

Structures and Forces Practice Quiz

Topic 5 - How Structures Fail

1. Structures fail for a number of reasons. Engineers study failed structures so they can design stronger, more durable structures. A flagpole that has been blown over in a strong wind happens because of the increased force that is applied to the ...

entire structure

entire base

opposite side of the flagpole's base

same side of the flagpole's base



2. When a solid material is compressed, small microscopic cracks in the material can enlarge or break apart. This can cause one section of the material to break away from the other part. This action is called ...

bend

buckle

shear

twist

3. Crash test dummies are used by auto safety designers and inspectors to identify impact points when material fails in a collision. When the car is rammed into a solid wall, the front end buckles. This happens to better protect the Crash test dummies (us) in a real accident. The metal deforms because of the energy it absorbs in the impact. Designers ...

do this on purpose to ensure the material buckles.

identify the weaknesses and try to fix them.

determine what materials buckle the least.

identify where the front end need more reinforcement.

4. The designers of spinning wheels work to ensure that the fibers, that are twisted together, are done so tightly that they lock together. If the fibers are twisted too much they tangle and shorten, unless you keep pulling them apart. This can be useful if you are wanting to make ...

stronger fabrics

lighter fabrics

more durable fabrics

stretchy fabrics

5. Metal fatigue happens because metal is ...
too old to be used any more

not made properly

bent or twisted over and over again

exposed to extreme conditions

Check your [Answers](#)

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Topic 5 - How Structures Fail

1. Structures fail for a number of reasons. Engineers study failed structures so they can design stronger, more durable structures. A flagpole that has been blown over in a strong wind happens because of the increased force that is applied to the ...

entire structure

entire base

opposite side of the flagpole's base (Text p. 315) The wind makes the flagpole act like a lever and the effort force is increased on the opposite side - Figure 4.41

same side of the flagpole's base



2. When a solid material is compressed, small microscopic cracks in the material can enlarge or break apart. This can cause one section of the material to break away from the other part. This action is called ...

bend

buckle

shear (Text p. 315) Figure 4.43 One section may shear away

twist

3. Crash test dummies are used by auto safety designers and inspectors to identify impact points when material fails in a collision. When the car is rammed into a solid wall, the front end buckles. This happens to better protect the Crash test dummies (us) in a real accident. The metal deforms because of the energy it absorbs in the impact. Designers ...

do this on purpose to ensure the material buckles. (Text p. 317)
Designers do this on purpose to ensure that the metal buckles in the right places to absorb most of the collision force.

identify the weaknesses and try to fix them.

determine what materials buckle the least.

identify where the front end need more reinforcement.

4. The designers of spinning wheels work to ensure that the fibers, that are twisted together, are done so tightly that they lock together. If the fibers are twisted too much they tangle and shorten, unless you keep pulling them apart. This can be useful if you are wanting to make ...

stronger fabrics

lighter fabrics

more durable fabrics

stretchy fabrics (Text p. 317) Making use of stress by over-twisting is what makes stretchy fabrics.

5. Metal fatigue happens because metal is ...

too old to be used any more

not made properly

bent or twisted over and over again (Text p. 318) When the metal is bent or twisted over and over again it weakens (small cracks get larger), causing metal fatigue and eventually failure.

exposed to extreme conditions