Date: November 23, 1998

To: MIL-HDBK-5 Coordination Group

Subject: Minutes of the 96th MIL-HDBK-5 Coordination Meeting

The minutes and attachments for the 96th MIL-HDBK-5 Coordination Meeting, held October 19-22, 1998, are enclosed. I would like to thank each of you for your participation. It is your input, obtained through your comments and contributions, that has helped make MIL-HDBK-5 very credible.

The next (97th) MIL-HDBK-5 Meeting will be held in Albuquerque, New Mexico, the week of April 26, 1999. Information concerning this meeting is contained with these minutes. A formal meeting announcement will be distributed in January 1999.

If you have any items you wish to have included on the agenda for the next meeting, please provide the data/information as soon as possible to allow time for complete and proper analysis. This will enhance the likelihood of approval of the item at the 97th meeting.

Sincerely,

Neal Ontko, Chairman
MIL-HDBK-5 Coordination Group
Air Force Research Laboratory
Materials and Manufacturing Directorate
Wright-Patterson AFB, OH 45433-7718

Enclosures

NO/RCR/DFL:bkb

Minutes

for the

96th MIL-HDBK-5 Coordination Meeting

held in

Chicago, Illinois
October 19-22, 1998

by

BATTELLE
505 King Avenue
Columbus, Ohio 43201-2693

for

Air Force Research Laboratory
Wright-Patterson Air Force Base, Ohio 45433

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MINUTES OF THE 96th MIL-HDBK-5 COORDINATION MEETING

held in

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I. Chairman's Remarks

The Chairman, Neal Ontko, Air Force Research Laboratory (AFRL), Materials and Manufacturing Directorate (ML), opened the meeting and welcomed attendees. He reviewed briefly the history of the MIL-HDBK-5 program. The Chairman indicated that MIL-HDBK-5 is maintained as a joint effort of the Department of Defense and the Federal Aviation Administration (FAA). The Air Force and FAA fund the MIL-HDBK-5 program. The purpose of the MIL-HDBK-5 semiannual meetings is to obtain coordination of changes and additions to the Handbook among industry, DoD, and FAA. Items for changes and additions, which may be introduced by any participant, are discussed at the meeting and a consensus is obtained. As with any military specification, actual approval of individual items is the responsibility of the coordinating governmental agency. In the event of unresolved issues, the preparing agency, in this case the Air Force as represented by the Chairman, is the final approving authority. The Chairman urged each person, particularly new attendees, to participate in discussion of the agenda items and to voice their company's viewpoint.

The Chairman gave the participants the opportunity to introduce themselves. A list of attendees with their telephone number, facsimile number, and E-mail address is attached. It was indicated that modifications and additions to the Handbook approved at this meeting will be prepared in final format by Battelle and will appear in MIL-HDBK-5H, Change Notice 1. A list of changes and additions approved at the 96th meeting is in an attachment to the minutes.

The Chairman announced the next (97th) MIL-HDBK-5 Meeting will be held in Albuquerque, New Mexico. The meeting will be held April 26-29, 1999. The Announcement for this meeting is attached. The first choice of the group for Fall 1999 was Hartford, Connecticut, with the back up being Raleigh-Durham, North Carolina. It appears at this time that we will be going to Raleigh-Durham, North Carolina in October 1999. Phoenix, Arizona was selected as the Spring 2000 meeting location with the backup being Salt Lake City, Utah. The Fall 2000 meeting (our 100th meeting) will be held in Dayton, Ohio, sometime in October-November.

II. Approval of 95th Meeting Minutes

The minutes of the 95th meeting were approved with the following editorial changes:

- Page v, Item 98-14 should be Item 98-22.
- Page 21, Item 98-14 should be Item 98-22.
- Page 36, Item 98-14 should be Item 98-22.
- Page 235, Item 98-14 should be Item 98-22.

III. Retirements/Announcements

None.

IV. Order of Business

The 96th meeting followed the format established at the 93rd meeting. The order in which items were discussed followed the chronology of the agenda. The activity on specific agenda items is recorded in these minutes in numerical order, by chapter. A list of new item numbers assigned at this meeting is attached.

Some of the items were approved on a 60-day basis; this indicates that comments may be made on these items within 60 days from the date of the cover letter. Comments should be provided to either the Chairman or Secretary of the Handbook. If no comments are received on an item within the 60-day period, the item is considered approved and will appear in MIL-HDBK-5H, Change Notice 1. If there are negative comments that are considered technical in nature, approval of the item will be withdrawn and the item will be readdressed at the next meeting.

The following two meetings were held in conjunction with the MIL-HDBK-5 meetings. No additional costs were incurred toward the MIL-HDBK-5 program to conduct these meetings.

V. Navy/Air Force Titanium Investment

The Engineering and Design Data Group and MIL-HDBK-5 Committee hosted a Government/Industry Steering Group meeting for Titanium Investment Castings for Airframe Structures (TICAS) on 20 Oct 1999 from 4:00 to 8:00 p.m. Discussions centered on data collection and publication of design data for titanium castings. The Air Force contributed static properties recently developed as part of the Navy's round-robin test program. A phase two program was planned for testing of 10 heats of material. The program has not received a commitment for delivery of cast material or testing support.

VI. NASM1312 Fastener Test Methods Working Group

The National Aerospace Standards Committee (NASC) 1312 Fastener Test Methods Working Group held a meeting at the conclusion of the MIL-HDBK-5 main coordination meeting. The meeting was chaired by Navy and Defense Industrial Supply Center (DISC) personnel and has associated itself with MIL-HDBK-5 meetings for several years.

Mr. Richard Eppright of the Naval Air Warefare Center, Patuxent River, presented a matrix indicating military specifications referenced in the NASM1312 series of test method standards. As appropriate, he indicated either superseding documents, or potential non-government standard (NGSs) to replace the "Mil-Specs." This information will aid the group with consistent replacement of military documents with appropriate NGSs.

The group reviewed proposed changes to test methods 8, 13, and 20, for tensile strength, double shear, and single shear, respectively. The task chairmen for each of the individual standards will coordinate our comments with their respective task groups.

Mr. Don Kloos and Mr. Jeff Schwieterman of Coating Measurement Instruments (CMI) provided an interesting and most welcome briefing and demonstration of some of their equipment used for determining the thickness of metallic coatings. Of particular interest to the group was the equipment used to determine coating thickness using x-ray fluorescence. This is one method being proposed for inclusion in NASM1312-12.

MINUTES OF THE 96th MIL-HDBK-5 COORDINATION MEETING

CHAPTER 1. GENERAL

No Item No. **AMS Coordination. (GCC)** D. Lahrman, Battelle, provided a brief summary of SAE/AMS activities. The Fall 1998 SAE/AMS meeting occurred two weeks before the MIL-HDBK-5 meeting. The items of interest to the MIL-HDBK-5 Coordination Group are summarized below.

A table is included in an attachment to the minutes that summarizes the actions taken for the AMS specifications contained in MIL-HDBK-5. Also included in the table are the draft specifications being sponsored. Some of the draft specifications are of interest to MIL-HDBK-5 as indicated below and may be included, pending approval and submission of the appropriate data.

6092/SiC/25p-T6P Aluminum Alloy, Particulate Reinforced Extrusion. AMS 4265. M. Van den Bergh, DWA, made revisions to this specification to correct the minimum mechanical properties and processing changes. Committee D decided at the Fall 1997 meeting that the revision constituted a downgrade since the minimum mechanical properties were reduced. The data provided to MIL-HDBK-5 for analysis supports the lower properties. The recommendation from SAE/AMS Committee D was to circulate this as a new draft specification on a 28-day ballot. The current specification will be either canceled or superseded. The draft specification has not yet been provided to SAE/AMS.

6092/SiC/17.5p-T6P Aluminum Alloy, Particulate Reinforced Extrusions. Draft D-94AR, M. Van den Bergh is to submit a 28-day redraft. The redraft has not yet been submitted to SAE/AMS.

6092/SiC/17.5p-T6P Aluminum Alloy, Particulate Reinforced Sheet. An SAE/AMS specification number was assigned; however, the SAE/AMS editorial consultant noticed the heat treatment process was not contained in the specification. He will discuss the issue with the SAE/AMS Committee D chairman to resolve the issue. A 21-day priority ballot may be circulated to allow committee members to comment on the addition of the heat treatment procedure to the specification.

7050-T7451 Aluminum Alloy Plate, AMS 4050, V. Dangerfield, Century Aluminum, sponsored the upgrade to this specification. The specification was upgraded to include product up to 8.000 inches thick. The specification was sent to Aerospace Council (see Item 97-5).

7055-T77511 Aluminum Alloy Extrusions, Draft D97AB, SAE/AMS assigned an AMS specification number, it is AMS 4337 (see Item 97-3).

7055-T7751 Aluminum Alloy Plate, Draft D97AC, SAE/AMS assigned an AMS specification number, it is AMS 4206 (see Item 97-4).

Action: Item continued.

No Item No. **Meetings of Potential Interest to MIL-HDBK-5 Coordination Members. (GCC)** D. Lahrman reviewed the list of meetings of interest to the group. A revised copy of the meetings of potential interest is included as an attachment to the minutes. If you wish to obtain additional information about a particular meeting, please call the indicated point of contact.

Action: Item continued.

No Item No. **Cancellation of Government Specifications and Subsequent Replacement Specifications. (GCC)** D. Lahrman indicated the conversion process of the canceled, or soon to be canceled, MIL and Federal specifications is in progress. Aerospace Industries Association's Early Warning Project Group (AIA EWPG) has identified several specifications that are of interest to the aerospace community and has forwarded the information to SAE/AMS. SAE/AMS Committee E has 35 specifications that were identified by the EWPG, 22 of these have been converted without modification to SAE/AMS specifications.

Action: Item continued.

No Item No. **Collection of Additional Fatigue, Fatigue Crack Growth, and Fracture Toughness Data. (GCC)** R. Rice, Battelle, presented a status report on efforts to collect fatigue, fatigue crack growth, and fracture toughness data from material suppliers and users.

He acknowledged a large collection of fracture toughness data provided by J. Runkle, McCook Metals LLC, on 7050-T7451 plate. R. Rice noted that data from at least two other aluminum suppliers were anticipated.

R. Rice indicated that a substantial quantity of steel data exists in the MIL-HDBK-5 files on the effects of surface treatment on load-control fatigue properties. After some debate, it was suggested by N. Ontko, AFRL, that the best forum for presentation of these data would be as a special technical report, rather than as a standard MIL-HDBK-5 data proposal.

Action: Item continued.

Item 96-11 **Chapter 1 Revision. (GTG)** R. Rice presented a draft rewrite of Chapter 1. A variety of editorial and content changes were suggested. A decision was made to closely coordinate the next review of Chapter 1 with the draft revision of Chapter 9. It was agreed that the next draft of Chapters 1 and 9 would be circulated to volunteer reviewers by approximately December 1, 1998. Comments on Chapter 1 will be collected until approximately February 1, 1999. At that time, the final draft of Chapter 1 will be compiled for inclusion in the 97th Meeting Agenda.

Action: Item continued.

No Item No. **Special Presentation. (GCC).** B. Rosenberger made a presentation on "Laser Direct Manufacturing, a Solid Freeform Fabrication Process for Metals." A copy of his presentation is included as an attachment.

No Item No. **Industrial Steering Group. (GCC).** R. Rice provided an overview of ISG-supported MIL-HDBK-5 activities during the past year. He briefly described one of the primary deliverables to ISG member companies, which is a statistical analysis and database application that can be used to develop direct and indirect design properties in accordance with MIL-HDBK-5 guidelines. He also noted tentative plans for the second year include the completion of the first part of a CAD compatible MIL-HDBK-5 database. He indicated several different ISG membership levels were being defined to allow broader industry participation.

Action: Item continued.

No Item No. **Guidelines Task Group. (GTG)** R. Rice noted the GTG had met on Tuesday, October 20th and reviewed all of the guidelines-related items in the overall agenda.

Action: Item continued.

No Item No. **Materials Task Group. (MTG)** R. Rice indicated the MTG had met on Wednesday, October 21st and reviewed all of the items involving changes or additions to the material property data included in Chapters 2 through 7 of MIL-HDBK-5.

Action: Item continued.

No Item No. **Statistics Working Group. (SWG)** R. Rice noted the SWG had met on Tuesday, October 20th and J. Kinateder had reviewed all the items on the statistical methods in Chapter 9.

Action: Item continued.

No Item No. **Historical Note: Recommended Design Properties for Wood in ANC-5 in 1938. (GCC)** R. Rice indicated he included this item in the agenda as a matter of historical interest only.

Action: Item closed with no action required.

CHAPTER 2. STEEL ALLOYS

Item 95-2 **Replacement of Cancelled MIL-Specifications in Chapter 2. (MTG)**
D. Lahrman reviewed a handout. Some questions received from the group were as follows: (1) is there a replacement SAE/AMS word-for-word conversion specification for MIL-S-7097, (2) is footnote (a) in Table 2.7.1.0(b) still appropriate when MIL-S-5059 is deleted, (3) is MIL-S-5059 to be removed from the columns

for ¼ hard, ½ hard, and full hard, and (4) does AMS 5901 cover only sheet and strip or does it also cover plate.

Action: Item continued.

Item 98-10 **A- and B-Basis Properties for AerMet 100 (280 ksi). (MTG)** D. Lahrman indicated an initial review of the data had occurred. These data met the minimum requirements to compute T_{99} and T_{90} values.

Action: Item continued.

CHAPTER 3. ALUMINUM ALLOYS

No Item No. **Die Forging Work Group. (DFWG)** P. Brouwer, Alcoa, the Chairman of the DFWG, reviewed the current group activities. The DFWG minutes are included as attachments to the minutes. A copy of a presentation given by G. Kuhlman, Alcoa, is also included.

No Item No. **Airframers Steering Group. (ASG)** G. Lundeen, Lockheed Martin, the Chairman of the ASG, reviewed the current group activities. The ASG minutes are included as attachments to the minutes.

Action: Item continued.

Item 95-28 **Review of the Fracture Toughness Tables in Chapter 3. (MTG)** R. Rice discussed plans for updating the fracture toughness table in Chapter 3. It was noted by Steve Thompson, AFRL, that ASTM Committee E8 was in the process of making a minor change to ASTM E399, the applicable plane-strain fracture toughness testing standard. However, he said that the change would only involve the addition of a cautionary note regarding the possible effect of residual stresses on resultant toughness values. Considering the minor nature of this anticipated change, it was agreed that the plane-strain data collection effort did not have to be put on hold.

S. Thompson also suggested the possibility of taking some of the more substantial data collections from the Air Force Damage Tolerant Design Handbook (DTDH) and incorporating the sample statistics for these datasets into MIL-HDBK-5. S. Thompson agreed to discuss this issue with N. Ontko, AFRL, and provide direction to Battelle if action is to be taken regarding DTDH plane-strain fracture toughness data.

The need for plane-stress fracture toughness data was also discussed. It was agreed that work should be done in this area, but that it should be tracked under a separate item number. Item No. 98-23 was assigned for this purpose.

Anyone who is able to provide a significant quantity of recently developed, plane-strain or plane-stress fracture toughness data on any of the aluminum alloys,

product forms or tempers included in MIL-HDBK-5 should contact S. Thompson at AFRL or R. Rice at Battelle. Specification certification data are useful if they are accompanied with sufficient background information (check the Handbook guidelines for details). If desired, the raw data, and the source of the information, will be handled on a proprietary basis.

Action: Item continued.

Item 97-3 **A- and B-Basis and Derived Properties for 7055-T77511 Aluminum Alloy Extrusion. (MTG)** D. Lahrman reviewed a handout and summarized the results of the analyses. The proposed minimum mechanical properties were accepted without comment. Since the item was a handout, the item is on 60-day notice to allow those members not present at the meeting to comment.

Action: 60-day approval, item closed. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 97-4 **A- and B-Basis and Derived Properties for 7055-T7751 Aluminum Alloy Plate. (MTG)** D. Lahrman reviewed a handout and summarized the results of the analyses. The proposed minimum mechanical properties were accepted without comment. Since the item was a handout, the item is on 60-day notice to allow those members not present at the meeting to comment.

Action: 60-day approval, item closed. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 97-5 **A- and B-Basis and Derived Properties for 7050-T7451 Aluminum Alloy Plate, 6.001 to 8.000 inches. (MTG)** D. Lahrman indicated the SAE/AMS specification with the additional thickness ranges was sent by SAE/AMS to Aerospace Council. It is anticipated the specification will be approved by the Aerospace Council. The additional bearing data were obtained and will be reviewed.

Action: Item continued.

Item 97-6 **A- and B-Basis and Derived Properties for Clad 2424-T3 Aluminum Alloy Sheet. (MTG)** D. Lahrman indicated an initial review and analysis of the data has occurred.

Action: Item continued.

Item 97-7 **A- and B-Basis and Derived Properties for Bare 2424-T3 Aluminum Alloy Sheet. (MTG)** D. Lahrman indicated an initial review and analysis of the data has occurred.

Action: Item continued.

No Item No. **Precision Modulus Procedure. (GTG)** D. Lahrman provided a status report. Air Force Research Laboratories, Materials and Manufacturing Directorate, completed

the compression testing on specimens from the 6061-T6 aluminum alloy tube. They are preparing a report covering their results. These data will be analyzed when the data from another test facility is obtained. Additional test facilities are needed in order to proceed with an ASTM specification.

Action: Item continued.

Item 98-5 **Identification/Clarification of the Data Sources in Table 3.1.2.3.1(a). (MTG)** R. Rice discussed this information item. No action is required.

Action: Item closed with no action required.

Item 98-2 **Design Properties for Russian Alloy 1163-T7. (MTG)** R. Rice noted that Vitaly Leibov, of the Russian Aviation Register, had planned to attend the 96th MIL-HDBK-5 coordination meeting to address this and several other items, but was unable to attend, due to a schedule conflict. R. Rice indicated that design properties for this material could be included in MIL-HDBK-5 when: (1) the issue of lower tail censoring is resolved, (2) the lack of derived property data for compression, shear and bearing data is addressed, and (3) the foreign specification issue is resolved (see Item 95-27 in the Chapter 9 section of these minutes). He also noted that incorporation of the 1163 data into the new Preliminary Material Properties Handbook was still an interim option.

Action: Item continued.

Item 98-14 **A- and B-Basis Tensile Properties for 7150-T7751 Aluminum Alloy Die Forgings. (MTG)** P. Brouwer indicated the data have been collected and will be provided to Battelle for review and analysis.

Action: Item continued.

Item 98-15 **A- and B-Basis Tensile Properties for 7150-T77511 Aluminum Alloy Extrusions. (MTG)** P. Brouwer indicated the data have been collected and will be provided to Battelle for review and analysis.

Action: Item continued.

Item 98-16 **A- and B-Basis Tensile Properties for 7050-T74 Aluminum Alloy Die Forgings. (MTG)** P. Brouwer indicated the data have been collected and will be provided to Battelle for review and analysis.

Action: Item continued.

Item 98-17 **A- and B-Basis Tensile Properties for 7050-T7452 Aluminum Alloy Die Forgings. (MTG)** P. Brouwer indicated the data have been collected and will be provided to Battelle for review and analysis.

Action: Item continued.

Item 98-18 **Clad 2524-T3 Sheet and Plate Typical Stress-Strain Curves. (MTG)** D. Lahrman reviewed the handout. The Ramberg-Osgood number of 260 computed for the longitudinal grain direction was outside the typical range of 2 to 40. It was agreed the typical stress-strain curves for 2024, 2224, 2324, 2424 all in the T3 temper should be analyzed. Alcoa agreed to provide stress-strain curves for the alloys they produce. The Ramberg-Osgood numbers from these alloys will be compared to the 2524-T3 data.

Action: Item continued.

No Item No. **Proposed Revision to Stress-Corrosion Cracking Resistance Definitions in MIL-HDBK-5. (MTG)** R. Rice discussed the attachment to the agenda. It was concluded the wording included in MIL-HDBK-5 on stress-corrosion cracking ratings should coincide exactly with the wording in the current applicable standard, which is ASTM G64. To ensure the accuracy of these changes, it was agreed this item would be held open so the revised wording could be scrutinized closely by everyone in the next agenda. Approval of this item at the next meeting will still allow the incorporation of these changes into Change Notice 1 of Revision H.

Action: Item continued.

No Item No. **Further Clarification of Inferior Stress-Corrosion Cracking Resistance of Several Aluminum Alloys in MIL-HDBK-5. (MTG)** R. Rice proposed the incorporation of additional verbiage at the beginning of the sections in Chapter 3 that include design property data for 2014, 2024, and 7075 aluminum alloys. He explained the stress-corrosion cracking resistance of these alloy systems could be very low in some product forms and grain directions (i.e., SCC Rating of D). He said this item was prepared to provide another level of warning beyond the cautionary footnotes that were added to appropriate tables at the last meeting (see Item No. 98-4).

Because some people did not have time to coordinate this item with the corrosion experts in their organizations, it was agreed the item would be held open, and re-addressed as part of the 97th meeting. Approval of this item at the next meeting will still allow the incorporation of these changes into Change Notice 1 of Revision H.

Action: Item continued.

CHAPTER 4. MAGNESIUM ALLOYS

No items on the agenda for this Chapter.

MINUTES OF THE 96th MIL-HDBK-5 COORDINATION MEETING

CHAPTER 5. TITANIUM ALLOYS

No items on the agenda for this Chapter.

CHAPTER 6. HEAT RESISTANT ALLOYS

No items on the agenda for this Chapter.

CHAPTER 7. MISCELLANEOUS ALLOYS AND HYBRID MATERIALS

Item 95-35 **A- and B-Basis and Derived Properties Program for 6092/SiC/25p-T6P Particulate Extrusion. (MTG)** D. Lahrman provided a status report. He indicated that a new specification would have to be prepared for this material because the S-basis properties in the current specification, AMS 4265, are higher than the data will support. Once the AMS specification has been sent to the Aerospace Council, an agenda item will be prepared. It was agreed to withhold this item from future agendas until the SAE/AMS specification has been circulated to SAE/AMS Committee D.

Action: Item continued.

Item 95-36 **A- and B-Basis and Derived Properties Program for 6092/SiC/17.5p-T6P Particulate Reinforced Extrusion. (MTG)** D. Lahrman reported a revised draft specification would have to be prepared for this material because several technical comments were received against the first draft. All of these comments could not be adequately addressed in the SAE/AMS meeting. It was agreed to withhold this item from future agendas until the SAE/AMS specification has been circulated to SAE/AMS Committee D.

Action: Item continued.

Item 96-19 **A- and B-Basis and Derived Properties Program for 6092/SiC/17.5p-T6P Reinforced Rolled Sheet. (MTG)** D. Lahrman reviewed a handout. A summary of the T_{99} and T_{90} values computed directly and indirectly was provided. No proposal for the A- and B-basis values were made. However, the differences between the derived properties computed using the L versus LT tensile properties in the denominator of the ratios indicated little differences in the T_{99} and T_{90} values. The Handbook does not indicate what the primary test direction should be. A recommendation was made at the meeting to use the LT as the primary test direction and thus use the reduced ratios obtained with the LT tensile properties in the denominator. This is the grain direction for the heat treatable sheet and plate aluminum alloys. The SAE/AMS specification was assigned, however, the editorial consultant noticed the specification does not contain a heat treatment procedure. He will discuss the issue with the chairman of Committee D. It is hoped that a 21-day priority ballot will resolve the issue.

Action: Item continued.

MINUTES OF THE 96th MIL-HDBK-5 COORDINATION MEETING

CHAPTER 8. STRUCTURAL JOINTS

No Item No. **Fastener Industry Working Group. (FIWG)** J. Pratt, Textron Aerospace Fasteners, report the FIWG meeting was attended by 11 fastener industry representatives and consultants and 9 members of the FTG. Action items resulting from the meeting are included in the attached minutes.

Item 95-13 **Static Joint Strength of AF3222 Blind 100-Degree Flush Head Rivets in Clad 2024-T3 Sheet. (FTG)** and

Item 95-14 **Static Joint Strength of AF3223 Blind Protruding Head Rivets in Clad 2024-T3 Sheet. (FTG)** Steve Ford, Tec-Con, Inc., reported that R. Goode, Lockheed Martin Vought Systems, had agreed to finalize these items for the next meeting agenda with the help of D. Richardson, Lockheed Martin AS, and S. Ford, Tec-Con/Battelle.

Action: Item continued.

Item 95-15 **Static Joint Strength of CR3222 Blind 100-Degree Flush Head Rivets in Clad 2024-T3 Sheet. (FTG)** and

Item 95-16 **Static Joint Strength of CR3223 Blind Protruding Head Rivets in Clad 2024-T3 Sheet. (FTG)** Steve Ford reported that R. Goode had agreed to finalize these items for the next meeting agenda with the help of D. Richardson, Lockheed Martin AS, and S. Ford, Tec-Con/Battelle.

Action: Item continued.

Item 95-37 **Static Joint Strength of AHG AL905 100-Degree Flush Head 7050 Rivets in Clad 2024-T3 Sheet. (FTG)** S. Ford reported that he and S. Keener, Boeing - Phantom Works, had completed the check of data converted from metric to English units and that this item would be included in the next meeting agenda.

Action: Item continued.

Item 97-10 **Static Joint Strength of HC6224 Blind Flush Head Rivets in Clad 2024 Sheet. (FTG)** S. Ford reported that the Fastener Task Group had completed its' final review of the proposal and with the exception of adding a "hole size" footnote to the Design Allowable table, approved it as submitted. The final proposal with the modified table is attached to these minutes and will become Table 8.1.3.2.2(v) in Change Notice 1 of Revision H. The item was approved and closed on a 60-day review basis.

Action: 60-day approval, item closed. Revision to appear in MIL-HDBK-5H, Change Notice 1.

CHAPTER 9. GUIDELINES FOR THE PRESENTATION OF DATA

Item 94-26 **Production Methods and Their Impact on Design Allowables. (SWG)** J. Kinateder, Battelle, presented this item. It was emphasized that future efforts on this item should be focused on how tabled values might be changed in the Handbook. It was requested that a subcommittee be formed to address these issues. Issues raised include: (1) specification of appropriate requirements on numbers of lots and heats (not just sample sizes), (2) shouldn't focus on triggers (we are not policemen) – but rather on procedures that could be used once an investigation is initiated, and (3) what about new producers of an existing material? Members agreeing to participate included: N. Ontko, U.S. Air Force, P. Brouwer, Alcoa, J. Helm, FAA, M. Tarkanian, Boeing, and G. Lundeen, Lockheed Martin Tactical Aircraft Systems.

Action: Item continued.

Item 95-23 **Use of Probability Plots. (SWG)** J. Kinateder presented this item, which included a proposed guidelines revision. The proposed revision was voted on and approved.

Action: Item closed. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 98-1 **Clarification of Quadratic Regression Details. (SWG)** J. Kinateder presented this item, which included a proposed guidelines revision. The proposed revision was voted on and approved.

J. Goodman, Alcoa, raised a separate issue associated with choosing between linear and quadratic regression. He pointed out that if there are very few distinct dimensions represented, it might be virtually impossible to distinguish between a linear and quadratic relationship. Battelle agreed to address this issue, including discussion of the appropriateness of the current test, in a new item at the next meeting.

Action: Item closed. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 98-3 **Procedure for Analyzing Lower Tail Censoring. (SWG)** J. Kinateder presented a status report on this item.

Action: Item continued.

Item 95-25 **Investigation of the Pearson Type III Method for Computing T_{90} and T_{99} from Skewed Data. (SWG)** J. Kinateder presented this item, which included a proposed guideline revision to incorporate the sequential Pearson procedure in place of the adjusted normal procedure for calculating T_{90} and T_{99}. After agreement to fix some editorial inconsistencies (e.g., log( ) vs. ln( ) notation), the revision was voted on and approved.

D. Richardson, Lockheed Martin, raised a concern regarding Figure 9.2.6, but it was decided this concern was not directly related to the proposal. Concern was

raised about the exclusion of a normal-based procedure. It was requested that some documentation be provided in the Handbook of the risk in using the old, normal method. Battelle agreed to look back at old agenda items that may have addressed this issue.

Concerns were also raised in regards to removal of other methods based on the normal distribution (e.g., F- and t-tests).

Action: Item closed. Revision to appear in MIL-HDBK-5H, Change Notice 1.

Item 95-27 **Guidelines for the Introduction of Foreign Materials into MIL-HDBK-5. (GTG)** R. Rice presented a summary of the results of an assessment performed by Clay Harmsworth (under a subcontract with Battelle) of the Russian American Materials Advisory Team report. A copy of the viewgraphs that were presented on this issue is attached.

R. Rice offered to prepare a guideline proposal for the next meeting that would eliminate any remaining ambiguity on this issue. He indicated this proposal would state explicitly the current MIL-HDBK-5 requirement is that foreign-produced materials be covered by an AMS or ASTM material specification before properties for that material are included in the Handbook. This restricted definition has been necessitated by the inability of the MIL-HDBK-5 coordination committee to agree upon a definition of what comprises an "equivalent" foreign standard.

Action: Item continued.

Item 96-12 **Preliminary Design Handbook Concept. (GTG)** R. Rice indicated that no progress had been made on this item since the last meeting. He asked the Airframer Steering Group to provide a list of materials not currently included in MIL-HDBK-5 that would be of interest to include in the first issue of the Preliminary Material Properties Handbook.

Action: Item continued.

Item 98-7 **Complete Restructuring of Chapter 9 Guidelines to Improve Usability. (GTG)** R. Rice indicated that a draft reconstruction of Chapter 9 (based on the outline presented at the 95th coordination meeting) was nearly complete. He indicated this draft would be provided to the group of volunteer reviewers by approximately December 1, 1998. He said it was his plan to have a second draft ready for another round of reviews prior to the 97th coordination meeting, so a final draft could be prepared and distributed prior to the 98th meeting. The long-range goal is to have the rewrite of Chapter 9 in final form by no later than the 99th meeting so it can be approved in time to include it in Change Notice 2 of Revision H.

Action: Item continued.

No Item No. **Recommendation for Revision of Fastener Guidelines. (FIWG)** S. Ford reported the final version of the fastener guidelines will not be prepared until the

statistical analysis methods for fastener data can be included. However, as noted in the FIWG meeting, Steve Ford will continue to work on other sections of the fastener guidelines.

Action: Item continued.

No Item No. **Revised Analytical Techniques for Analysis of Fastened Joints. (FIWG)** S. Ford reported several proposed approaches have been provided to T. Kilinski, Battelle. Both R. Rice and the Chairman indicated considerable effort would be applied in this area during the next work period to prepare a guideline proposal for the next meeting.

Action: Item continued.

Item 98-25 **Clarification of Computation for Sequential Weibull Threshold. (SWG)** J. Kinateder presented this item, which included a proposed guideline revision. The proposed revision was voted on and approved.

Action: Item closed. Revision to appear in MIL-HDBK-5H, Change Notice 1.

No Item No. **Testing Issues of Importance in Generating MIL-HDBK-5 Bearing, Compression, Shear, and Precision Modulus Data. (MTG)** R. Rice reviewed this informational item. He suggested that anyone with concerns about any of the ASTM standard test methods cited in MIL-HDBK-5 should contact the appropriate ASTM Subcommittee and, if possible, get involved with that Subcommittee to update and/or revise the applicable testing standard.

Action: Item closed.