Project Title: Feasibility and Application of Bio-fuel as well as Low Cost and Diluted ANFO for Cost Effective and Safe Blasting Practices in Opencast Metalliferrous Mines in India

Project No. :GAP/MS/MOM/86/2010-11

Executive Summary:

ANFO is a mixture of Ammonium Nitrate (AN) prill and diesel oil. ANFO with diesel oil only is not economically viable and since to search out other alternatives which were compatible for ANFO blasting is the need of the hour. Therefore a S & T project was taken up by the CSIR-CIMFR with the following objectives:

i) Development of an economical ANFO type explosive without jeopardizing safety and environmental concerns.
ii) To develop economical and environmental friendly blended ANFO explosive to achieve higher productivity with improved safety.
iii) Possible replacement of HSD with environment friendly bio-fuel/LDO in ANFO explosive.

The alternative bio-fuels like Jatropha oil, Kusum oil, Mahua oil, Karanj oil, Saw dust and Rice husk were considered for the study. The fuel properties of bio-fuels such as density, viscosity, flash point, calorific value, pure point etc. were studied to establish their compatibility with AN prills. ANFO with Bio-fuels were prepared in laboratory conditions. It is a booster sensitive explosive. The explosive properties like density and VOD under unconfined and confined conditions were studied with ANFO explosive. The detonation velocities tested and recorded were found to be satisfactory and efficient for rock blasting. The safety parameters with low cost ANFO were studied found safe to use for mining applications. They are easy to handle and produces less fumes. The trial blasts were conducted at Limestone and Manganese ore mines and provided satisfactory blast results.