



# Mine air compressor comprehensive performance testing system based on virtual instrument

Q. N. Niu and Y. B. Zhao\*

*Hebei University of Engineering, Handan, China.*

*\*corresponding author: wgm211@sohu.com or guimeiwang@hebeu.edu.cn*

## Abstract

As an important, large-scale equipment in the mining industry, the mine air compressor's performance should be ensured. Traditional testing methods on mine air compressor's performance can not meet the requirements due to multiple shortcoming such as low accuracy, complicated operation, high supporting equipment requirements, and high costs. For this reason, this paper describes a new air compressor comprehensive performance testing system based on virtual instrument technology. The system, relying a virtual instrument software environment – LabVIEW as a platform, can greatly improve the test accuracy and efficiency through "hardware and software-based" thinking to achieve a variety of instrument functions. It has a good expansion and openness.

**Key words:** *Component, Air compressor, Testing system, Virtual instrument, LabVIEW*

## 1. Introduction

Air compressor, as mine production and construction of major large-scale mechanical and electrical equipment, provides the impetus protection for the air-driven mechanical and plays an important role in the mine production and the construction process (Coal Mine Safety Regulation, 2004; Safe Production Industry Standards of PRC, AQ1013-2005). At present, a manual meter-reading method is used extensively in our country. It has many disadvantages, such as too many parameter, complicated data processing, low degree of automation and poor accuracy (Li *et al.*, 2008). Therefore, a more accurate, more convenient testing system with more software

function is in urgent need.

Different from traditional instruments, virtual instrument technology is a computer-based instrumentation and measurement technology--computer and equipment are closely tied up on the basis of the computer coupled with the appropriate hardware and proprietary software, forming a very efficient, accurate and cost-effective measurement system (Yang *et al.*, 2006; Wang *et al.*, 2009). Therefore, this paper applies the virtual instrument technology to build a highly efficient test system using LabVIEW software. The system, utilizing software instead of hardware, is simple and powerful, not only that testing results can be displayed automatically, but multiple functions such as data transmission, analysis, processing, storage and report printing can also be realized