

MMPDS

1st Coordination Meeting

MIL-HDBK-5

101st Coordination Meeting



April 22-25, 2002

FAA William J. Hughes Technical Center
Atlantic City, NJ

Schedule of Meetings

Monday, 22 April

9:30am - 12:00pm	Industry Steering Group (ISG members only)
1:15pm - 4:30pm	Industry Steering Group (open meeting, all welcome)
3:15pm - 4:30pm	Government Steering Group (GSG members only)
4:30pm - 6:00pm	Joint Industry/Government Steering Groups

Tuesday, 23 April

9:50am - 11:30am	Tour of William J. Hughes FAA Technical Center (will start at front gate)
1:15pm - 3:00pm	Statistics Working Group
3:15pm - 5:00pm	Guidelines Task Group

Wednesday, 24 April

8:30am - 10:00am	Joint Fastener Industry Working Group and Fastener Task Group (note distinct AM and PM open meeting times)
3:15pm - 4:30pm	
8:30am - 12:00pm	Materials Task Group
1:15pm - 4:30pm	
10:15am - 12:00pm	Fastener Task Group (FTG members only)
1:15pm - 3:00pm	
10:15am - 12:00pm	Fastener Industry Working Group (breakout meeting, separate from FTG)
1:15pm - 3:00pm	

Thursday, 5 April

8:30am - 12:00pm	MIL-HDBK-5 General Coordination Group Meeting
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**101st MIL-HDBK-5 and 1st MMPDS COORDINATION
MEETING**

DATE: April 25, 2001
PLACE: Atlantic City, NJ
TIME: 8:30 a.m.

- I. Introduction of Attendees
- II. Chairman's Remarks
- III. Approval of 100th Meeting Minutes
- IV. General Discussion Items
 - A. ISG Status Report
- V. Chapter 1 General Items and Special Presentations
- VI. Summary Review of MIL-HDBK-5 Agenda Items
- VII. MIL-HDBK-5 Wrap Up Discussions
 - A. Selection of Next Meeting Location & Time
 - B. Closing Comments

**Agenda
for
1st MMPDS and 101st MIL-HDBK-5 Coordination Meetings
in
Atlantic City, NJ
April 23-25, 2002**

Note: For the sake of simplicity the traditional terminology of MIL-HDBK-5 or MIL-5 is maintained throughout this agenda. However, unless otherwise noted, actions taken on these agenda items will also apply to the new MMPDS Handbook, which will be issued by the FAA in early 2003.

CHAPTER 1. GENERAL

- No Item No. **AMS Coordination. (GCC)** J. Jackson, Battelle, will provide a handout on relevant AMS material specifications that were approved or initiated between the 100th and 101st coordination meetings. Three AMS meetings will have been held during this 13-month time period. The first meeting was held in Savannah, GA the week of April 23rd 2001. The second meeting was held in Colorado Springs, CO the week of October 8th, 2001. The third meeting will be held in Savannah, GA the week of April 8th 2002.
- No Item No. **Meetings of Potential Interest to MIL-HDBK-5 Coordination Members. (GCC)** R. Rice, Battelle, will review the enclosed list of meetings. Note that the current list contains relevant technical society websites.
- No Item No. **Cancellation of Government Specifications and Subsequent Replacement Specifications. (GCC)** J. Jackson will review a handout on the most recent information available from SAE/AMS. She will also review the recent specification actions of the AIA Early Warning Group.
- No Item No. **Collection of Additional Fatigue, Fatigue Crack Growth, and Fracture Toughness Data. (GCC)** R. Rice will propose closure of this item without further action. This item has been kept open for the past few years to highlight continuing interest within the MIL-HDBK-5 coordination group to expand statistically-based coverage of fatigue, fatigue crack growth and fracture toughness behavior of materials in MIL-HDBK-5. However, the current scope of work for MIL-HDBK-5 coordination does not support substantial activity in this area.
- Battelle will continue to collect fatigue, crack growth and fracture toughness data on materials of interest to the MIL-HDBK-5 coordination group, and include those data with other static property data proposals, where this can be done with very limited effort. However, analyses of other, more substantial fatigue, crack growth and fracture toughness databases will be put on hold for future consideration.
- No Item No. **Special Presentation. (GCC)** C. Smith, FAA William J. Hughes Technical Center, will give a special presentation on the FAA aging aircraft research program. An abstract of the presentation, which will be given immediately following opening remarks on Thursday morning, April 25th, is included as an attachment.

- No Item No. **Special Presentation. (GCC)** R. Eastin, FAA, Chief Scientific/Technical Advisor Fracture Mechanics, will give a special presentation on proposed changes to FAA Regulations, 14 CFR Part 25, Revised Requirement for Material Strength Properties and Design Values for Transport Airplanes and Notice of Proposed Advisory Circular (AC) 25.613-1X; Proposed Rule and Notice.
- No Item No. **Special Presentation. (GCC)** J.R. Wood, Allvac, will give a special presentation on EB Melting of Ti-6Al-4V. An abstract of the talk, which will be given at approximately 10:15am on Thursday, April 25th, is included as an attachment.
- No Item No. **Government Steering Group. (GSG)** S. Thompson, AFRL/MLSC, will provide a brief GSG status report at the General Coordination Committee (GCC) meeting on Thursday morning. A closed meeting of the GSG will be held on Monday, April 22nd, beginning at 3:15pm.
- No Item No. **Airframer Steering Group. (ASG)** J.T. Amin, Lockheed, will provide a brief status report on ASG activities and concerns at the General Coordination Committee (GCC) meeting on Thursday morning. However, a formal ASG meeting is not currently scheduled for Monday.
- No Item No. **Industrial Steering Group. (GCC)** R. Rice will give a brief status report at the GCC meeting on current ISG-supported technical activities.
- The 9th ISG meeting will be held on Monday, April 22nd. The morning session, which will begin at 9:30am, will be limited to representatives of ISG 2002 member companies. However, the afternoon session, which is scheduled to begin at 1:15pm, will be open to other Handbook coordination-meeting attendees. The initial focus of the afternoon session will be on a review of work accomplished on continued ISG items since the 8th ISG meeting in October 2001. This review will include demonstrations of recent ISG software, database and website enhancements. The second part of the ISG afternoon session will focus on 3 technical items listed in the attached ISG meeting agenda and on recommendations for new ISG ballot items from the current ISG membership. The joint session of the ISG and GSG is scheduled to begin at 4:30pm.
- No Item No. **Guidelines Task Group. (GTG)** R. Rice will lead discussion of current Chapter 9 items in the Guidelines Task Group meeting, which will take place on Tuesday, April 23rd. A copy of the GTG meeting agenda is attached.
- No Item No. **Materials Task Group. (MTG)** J. Jackson will lead discussion of the new and continued materials items for Chapters 2 through 7 in the Materials Task Group meeting, which will be held on Wednesday, April 24th. A copy of the MTG meeting agenda is attached.
- No Item No. **Electronic Submission of Aircraft Material Certification Data. (MTG)** J. Pillers, Boeing, requested the addition of this discussion item to the MTG agenda. R. Rice will review the enclosed brief informational item and coordinate

subsequent technical discussions. A discussion of this topic will also take place during the Monday afternoon session of the ISG (see attached ISG agenda).

- No Item No. **Statistics Working Group. (SWG)** H. Tsai, Battelle, will lead discussion of new and continued statistics items at the Statistics Working Group meeting, which will be held on Tuesday, April 23rd. A copy of the SWG meeting agenda is attached.
- No Item No. **Commonly Used Formulas. (GTG)** R. Rice will review this enclosed, brief agenda item, which covers the proposed insertion of the Ramberg-Osgood equation in Section 1.3 of the Handbook. This change was requested by Pilatus Aircraft Co.

CHAPTER 2. STEEL ALLOYS

- Item 01-07 **Fracture Toughness Properties of AerMet 100. (MTG)** J. Jackson will present the enclosed item. J.T. Amin, Lockheed, requested this new item to cover the addition of plane strain fracture toughness data on AerMet 100 into MIL-HDBK-5.
- Item 02-01 **Design Properties for Custom 465 in the H950 & H1000 Conditions (MTG).** J. Jackson will present the enclosed data proposal for this new steel alloy. S-basis properties are proposed at this time, to be followed by proposed A- and B-basis properties after data from the required minimum number of heats has been added to the database.

CHAPTER 3. ALUMINUM ALLOYS

- Item 95-28 **Review of the Fracture Toughness Tables in Chapter 3. (MTG)** R. Rice will propose closure of this item without further action, since the current scope of work for MIL-HDBK-5 coordination does not support substantial activity in this area. Battelle will continue to collect plane strain fracture toughness data for inclusion in Table 3.1.2.1.6 of MIL-HDBK-5 in conjunction with other static property data proposals, where this can be done with very limited effort.
- Item 98-2 **Design Properties for Russian Alloy 1163-T7 (2224A-T351). (MTG)** J. Jackson will present a status report. If no progress is anticipated in the next 6 months on the development of an AMS specification for this material a recommendation will be made to close this item with no further action. If Item 98-2 is closed without further action a new item will not be assigned to cover inclusion of design properties on this alloy in MIL-5 until the AMS specification is finalized.
- Item 00-5 **Review of Converted Effect of Temperature Curves in MIL-HDBK-5. (MTG)** R. Rice will briefly review the work that was done on this “house-keeping” item before Change Notice 1 of MIL-HDBK-5H was published. Assuming no other concerns are identified with effect of temperature curves that were digitized for electronic publication in Revision H or CN1 this item will be closed with no further action.
- Item 00-6 **A and B-Basis Properties for 2297-T87 Plate. (MTG)** J. Jackson will review the enclosed agenda item. The AMS specification was not approved soon enough to

include this alloy in Change Notice 1. Now that the AMS specification (AMS 4330) is finalized, review and approval of this updated data proposal can proceed.

- Item 00-9 **Including EXCO Ratings in MIL-HDBK-5. (MTG)** R. Rice will review a handout on this item. Committee members who volunteered information and data for this item were J. Yudin, Universal Alloy, A. Walker, SCI, and P. Brouwer, Alcoa.
- Item 00-10 **Reference for Weldability of Aluminum in Section 3.1.3.4. (MTG)** J. Jackson will review this brief agenda item.
- Item 01-08 **Update Test Methods for Plane-Stress Fracture Toughness Data. (MTG)** R. Rice will present a handout on recommended new guidelines for the collection, analysis and presentation of plane-stress fracture toughness data in MIL-HDBK-5.
- Item 01-09 **Derived Properties for 2297-T87. (MTG)** J. Jackson will review this additional item on 2297-T87, which focuses on the collection and analysis of derived property data.
- Item 01-11 **A- and B-Basis Properties for 7250-T7451 Aluminum Alloy Plate. (MTG)** J. Jackson will present the enclosed data proposal. She will also review the status of the new AMS specification.
- Item 01-12 **S-Basis Properties for 2026-T3511 Aluminum Alloy Extrusions. (MTG)** J. Jackson will briefly review this agenda item. At the 100th coordination meeting it was agreed to publish S-basis properties on this material in CN1 if the specification was finalized with no change by ASC by 4/24/01. Since this deadline was not met, the item was continued.
- Item 01-15 **S-Basis Properties for 7055-T76511 Aluminum Extrusions (MTG).** J. Jackson will present the enclosed data proposal. She will also review the status of the new AMS specification.
- Item 01-16 **A- and B-Basis Tensile Properties for 7249-T76511 Aluminum Alloy Wide Extrusions. (MTG)** J. Jackson will review the enclosed agenda item. Design allowables were proposed on this material at the 100th coordination meeting, but it was not possible to include them in Change Notice 1, because the AMS specification was not yet finalized. The results of recent data analyses and the status of the AMS specification will be reviewed.
- Item 02-02 **Reduced Beryllium Replacement for D357-T6. (MTG)** J. Jackson will present the enclosed brief data proposal.
- Item 02-03 **Reduced Beryllium Replacement for A357-T6. (MTG)** J. Jackson will present the enclosed brief data proposal.
- Item 02-04 **A- and B-Basis for 2026-T3511 Aluminum Alloy Extrusions. (MTG)** J. Jackson will present the enclosed data proposal.

- Item 02-05 **T₉₉ Values for 7075-T73 & T7352 Die Forgings (MTG).** J. Jackson will review this brief, enclosed agenda item.
- Item 02-06 **Effect of Exposure at Elevated Temperature Curves (MTG).** J. Jackson will review the enclosed item, which was created to prevent the possible misinterpretation of exposure data presented in Figures 3.2.3.3.1 (c) and (d); 3.2.3.4.1 (c) and (d); 3.2.3.4.5 (a) and (b); 3.3.4.5 (a) and (b); and 3.2.3.5.5 (a) and (b).
- Item 02-07 **Correlative Information Correction for Figure 3.7.8.1.8(c), 7175-T73511 Extrusion (MTG).** R. Rice will present this brief editorial item. It will be presented as an information item only, since the corrected equivalent stress equation was already published in Change Notice 1 of MIL-HDBK-5H.
- Item 02-10 **Design Minimum Properties for 7055-T74511 Extrusions. (MTG)** J. Jackson will present the enclosed data proposal on this new item. A draft AMS specification has been prepared and sent to SAE/AMS.
- Item 02-14 **Design Minimum Properties for 7150-T77511 Extruded Wide Panels (MTG).** J. Jackson will present the enclosed data proposal on this new item. A draft AMS specification is being balloted at SAE/AMS.
- No Item No. **A- and B-Basis Properties for 7050-T7651 Aluminum, 1.0 – 1.5 Inch Thick Plate (MTG).** R. Rice will present a handout of the results of the reanalysis of strength data on this alloy using the recently accepted Pearson method.
- No Item No. **Stress Corrosion Threshold Values in MIL-HDBK-5. (MTG)** R. Rice will present a handout on this item. The goal, which was first proposed by T. Khaled, FAA, is to develop guidelines for the inclusion of quantitative data on stress corrosion cracking (in terms of stress and time) in MIL-HDBK-5. Ultimately, it is hoped that these quantitative data will replace the current letter ratings.

CHAPTER 4. MAGNESIUM ALLOYS

No open items for review.

CHAPTER 5. TITANIUM ALLOYS

- Item 99-11 **A- and B-Basis Design Mechanical Properties for Ti-6-4 Castings. (MTG)** J. Jackson will review the enclosed agenda item.
- Item 02-08 **Mechanical Properties for Ti-6.5Al-3V-2Fe-2Mo Titanium Alloy Bar (MTG).** J. Jackson will review the enclosed agenda item.
- Item 02-09 **Derived Properties for Ti-6.5Al-3V-2Fe-2Mo Titanium Alloy Sheet (MTG).** J. Jackson will review the enclosed agenda item.

- Item 02-15 **A- and B-Basis Design Minimums for Ti-6Al-4V Plate (MTG).** J. Jackson will review the enclosed agenda item.

CHAPTER 6. HEAT RESISTANT ALLOYS

- Item 01-14 **A- and B-Basis Properties for HAYNES® HR-120® Alloy Sheet, Strip, and Plate. (MTG)** J. Jackson will provide a status report on this item, which was approved at the last meeting pending approval of the AMS specification. The newly released specification on this alloy is AMS 5916.
- No Item No. **Consideration of Inconel 617 Sheet for Inclusion in MIL-HDBK-5 (MTG).** R. Rice will summarize the results of an informal survey of interest in putting this material in MIL-HDBK-5. Fatigue, fracture toughness, compression, shear and bearing data are already available in the MIL-HDBK-5 files. If there is interest in putting this material in MIL-HDBK-5 a tensile property database will need to be accumulated.
- No Item No. **Addition of Stress-Strain Curves for Haynes 230 Plate. (MTG)** R. Rice will review this brief agenda item.

CHAPTER 7. MISCELLANEOUS ALLOYS AND HYBRID MATERIALS

- Item 02-11 **Full Range Stress Strain Curves for 2024-T3/Aramid Fiber Laminate. (MTG)** R. Rice will present this informational item. No action will be necessary since the correction to Figures 7.5.1.1.6 (i)-(l) was included in Change Notice 1.
- No Item No. **Recent Design Allowables Development Efforts on 6092 Metal Matrix Composites. (MTG)** M. van den Bergh, DWA Aluminum Composites, to give a status report.

CHAPTER 8. STRUCTURAL JOINTS

- Item 99-13 **Addition of Brazing Strength Design Factors. (FTG)** R. Yano, Battelle, will present a status report on this item.
- Item 01-17 **Addition of Section 8.1.1.2 Data Sources. (FTG)** N. Ontko, AFRL/MLSC, will present a status report on this new item. The item was opened at the 100th coordination meeting at the request of S. Ford, TecCon, Inc. He requested the new agenda item to address proposed new wording for Section 8.1.1.2, which is shown in bold below.

“The data shown in subsequent tables are provided by one or more manufacturers as listed in the table. There may be more than one producer of a fastener type, but data support is provided by only the footnoted source. **Caution should be exercised to ensure that use**

of static joint strength data is applicable only for the data producer indicated by the footnote on each table.”

No Item No. **Fastener Task Group. (FTG)** As the acting chair of the Fastener Task Group, N. Ontko will lead discussions at the Fastener Task Group meeting, which will be held on Wednesday, April 24th. Several individuals have left the FTG in the past two years, due either to retirement or a job change. Representatives of airframe manufacturers who have expertise in aircraft fasteners and have an interest in serving on the FTG should contact N. Ontko at AFRL or R. Rice at Battelle.

Interested parties should note that a portion of the FTG meeting will be restricted to members only. Please check the final posted schedule for exact times of the closed and open portions of the FTG meeting.

No Item No. **Fastener Industry Working Group. (FIWG)** The Fastener Industry Working Group will meet with the Fastener Task Group at the beginning of the day on Wednesday morning, April 24th. During this joint FIWG/FTG session, the primary focus of discussion will be on the proposed new analytical methods for developing fastener design allowables.

Later in the day, the first two topics of discussion within the FIWG-only portion of the meeting be on 1) selection/confirmation of new FIWG leadership and 2) identification of new FIWG initiatives. Fastener industry representatives who would like to participate in the FIWG should contact N. Ontko at AFRL or R. Rice at Battelle prior to the meeting. These same individuals should be contacted if fastener industry representatives would like to recommend a new fastener system for FTG review and eventual inclusion in MIL-HDBK-5.

Item 02-12 **Update of Fastener Index and Editorial Correction of Fastener Summary Tables. (FTG)** R Yano will review the enclosed agenda item.

Item 02-13 **Correction to Yield Strength Value in Table 8.1.3.2.1(f) Covering Design Allowables for MS20601AD Rivets. (FTG)** R Yano will review the enclosed brief agenda item.

No Item No. **Reconsideration of Item 97-9. Static Joint Strength of HC3214 Blind Flush Head Rivets in Clad 2024 Sheet. (FTG)** R. Yano will lead the discussion on this previously approved item, the fastener table from which was inadvertently omitted from Change Notice 1 of Revision H. The approved table was included on page 200 of the 95th meeting minutes.

CHAPTER 9. GUIDELINES FOR THE PRESENTATION OF DATA

Item 94-26 **Production Methods and Their Impact on Design Allowables. (GTG)** R. Rice will lead discussion on this long-standing agenda item. When this item was initiated 8 years ago the initial discussion was primarily statistical in nature, so the item was assigned to the Statistics Working Group. All of the key statistical issues on this topic have been resolved, as documented in prior meeting minutes under

this item, but other practical engineering issues remain, so responsibility for the item has been transferred to the Guidelines Task Group (GTG). The primary engineering issues that will be discussed under Item 94-26 at the upcoming GTG meeting are:

- When should the statistical procedure (for testing whether a production change has reduced a material's design allowables) be applied, and what should trigger the evaluation?
- How should be statistical results be interpreted? For example, should a statistically inconclusive, but seemingly negative result, lead to a request for more data?
- Should checks on the effects of processing changes be applied to mechanical properties other than static strength (fatigue, fracture toughness, corrosion resistance, etc.)?

To aid the discussion R. Rice will review the past history on this item as summarized in the enclosed agenda item. A handout will also be provided that outlines several alternative approaches for resolution of the key remaining engineering issues.

Item 98-3 **Procedure for Analyzing Lower Tail Censoring. (SWG)** H. Tsai will present a handout describing the latest status of this item.

Item 98-7 **Complete Restructuring of Chapter 9 Guidelines to Improve Usability. (GTG)** R. Rice will review the enclosed agenda item, which outlines the proposed new structure for Chapter 9 and relates it back to the current chapter organization. The complete draft of the restructured guidelines was distributed to the following volunteer reviewers in February:

- J.T. Amin, Lockheed
- S. Fantle, Boeing
- R. Goode, Huck
- S. Thompson, AFRL
- J. Bakuckas, FAA

The near-term goal with this item is to obtain coordination group approval of the restructured Chapter 9 guidelines at the Fall 2002 coordination meeting. This will allow incorporation of the new guidelines into MIL-HDBK-5J and the first edition of the MMPDS, which will be published in early 2003 by the DoD and FAA, respectively.

Item 99-27 **Revised Analytical Techniques for Analysis of Fastened Joints. (FIWG)** R. Yano, Battelle, will review a handout covering the status of the proposed new statistical procedure for analyzing fastened joints.

Item 00-13 **Rewrite of Section 9.4 Properties of Joints and Structures. (FTG)** R. Yano will present a status report on this item. This item is closely linked with Items 98-07 and 99-27, because the revised version of Section 9.4, must be incorporated into the restructured Handbook guidelines, and include the revised analytical technique for analyzing fastened joints.

- Item 01-01 **Regression for Skewed Data. (SWG)** H.C. Tsai will present the enclosed agenda item. This item includes the basic elements of a proposed procedure for statistically analyzing skewed data. It also details the plans for refining, validating and implementing the new procedure.
- Item 01-02 **Proposal to Change Backoff Limit to Percentage of Standard Deviation in the Sequential Weibull and Sequential Pearson Procedures. (SWG)** H.C. Tsai will review the enclosed brief agenda item.
- Item 01-04 **Reevaluation of Statistical Procedures for Calculations of S-Basis Design Values. (SWG)** R. Rice and H.C. Tsai will review a handout on this new agenda item. This item was created to address the limitations of the normal analysis procedures currently used by SAE/AMS to compute S-basis design values. The handout will include a draft of a procedure that the MIL-HDBK-5 coordination group will work to have adopted by AMS. P. Brouwer and J. Jackson agreed to work together on gaining AMS approval of the new procedure. After AMS adopts a new procedure, it will be used to propose an update to Section 9.1.6.8 of MIL-HDBK-5 (see Item 01-05).
- Item 01-05 **Revise Section 9.1.6.8 in Coordination with SAE/AMS. (GTG)** J. Jackson will provide a status report on this new item, which will cover the modification of Section 9.1.6.8 of MIL-HDBK-5, "Guideline Requirements for Specification Minimum Design Mechanical Properties". Development of the proposed new procedure will be done under Item 01-04 in close coordination with the SAE/AMS committee. A formal proposal for revision of Section 9.1.6.8 of the Handbook will await approval of the Item 01-04 statistical procedures by the SAE/AMS committee.
- Item 01-06 **Historical Review of MIL-HDBK-5 Round-off Procedures. (GTG)** J. Jackson will lead the discussion on this item. A. Walker, SCI, will give a brief report on related AMS conversion procedures from English to metric units. P. Brower, Alcoa, and J. Yudin, Universal Alloy, will report on relevant Aluminum Association information that they have collected.
- No Item No. **Testing Direction for Die Forging (MTG).** – R. Rice will present the enclosed agenda item.
- No Item No. **Define Lower Bound Properties for Elongation (SWG)** – R. Rice will review a handout on this item, which was requested by J. Goodman, Alcoa. He noted that it was difficult to calculate realistic design minimum values for elongation using the current ISG software (which was designed to conform with current Handbook guidelines).

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