

EXPERIMENTAL INVESTIGATION ON AIR COMPRESSOR INTELLIGENT TESTING RIG TO EVALUATE PERFORMANCE RATING

RITHIKAA K

Department of Mechatronics

Bannari Amman Institute of Technology, Erode, Tamil Nadu, India

ELANKATHIRAN K K,

Department of Mechanical

Bannari Amman Institute of Technology, Erode, Tamil Nadu, India

SHIYAM SUNDAR V,

Department of Mechanical

Bannari Amman Institute of Technology, Erode, Tamil Nadu, India

The increasing demand for energy-efficient and reliable air compressors requires accurate and efficient performance evaluation procedures. This project, Experimental Investigation on Air Compressor Intelligent Testing Rig to Evaluate Performance Rating, aims to design and build a smart, semi-automated testing rig for air compressors. The goal is to explore, evaluate, and optimize air compressor performance aspects such as power consumption, efficiency, airflow rate, pressure fluctuations, and thermal performance under a variety of operating situations. The intelligent testing rig includes sensors, data gathering systems, and control units that track key performance indicators (KPIs) in real time. The incorporation of modern sensors, such as pressure transducers, temperature sensors, and flow meters, enables precise monitoring of many parameters. A SCADA system is used to automate the testing process and collect data more efficiently. The acquired data is examined using statistical techniques and machine learning algorithms to calculate the compressor's performance rating, which includes identifying operational inefficiencies and opportunities for improvement. The study examines numerous compressor types (e.g., reciprocating, rotary screw, and centrifugal) under varying load situations, allowing for a thorough evaluation. The project's goal is to validate the effectiveness of the intelligent testing rig by comparing its results to industry-standard methodologies. Furthermore, the designed rig offers a scalable solution that can be tailored to a variety of compressor models, ensuring extensive applicability in both industrial and laboratory environments. Through this research, we hope to improve the accuracy, repeatability, and automation of air compressor performance evaluations, resulting in better compressor design and more energy-efficient systems.