Spring 2021

Jominy Hardenability Tester Redesign

Dennis Kopacz
djk93@zips.uakron.edu

Shadoe Beatty
smb312@zips.uakron.edu

Thomas Benenati
tcb59@zips.uakron.edu

Jared McLean
jgm74@zips.uakron.edu

Matthew Yokosuk
mjy25@zips.uakron.edu

Jominy Hardenability Tester Redesign

Shadoe Beatty

Thomas Benenati

Dennis Kopacz

Jared McLean

Matthew Yokosuk

Advisors

Dr. Yogesh Singh

Dr. Alper Buldum

Dr. Gopal Nadkarni

Dr. Scott Sawyer

Department of Mechanical Engineering University of Akron

Spring 2021

Executive Summary

Due to confidentiality reasons the full report for this project cannot be published at this time. A brief summary of the work will be discussed. This project consisted of two distinct parts. The first consists of a prove-out of an induction heated Jominy Hardenability Tester that was created by a previous University of Akron design team. This included creating a safety manual and collecting results so the machine could be compared to traditional testers. Our group prepared the machine to be run, created an instruction manual, and then performed multiple tests with this machine.

The second task consisted of creating a new machine that incorporated an intensive quenching element. This intensive quenching element would simulate a traditional Jominy hardenability test. Our group needed to consult with our industry and academic sponsors to design this machine. The brainstorming and conceptual design process took very long, but our group was able to successfully create this machine at one of the sponsor's facilities. Multiple visits were needed and many changes were made to the machine through the design process. This machine was tested and compared to the previous tester. The data collected showed that intensive quenching does in fact result in a higher hardness compared to traditional quenching. It is our group's thoughts that this tester can be used as a device to set a standard for intensive quenching for different materials. The results, conclusions, and design process are all outlined in the full report.