

## Chapter 7

# Study Properties and Mechanical Behavior of the Shaft Material 16MnCr5

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### Abstract

A detailed study properties and behavior of the shaft material (16MnCr5) at different hardness i.e. 40 HRC, 45 HRC, 55 HRC was carried out by heat treating the shaft at 500 °C, 450 °C, and 250 °C respectively. Following this, a tensile test was carried out for the material with different hardness and hence the design stress was determined by analyzing the shaft at full load capacity. Detailed calculation involving the Factor of Safety of the shaft was done based upon the tensile stress and design stress and it was found to be Suitable material (20NiCrMo2) with a greater tensile strength and similar chemical composition is also recommended. Comparative statement has been made for obtaining maximum yield strength and hardness for a highly stressed environment parts and optimum value has been selected for 16MnCr5 material with number of heat treatment processes.

*Keywords: Mechanical behavior, Hydraulic steering pump, shaft and 16MnCr5, Heat treatment, Micro hardness.*

