Strain Transformation equations

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Strain Transformation equations:

1.Quiz - Answer:

1.   What is meant by deviatoric stress?

$\sigma' = \sigma_1$ - σ_m, where the deviatoric stress, σ' is the difference between normal stress and mean stress.

2.   Hydrostatic stress is known not to cause yielding. Then why hydrostatic extrusion is used?

Hydrostatic stress can increase the ductility of materials. Therefore, ceramics and other materials with poor ductility can be extruded using hydrostatic extrusion.

3.   When a steel ball of 2.5 cm diameter is subjected to a hydrostatic pressure of 12 GPa, what will be its final diameter?

We have for hydrostatic compression for uniform strain in all directions:

3ε = -3p(1-2v)$/E$. We get the strain = 0.024.

From this we can get the final diameter = 2.44 cm

4.   Name some forming processes which use plane strain deformation.

Forging, strip rolling, strip drawing.