

ME349

Engineering Design Projects

20 Questions (about) to Consider As You Develop Your Concept

Are the customer's needs satisfied?

Are the supporting functions (wants) fulfilled?

Does the chosen form, component shapes, materials and dimensions provide:

- Adequate durability
- Efficient material usage (strength-to-mass)
- Suitable product life (fatigue)
- Permissible deformation (stiffness)
- Adequate force flows (stress concentrations)
- Adequate stability
- Impact resistance
- Freedom from resonance
- Unimpeded expansion and heat transfer
- Acceptable corrosion and wear within service life and loads

Do the chosen layout and components provide:

- Efficient energy transfer
- Adequate dynamic and steady state behavior
- Appropriate motion, velocity and acceleration profiles

Have all the factors affecting safety of the user, components, functions, operation and the environment been considered?

Have the human-machine relationships been fully considered (ergonomics)?

Have unnecessary human stress or injurious factors been predicted and avoided?

Has attention been paid to aesthetics and the intrinsic "feel" of the system?

Has there been a technological and economic analysis of the production capabilities, processes, and suppliers?

Have standard product tolerances been chosen (not too tight)?

Can all internal and external assembly operations be performed simply, repeatedly, and in the correct order (without ambiguity)?

Have all the factors influencing the product's operation (noise, vibration, handling) been considered?

Can the product (and its components) be recycled?

Have the materials been chosen to aid recycling?

Is the product easily disassembled?

Can maintenance, inspection, and repair be easily performed and checked?

Have the stipulated cost limits been observed?

Will additional operational or subsidiary costs arise?