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FATIGUE FAILURE OF DECK SUPPORT BEAMS ON A VIBRATING SCREEN

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ABSTRACT

Vibrating screens are widely used for ore processing in the mining industry. They are subjected to an unusually high number of stress cycles during their lifetime - 10 million cycles are typically reached in approximately 185 hours of operation. The design of screens therefore calls for special attention to fatigue detail. An apparently insignificant change in design detail can have a profound effect on the fatigue life of a screen. The catastrophic failure of two deck support beams on a vibrating screen is evidence of the above statement and the subject of this paper.

INTRODUCTION

An overview of fatigue

As the failure discussed is classified as a fatigue failure it would be appropriate to provide a brief overview on the subject of fatigue.

Fatigue is defined in BS 5400 as the damage, by gradual cracking of a structural part, caused by repeated applications of a stress which is insufficient to induce failure by a single application. [1] This definition further calls for distinguishing between low cycle and high cycle fatigue. The term low cycle fatigue indicates the presence of marked plastic deformation in a loaded member and is associated with high stress ranges and a low number of cycles to failure. High cycle fatigue on the other hand is associated with relatively low stresses, in the elastic range, and a high number of cycles to failure - typically above 100 000 cycles. Further discussion of the topic will be limited to high cycle fatigue.