

**[Paper ID904] APPLICATION OF MULTI-OBJECTIVE GENETIC ALGORITHM (MOGA) FOR DESIGN OPTIMIZATION OF VALVE TIMING AT VARIOUS ENGINE SPEEDS**

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**ABSTRACT**

This paper aims to demonstrate the effectiveness of Multi-Objective Genetic Algorithm Optimization and its practical application on the automobile engine valve timing where the variation of performance parameters required for finest tuning to obtain the optimal engine performances. The primary concern is to acquire the clear picture of the implementation of Multi-Objective Genetic Algorithm and the essential of variable valve timing effects on the engine performances in various engine speeds. Majority of the research works in this project were in CAE software environment and method to implement optimization to 1D engine simulation. The paper conducts robust design optimization of CAMPRO 1.6L (S4PH) engine valve timing at various engine speeds using multi-objective genetic algorithm (MOGA) for the future variable valve timing (VVT) system research and development. This paper involves engine modelling in 1D software simulation environment, GT-Power. The GT-Power model is run simultaneously with mode Frontier to perform multi-objective optimization. By using the MOGA optimization approach in mode Frontier, multi-objective optimization could be done with coupling with several of software environment; this does not require any modification of the original model. Thus, it is able to provide professional, reliable and accurate solution.

**[Paper ID908] HVOF COATING OF INCONEL 625 BLENDED WITH WC: FRACTURE TOUGHNESS MEASUREMENT**

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**ABSTRACT**

HVOF coating finds application in industry to protect the surface from the harsh environments such as high temperature, corrosion, and abrasion. In the present study, HVOF coating consisting of Inconel 625 powders blended with WC particles and sprayed on to 304 steel is carried out. The mechanical properties, such as elastic modulus and fracture toughness, of the resulting coating are determined using the indentation tests. The influence of the mass fraction of WC on the fracture toughness and elastic modulus of the coating are also examined. It is found that addition of WC particles in Inconel 625 powder enhances the fracture toughness of the resulting surface. This is attributed to increased elastic modulus and hardness.

**[Paper ID909] DEVELOPMENT OF A PILOT-SCALE WEB-BASED INVENTORY MANAGEMENT SYSTEM FOR LAB EQUIPMENT AND CONSUMABLES**

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**ABSTRACT**

A proper management of inventory items can bring in significant benefit to any organization. With the advancement of communication system through internet and intranet, its scope is expanding rapidly in the form of web-based system. A web based inventory management system can bring exceptional value to an organization. As an organization grows, it is inevitable to deal with a lot of paper-based records for each transaction, thus requiring a lot of storage. Additionally, strict control of inventory with frequent cycle counting and high record accuracy is becoming imperative to survive in this competitive world. A web-based inventory system, as an alternative to conventional system, provides a platform where records can be archived and updated digitally, thus reducing filing activity at the end of each term and providing a scope of frequent counting with higher record accuracy. Another significant advantage is that a web based system can be accessed by authorized person anywhere and anytime. As a result, a manager should be a happier person if he can feel more 'in control' of what he manages. There has been a common perception that an inventory model is developed mostly in the context of

manufacturing, wholesale, and retail sectors. Now with the advantages of the web based system, application of inventory management has crossed the common boundary. The pilot-scale research project was undertaken to study the scope of web based inventory system for managing laboratories of engineering program at a higher learning institute. Relevant data and information from few laboratories were gathered including the list of current inventory items. A web-based inventory management system for the laboratory inventory has been developed which could be used to check the current status of raw materials, consumables and machinery available, reveal the pattern of the need of materials in the various laboratories, identify the critical parts and equipment, and current stock level. A built-in function in the system can be used for planning in the context of determining the order quantity, reorder quantity and lead time.