DTI's Technical Report #28

'Coronet' Load Indicator tests on out of parallel faces.

Introduction

The Specification for Structural Joints Using A325 or A490 Bolts allow a surface slope of 1 :20. This test examines the effect of taper on the 'Coronet' Load Indicator when fitted under the head.

Summary

The permitted flange taper does not affect the performance of the 'Coronet' Load Indicator, which registers the required minimum bolt tension at an average gap of 0.015".

Procedure

A 7/8" diameter A325 bolt was assembled with a load indicator and a 2! bevel washer under the head to simulate the out-of –parallel condition. The assembly was tightened in a Norbar Load Meter until an average indicator gap of 0.015" was reached, and the load read.

The test was repeated for five additional bolts.

Test #	Load Indicator Gaps Thousandths of an Inch	Average Gap Inches	Bolt Load Kips
1	3, 7, 17, 27, 22	0.0152	38.4
2	3, 6, 16, 29, 21	0.0150	37.6
3	5, 5, 12, 28, 25	0.0150	37.4
4	4, 7, 24, 20, 18	0.0146	38.1
5	10, 9, 25, 25, 6	0.0150	37.6
6	15, 25, 29, 6, 2	0.0154	37.4

Required minimum bolt tension 36 kips.*out on three of the bolts.

Discussion of Results

In practice, it has been found that the protrusions of the Load Indicator rarely close down equally around the Indicator circumference under applied load. Even with flat surfaces there is likely to be some lack of alignment due to rolling tolerances and the practical difficulty of drilling the hole exactly normal to the surface, The tests show that the 'Coronet' Load Indicator is able to accommodate these variations in alignment and at an average gap of 0.015", the minimum bolt tension will be achieved.

*Since these tests were carried out, A325 has revised the minimum bolt tension from 36 to 39.25 kips. 'Coronet' Load indicators have been modified accordingly.

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