McB INDUSTRIES

AIRPORT LIGHTING PRODUCTS

home of the LSO-1 bolts

Khalil Kodsi
Airport Safety & Standards
Airport Engineering Division
800 Independence Avenue, SW
Washington, DC 20591

December 13, 2019

Dear Mr. Kodsi,

I am writing on behalf of Seward Ford and myself. We received The Summary of Technical Basis for Federal Aviation Administration Engineering Brief 83A, through Mark Nielsen at Senator Ron Jonson's office back in September and appreciate your feedback on the decision-making factors used in determining the standards.

There remain some questions regarding the testing process and continued future involvement of industry stakeholders in the process moving forward that I would like to address with you.

With regards to the testing process there is concern on the proposed timeline for testing to begin. It was mentioned at the Illumination Engineering Society (IES) conference this year that testing to measure the friction between faying surfaces is the next step. When is this scheduled ?

In the initial testing done by the FAA and presented by Intertek at IES 2017, all bolts failed to develop sufficient clamp load for the Airbus 380 with the galvanized faying surfaces. In the beginning of May, 2018 we did testing on a coating that exceeds the RSCS Class D requirement of minimum μ=.50. We shared the test results with the FAA in early June, 2018. (See Intertek Report No: 103473607CRT-001 Enclosed) The test results showed that galvanized faying surfaces failed, but the "SuperGrip" surface with six F593C bolts would provide enough friction to offset the horizontal shear from the AB 380. The testing we have gathered shows that just changing the bolts is not enough to overcome the shear forces that are applied to the jointed connection, but rather high friction coatings applied to existing surfaces can greatly increase the success of the joints holding while reducing the reliance on the bolts. This fact helps ensure the longevity of the joint. With a high friction faying surface we would not have to rely on the bolts to provide the primary source to create the friction. After the initial installation, an airport may replace the bolts with lower clamp load bolts, but with the μ=.50 most bolts would provide sufficient clamp load. This reduction in bolt clamping capability is not as critical when the primary source of the joint strength is determined by the friction of the faying services. The friction requirement will be specified in AC 150-5345-42. The AC would require base manufacturer certification that the base with accessory rings meets minimum specified friction requirement between fraying surfaces. This is critical to ensure that enough clamping force is available to overcome most situations, including the replacement of bolts with reduced clamping capability, installed by airport personnel as maintenance and time makes necessary.

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This brings us to how the future involvement of industry stakeholders could benefit the industry. We have had many meetings on bolts. However, the meetings were mostly lecture and not discussion. In EB 83A, it was decided that Grade 5 bolts were the solution and then the testing was designed to support that assumption. In the future we should not start with a given of and work to prove it. We should test to find a solution.

We are looking forward to hearing back form you regarding the testing topics, timelines, and open-door committee meetings. If you have additional suggestions for how to stay involved with resolutions on these issues, we look forward to hearing about them.

Regards,

Mary Baeten
President
MCB Indusries, Inc.

(Enclosed 2)

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Intertek Test Report No. 103473607CRT-001 May 3, 2018 through May 7, 2018

SUMMARY

Testing of various combinations of bolts and faying surfaces to measure clamp load and μ.

Bolts

Size	Bolt Type	Yield Strength (psi)	Tensile Strength (psi)	Yield Load (lbs.)	75% of Yield (lbs.)
3/8"-16	ASTM F593C	65,000	100,000 150,000	5038	3778
3/8"-16	SuperBolt	150,000	180,000	11625	8719

Faying Surfaces

3/4" + 1/2" + 1/16" spacer rings rough texture (SuperGrip)
4.00" extension with top flange rough texture (Super Grip)
Aluminum Fixture

3/4" + 1/2" + 1/16" spacer rings galvanized
4.00" extension with top flange galvanized
Aluminum Fixture

William system

3/4" spacer ring galvanized w/ 6 thru holes and 6 countersunk thru holes
1/2" + 1/4" spacer rings galvanized w/ 12 thru holes
.00" extension with top flange galvanized
Aluminum Fixture

The SuperGrip surface treatment is the only combination that achieved sufficient clamp load to offset the horizontal shear generated by the Airbus 380-800 or the Boeing 737-900

14,500 lbs clamp force
μ=.64 (See results on page 16)

12,000 lbs clamp force
μ=.53 (See results on page 19)

Summary Intertek Test Report 103473607CRT-001 05/09/18

Page Number(s)	Configuration	μ^1	Clamp Force (lbs)	AB 380-800 Horz. Shear (lbs) EB 83A	Boeing 737-900 Horz. Shear (lbs) EB 83A	
15	6 F593C 4.00" bolts 3/4" + 1/2" + 1/16" Super Grip surfaces 4.00" extension w/ SuperGrip top flange Aluminum Fixture	.640	14,500	10,620	9,916	**SUPERGRIP** **PASS**
17	6 SuperBolts 3.00" 3/4" + 1/2" galvanized surfaces 4.00" extension w/ galvanized top flange Aluminum fixture	.160	8,500	10,620	9,916	**GALVANIZED** **FAIL**
18	William system (12 bolts) 3/4" galvanized surface 6 thru holes, 6 countersunk 1/2" + 1/14" galvanized surface 4.00" extension w/ galvanized top flange Aluminum fixture	.150	3,500	10,620	9,916	**GALVANIZED** **FAIL**
19	William system (12 bolts) 3/4" SuperGrip surface 6 thru holes, 6 countersunk 1/2" + 1/14" SuperGrip surface 4.00" extension w/ SuperGrip top flange Aluminum fixture	.530	12,000	10,620	9,916	**SUPERGRIP** **PASS**

[1]μ – slip coefficient faying surfaces