EAGAR LLC
138 Claflin Street
Belmont, MA 02478
617-253-3229
Eagar@MaterialsEng.com

Member of MEG

Materials and Engineering Group LLC
- M.C. Balmforth, MS, PE, CWI
- S.C. Bellemare, PhD, PE
- T.W. Eagar, ScD, PE

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November 14, 2014

Richard E. Gillespie
Executive Director
TIGHAR
2366 Hickory Hill Road
Oxford, Pennsylvania 19363

Dear Mr. Gillespie,

On November 14, 2014, you brought a piece of riveted aluminum sheet metal to my office for inspection by myself and four of my colleagues on the MIT faculty and staff. Each of us have extensive experience in forensic analysis. You provided information on the discovery of this sheet on Gardner Island in the Pacific Ocean. The question posed was whether this sheet metal is consistent with a window patch known to have been present on the Amelia Earhart Lockheed Electra aircraft?

After examination of this evidence and discussion between you and my colleagues and myself for more than two hours, I have determined that there is nothing on this sample that is inconsistent with it being the patch that was on the Amelia Earhart aircraft. Stated more affirmatively, there is a large amount of evidence that is consistent with the information TIGHAR has collected concerning the installation, the geometry and the shape of the evidence as being the patch on Amelia Earhart's aircraft. While the metallurgical analysis is not dispositive, it is clearly supportive of the TIGHAR hypothesis.

We examined the rivet holes, the fractures, the edges of the sheet and the presence of corrosion on the sample both visually and with aided magnification. We did no destructive analysis, although you were amendable to our doing so. I did recommend a commercial laboratory that has extensive experience in chemical analysis of aluminum alloys.

Given that the metal had been submerged in the ocean for a half century, there were challenges in determining which metallurgical and mechanical features were original and which were produced by forces from wave action and/or sand abrasion over time. Nonetheless, as in most forensic investigations, there are some facts that stand out which permit conclusions to be drawn with reasonable engineering

certainty. For example, I and several of my colleagues found most of the sheet edges and fractures to be consistent with wave action creating an elevated pressure from the inside. I believe this flexing, along with the metallurgy of the rivets and the Alclad sheet, explains the loss of the aluminum rivets. I believe these rivets lost their heads due to stress corrosion cracking. I do not believe general corrosive wasting of the rivets is consistent with the lack of corrosion in the holes or the deformation of the sheet metal.

The size of the sample, the pattern of the holes as compared to your examination of an exemplar Lockheed Electra aircraft structure, make a very strong case that this is not merely a random piece of aircraft wreckage extracted from the Pacific Ocean. On this basis alone, I would conclude that it is the actual piece from the Amelia Earhart aircraft or a very detailed and elaborate forgery. While someone familiar with the Lockheed Electra airframe structure might be able to generate a credible geometry of your piece, I believe it would take a highly skilled team to match the geometry with the metallurgical wear which would occur in salt water over a fifty year period. Tying this geometry and wear together leads me to conclude that the preponderance of the evidence indicates that you have a true Amelia Earhart artifact.

This conclusion is my own and is personal to me. It does not represent a position taken by my employer or by my colleagues who examined this with me. You are welcome to solicit their opinions as well.

Sincerely yours,

Tom Eagar

Thomas W. Eagar

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