# EnggCoat - 2012

CONFERENCE ON ENGINEERING COATINGS: PROCESSES, CONTROLS & APPLICATIONS

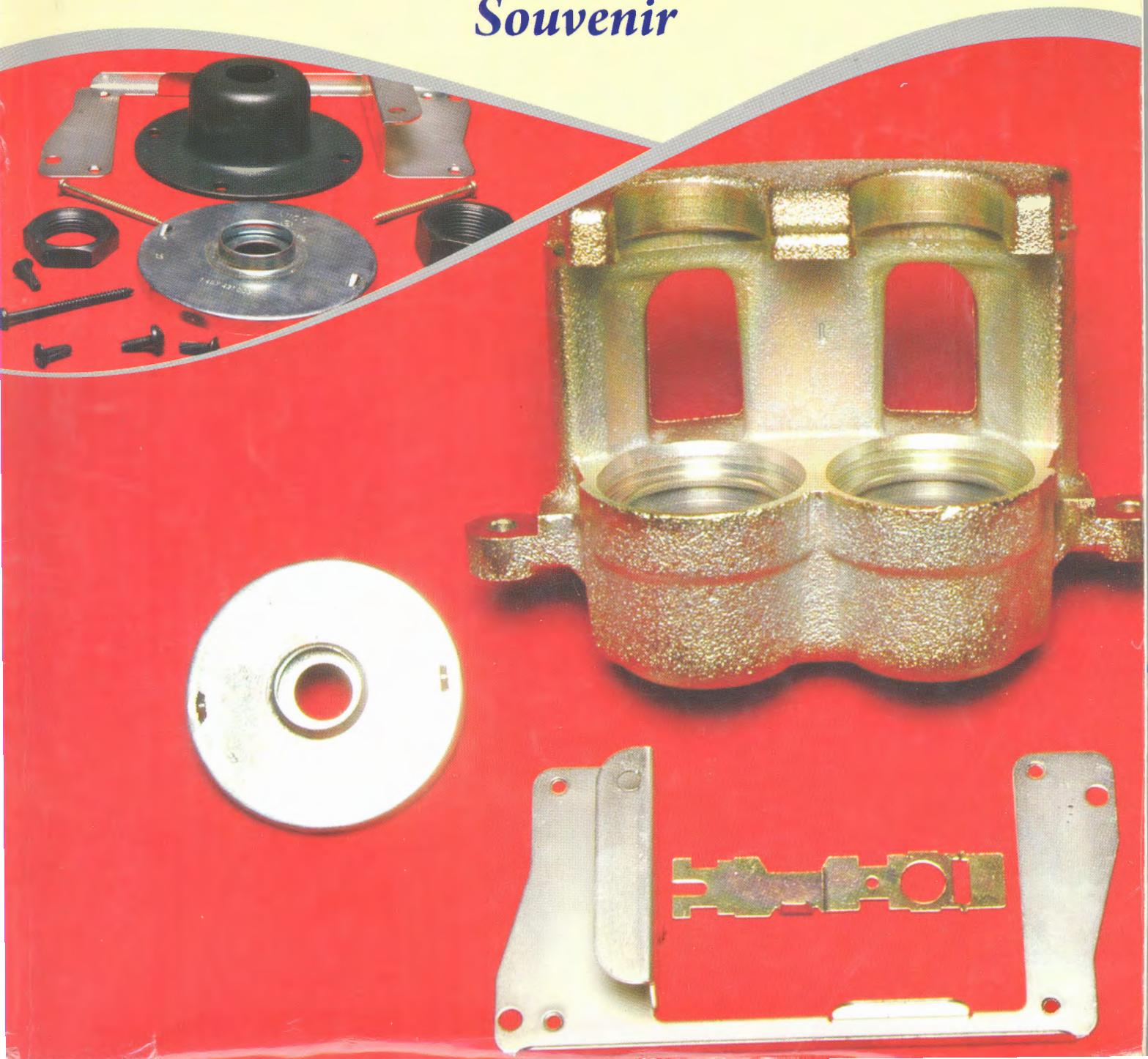
9-11 February, 2012

Victor Menezes Convention Centre, IIT Bombay

**Organised by :**
ASM International, India Chapter
Metals and Materials Association, IIT Bombay
Metal Finishers' Association Nasik
Pune Metal Finisher's Association
NACE International, Gateway India Section

**International Partner**
Institute of Metal Finishing

## *Souvenir*



removal of impurities from metal surface and enriching the surface with a protective layer which will further help the paint system to achieve the desired performance parameters.

Removal of surface impurities can be done by mechanical or chemical method depending on type of article to be painted and the desired end results. Mechanical methods involves sand, shot blasting operations where as chemical methods involves use of different chemicals to remove impurities and to enrich the surface.

Use of other metals in the engineering industry like aluminium alloys, different types of galvanized steel and non metals like various types of plastics has increased the challenges of pretreatment of surface before painting. The environmental concern has forced to develop various options of pretreatment apart from the conventional methods.

# Smart Coatings

## Renewable resource based novel antimicrobial polyesteramide-urethene-hybrid coatings

*T O Siyanbola[1,2], B V S K Rao[3], R Narayan[1], O Olaofe[4], E T Akintayo[4] and K V S N Raju[1]*

*[1]Polymers and Functional Materials Division, Indian Institute of Chemical Technology, Hyderabad- 500007, India.*

*[2]Chemistry Department, College of Science and Technology, Covenant University, P.M.B. 1023, Ota, Ogun state, Nigeria.*

*[3]Centre for Lipid Research, Indian Institute of Chemical Technology, Hyderabad-500007, India.*

*[4]Chemistry Department, University of Ado-Ekiti, P.M.B. 5363, Ado-Ekiti, Nigeria*

*Email: kvsnraju@iict.res.in*

The use of renewable resources for the development of coating materials is a viable means to reduce environmental impact and support sustainability efforts. This paper describes a novel antimicrobial polyesteramide-urethane-silica- Zinc Oxide (ZnO) hybrid coatings based on milk bush seed oil as renewable resource. Initially ZnO nanoparticles were modified with aminopropyltrimethoxysilane to get silica grafted ZnO composite particles. The milk bush oil based polyesteramide were reacted with excess H12MDI to get NCO terminated polyesteramide-urethanes and the excess NCO was reacted with silica grafted ZnO composite particles to get the reactive hybrid prepolymers. These prepolymers were casted on tin foil and cured under atmospheric moisture to get eco-friendly moisture curing polyesteramide-urethane-silica- Zinc Oxide (ZnO) hybrid coatings films. The coatings films were evaluated for its antimicrobial and thermo mechanical properties while coated steel specimen were used for corrosion studies. The techniques such as FTIR, TGA, DSC, DMTA, SEM and XRD have been used in this study. The hybrid coating films has shown very good antibacterial and antifungal properties, higher thermal stability and better thermo mechanical properties. The improvement in the properties was dependent on the concentration of ZnO composite particles in the coating films. The antibacterial experiments show that the ZnO doped films exhibit excellent antibacterial activity, especially for E.coli. The salt spray test on coated specimen show good corrosion resistance properties for hybrid coatings.