

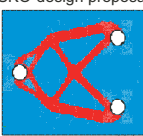
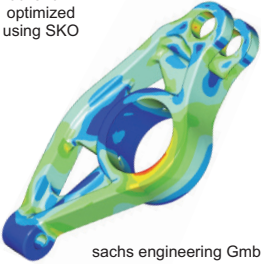


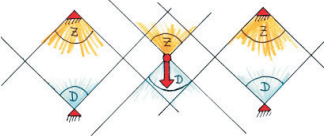

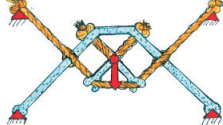

Lightweight Design According to Nature


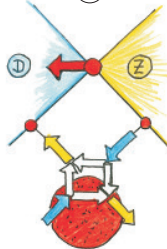
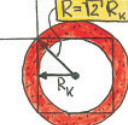
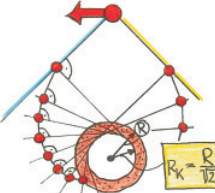
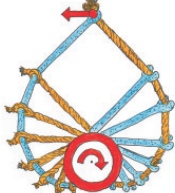
Computer-free Engineering Design Using Thinking Tools

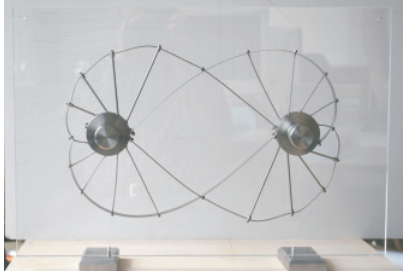
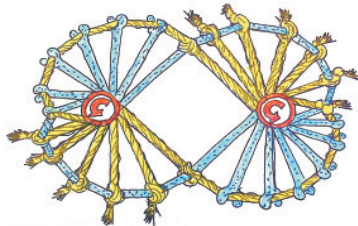
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<p>Computer-aided lightweight design using Soft Kill Option (SKO)</p> <p>A) SKO (Soft Kill Option) is a computer application to optimize the weight of technical components, which is based on the demineralization of bones by osteoclasts.</p> <p>B) In consideration of technical specifications, non- or minor - loaded areas of the technical component are removed.</p> <p>C) For optimized technical components under the specified load, material usage and weight are minimized.</p>	 <p style="text-align: right;">A</p>	<p>boundary conditions</p>  <p>design space</p> <p>SKO-design proposal</p>  <p style="text-align: right;">B</p>	<p>rocker arm optimized using SKO</p>  <p>sachs engineering GmbH</p> <p style="text-align: right;">C</p>
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	<p>Simplified Design Tools</p> <p>Shear Squares, Tension Triangles, and Force Cones</p>	
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<p>Method of Force Cones</p>  <p>applied load and force cones</p>	<p>Concept: Single loads orientate along axial 90° compression cones and 90° tension cones, respectively. Using the edges and intersection points of these cones, a lightweight design proposal can be generated.</p>  <p>design proposal using the Method of Force Cones</p>	 <p>visualization of the principle</p>	 <p>comparison with SKO computing</p>
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<p>Torsion Anchor</p> <p>At force cones and primary points (●), tensile and compressive forces intersect at right angles.</p> <p>Each point along the circumference of the anchor circle is a primary point.</p> <p>The constructive circle (radius R_K) enables simplified engineering of the torsion anchor using tangent lines. The loaded radius of the torsion anchor is R.</p>	<p>A</p>  <p>applied load</p>	<p>B</p>  <p>force cones</p>	<p>C</p>  <p>constructive circle</p>	<p>D</p>  <p>string of primary points</p>	<p>E</p>  <p>visualization of the principle</p>
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<p>Demonstrator of Two Interacting Torsion Anchors</p> 	<p>Visualization of the Principle</p> 
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more information: www.mattheck.de