Cold Starting of IC Engines

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ABSTRACT

Studies of cold starting of IC engines carried out at Indian Institute of Petroleum (IIP) and field trials at high altitudes under sub-zero temperature conditions are described in this paper. Different operating factors influencing the cold starting of diesel engines and the role of starting aids developed at IIP have also been described. IIP device has given satisfactory starting performance upto temperature as low as -35°C.

1. INTRODUCTION

The general practice adopted to start the diesel trucks under low temperature conditions, was to tow the vehicle for about 15 to 20 minutes even after using special low temperature fuel, lubricating oil etc. This method obviously, is not reliable for emergency starting and not suitable for hilly areas as existing in Northern Borders.

Cold starting¹ of IC engines under sub-zero temperature conditions is a delicate operation. A little carelessness can damage the whole engine, but if proper precautions are taken and right type of lubricating oil, fuel, coolant, starting aid, etc. are used then a summer like start can be achieved. This paper describes the general problems involved at low temperature conditions, design aspects of the engine, the battery, starting aids and the results obtained during the tests and trials in actual field conditions.

2. SI ENGINES

Starting of SI engines at low temperatures² is easier than CI engines due to sparking systems in the combustion chamber and the fuel properties. By using the conventional lubricating oils, fuels, etc., the SI engines can easily be started by using the more volatile fuel having 10 per cent evaporation temperature at about 40°C.

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