avoids human fallenness and failibility

Design must be modest and conservative, knowing that we cannot predict all the consequences of our actions
<table>
<thead>
<tr>
<th></th>
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<th>Transparent</th>
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</table>
Assignment

Include discussion of at least three norms in your PPFS
For further reading


Christian Engineering Society > Past Conference Proceedings
http://www.calvin.edu/academic/engineering/ces/ceec/#past

Especially
