



Short communication

Hardbanding failure in a heavy weight drill pipe

G.V.S. Murthy*, Goutam Das, Swapan Kumar Das, Nikhat Parveen, S.R. Singh

Materials Science and Technology Division, National Metallurgical Laboratory (CSIR), Jamshedpur 831 007, India

ARTICLE INFO

Article history:

Received 11 August 2010

Received in revised form 15 March 2011

Accepted 23 March 2011

Available online 31 March 2011

Keywords:

Drill pipe

Hardbanding

Charpy energy

Pearlite

Pro-eutectoid grain boundary ferrite

1. Introduction

A heavy weight drill pipe (HWDP) is a type of drill pipe whose walls are thicker and collars are longer than conventional drill pipe. HWDP should be stronger and should have higher tensile strength than conventional drill pipe, as it is placed near the top of a long drill string. Drill pipes are subjected to various types of loads and are operated under different environmental conditions. The heavy weight drill pipes are the most expensive elements of the drill pipe string and their durability is essential for the economical drill work efficiency. In the exploration work, abrasive wear occurs and the durability of the heavy weight drill pipe is decreased. The abrasive wear is the result of the friction between the heavy weight drill pipe with the inner surface of the casing or the open hole wall. In order to improve the wear resistance of heavy weight drill pipes the hardbanding technology is worldwide applied.

Hardbanding of drill pipe tool joints and other drilling equipment has been around since the late 1930 [1–3]. Originally hardbanding was applied primarily to protect the drill pipe and other tools from premature abrasive wear. Since, that time there have been numerous changes in hardbanding and its application, but only within the last few years has new technology been introduced that allows hardbanding to protect the casing and the drill pipe at the same time. Several types of wear resistant alloys are now available for hardbanding. Most of them are designed to protect the casing, the marine riser or the drill pipe, but only one or two can sufficiently protect all at the same time, from premature abrasive wear. The proper hardbanding with the right application can substantially increase the tool joint wear life; reduce casing wear caused by drill string, downhole drag and torque, and rig fuel consumption and allow operators to run lighter weight and grade casing.

The essential features and advantages of all of these hardbanding alloys are: (i) It has a very low coefficient of friction, which minimizes rapid casing wear caused by drill string contacting the casing wall; (ii) It has excellent resistance to the high stress abrasion experienced in open hole; (iii) It can be applied raised to give maximum casing and tool joint wear reduction and (iv) It can be applied over existing deposits with some limitations like the existing hardbanding must be in

* Corresponding author.

E-mail address: gvs@nmlindia.org (G.V.S. Murthy).