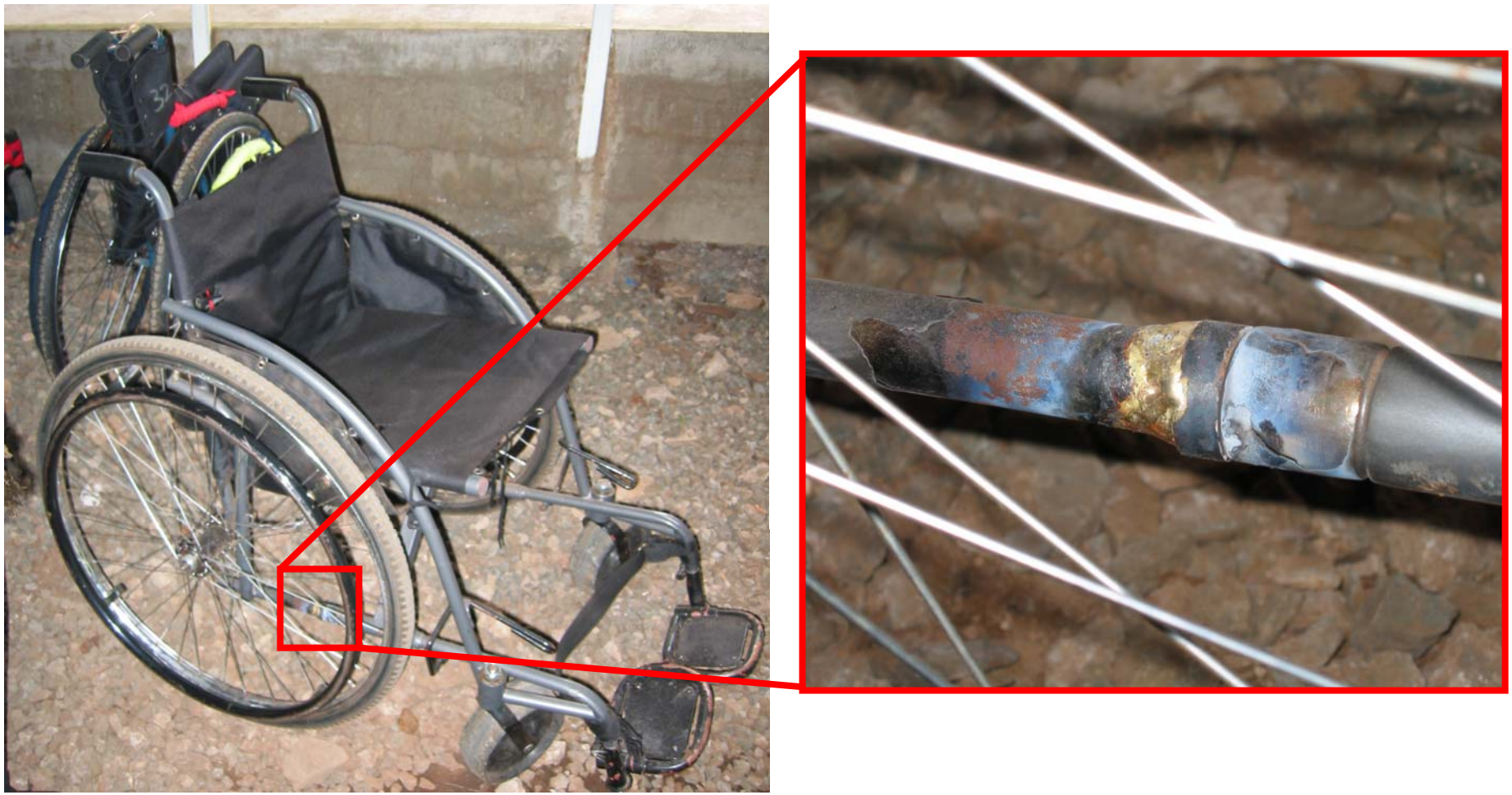
MATERIAL PROPERTIES AND PERFORMANCE



HOT WORKING VIDEOS

- **Hot forging a nail**

http://www.youtube.com/watch?v=7YNbMAAxvnQ

- **Cold forging a metal bar**

http://www.youtube.com/watch?v=Zdi6C-oADEI

STEEL YIELD STRENGTH VS. ELONGATION
Steel alloys with different amounts of carbon

AISI #	Tensile Strength (MPa)	Ductility (%EL)
1010	180	28
1020	205	25
1040	585	19
1080	980	13
1095	830	10

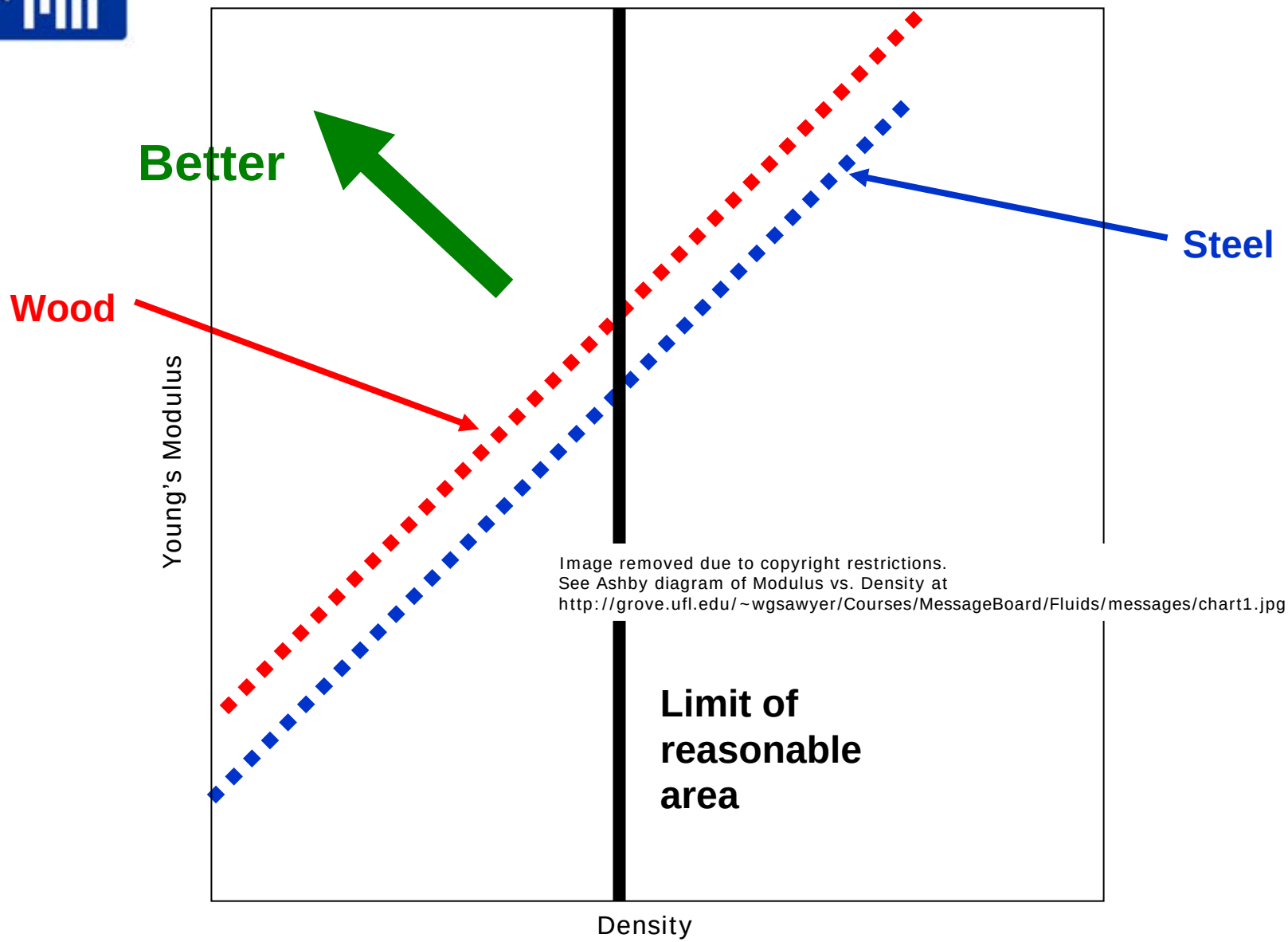
From W. Callister, Materials Science and Engineering

MECHANICAL PROPERTIES OF 1020 STEEL
Effects on performance from different processes

Treatment	Tensile Strength (MPa)	Ductility (%EL)
Hot rolled	210	25
Cold drawn	350	15
Annealed (@ 870 deg C)	295	36.5
Normalized (@ 925 deg C)	345	38.5

From W. Callister, Materials Science and Engineering

MODULUS VS. DENSITY



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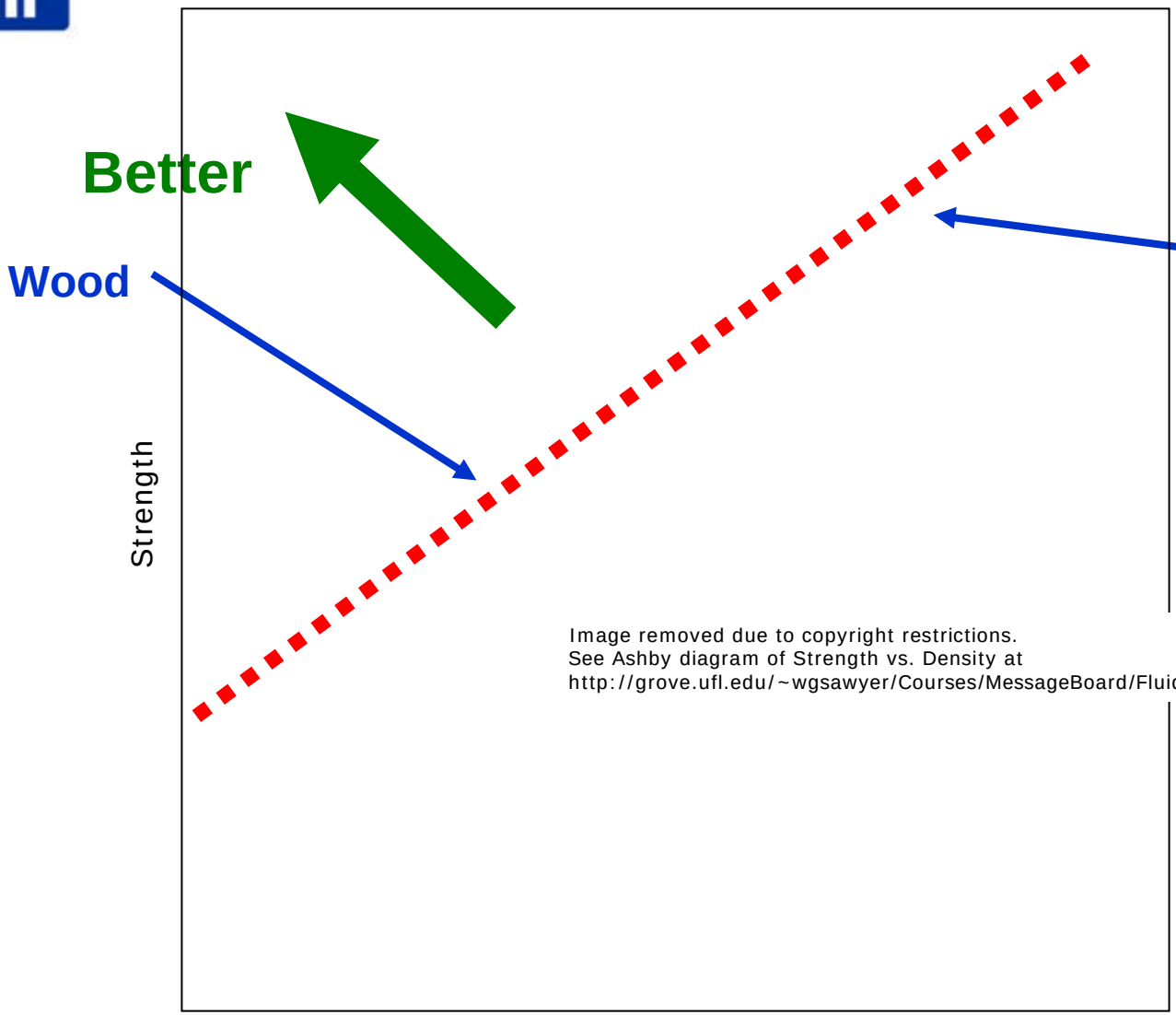
See Ashby diagram of Modulus vs. Density at
http://grove.ufl.edu/~wgsawyer/Courses/MessageBoard/Fluids/messages/chart1.jpg

STRENGTH VS. DENSITY



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See Ashby diagram of Strength vs. Density at
http://grove.ufl.edu/~wgsawyer/Courses/MessageBoard/Fluids/messages/chart2.jpg

HOMEWORK

- **Read “Mechanical Principles of Wheelchair Design”**
- **Prepare for Concept presentations next Thursday**