

FINAL REPORT

ATSRAC HWG TASK 7

**ELECTRICAL STANDARD WIRE PRACTICES
MANUAL (ESWPM)**

**Prepared by Co-Chairmen Tony Poole & Don Andersen on behalf of
the members of Harmonization Working Group 7**

Issue	Reason	By Whom	Date
A	Initial Draft Issue	TP	17 th March 2002
B	Editing/addition of appendices	DK	19 th March 2002
C	Addition (Splice coverage)	SC	2 nd April 2002
D	Addition of Notes re: general consensus	TP	9 th April 2002
E	Final re: General Consensus	TP	15 th April 2002
F	Incorporation of membership comments from September HWG7 meeting	DA	7 October 2002
G	Incorporation of ATSRAC recommendations and editorial comments	DA	28 October 2002
H	Incorporation of clarifications from HWG7 member	DA	31 October 2002

Final Report

Task 7, Electrical Standard Wire Practices Manual (ESWPM)

1) - Introduction

This report contains the tasking statements, operating procedures, conclusions, and final recommendations of Harmonization Working Group Number 7 operating under charter of the Aging Transport Systems Rulemaking Advisory Committee.

Under the current Air Transport Association (ATA) Specification i2200, the original airframe manufacturers (OAMs) are expected to provide a compilation of practices used to repair and maintain the aircraft, engine, and component aircraft-related wiring as Chapter 20 of the Wiring Manual. That compilation is to be entitled Standard Wiring Practices. ATA i2200 Paragraph 2.7 indicates that the Standard Wiring Practices can be provided as:

- a. part of the customized Wiring Manual, or
- b. a separate customized Standard Wiring Practices Manual (with applicable WM FM except service bulletin list), or
- c. a separate model-independent Standard Wiring Practices Manual (with applicable WM FM except service bulletin list).

These current specifications, however, do not specify the minimum content or a standard arrangement of that material.

Therefore, because there is presently such a variety of document configurations and titles, this report will use the term "Electrical Standard Wire Practices Manual (ESWPM)" that will also cover and be applicable to the cases where OAMs include the coverage of electrical standard practices as Subject 20 of the wiring diagram manual.

The co-chairs would also like to express their thanks to those members representing the operators, the manufacturers and the FAA whose expertise has been instrumental to the working of the group.

2) - Background

Task 3.G of the FAA's *Aging Transport Non-Structural Systems Plan* recommended that each airline/operator should work with the OAM, ATA and vendors to revise and create a practical, user friendly "standard practices" chapter of the aircraft maintenance manual. Operators should be encouraged to create specialized training curriculums to address conventional and peculiar types of aircraft wiring techniques and practices. It also recommended that operators should be encouraged to create and publish supplements to chapter 20 to incorporate any "standard repairs" devised by company engineering and necessary due to deterioration peculiar to the operator's environment.

The Terms of Reference given to the Task 4 Working Group by ATSRAC, Phase I meant to address the FAA's recommendations also required the group to consider the "simplification" of Wiring Diagram Manuals (WDM) Chapter 20. It appeared that a "simplified" Chapter 20 ESWPM manual created by the end-users was not recommended for several reasons:

- It would result in different standards from one end-user to another,
- Due to the lack of source data, it would not be practical for the end-users to do this, and
- The end-user would need the details for inspection, maintenance and repair that are currently in the manufacturer's ESWPM.

However the Task 4 working group made the following recommendations following accomplishment of their Terms of Reference:

- OAMs should provide standard practices for maintenance of wire and cable with a defined minimum content of subjects
- Add requirements in ATA Specification 100 (now i2200) for standard practices for wiring systems. ATA is to define the structure for standard practices for inclusion in ATA Specification 100.

It is the aim of the Task 7 Harmonization Working Group (HWG7) to carry out and implement the previous ATSRAC recommendations that cover the ESWPM. The result of which will provide the methods to enhance the usage of the ESWPM.

3) – Discussion Resume Concerning Each Task

ATSRAC accepted several additional tasks in Phase II, five of which concerned the continuation of work proposed by the Task 4 Working Group concerning the development of recommended minimum content and standard format for documents providing standard wiring practices. Each subtask assigned the HWG7 is provided below verbatim and is immediately followed by the results of our review.

TASK 7.1: Establish a Harmonization Working Group (HWG)

Through this tasking, the FAA intends to implement the ATSRAC Task Group 4 recommendations for a revised ESWPM. The result of this tasking will be a recommendation from ATSRAC for a standardized ESWPM. The FAA will use this recommendation to develop an AC that identifies the standardized structure of major sections for standard practices dealing with wire, cable, and other wiring components. Therefore, ATSRAC is tasked to establish an Electrical Standard Wire Practices Manual (ESWPM) HWG. This HWG should consist of, as a minimum, representatives from:

- *the Air Transport Association (ATA)*
- *operators*
- *aircraft and component manufacturers*
- *regulatory authorities*

HWG7 was established and convened at the first meeting held in Seattle on the 24th July 2001.

The tasking statement required the group to consist of, as a minimum, representatives from:

- the Air Transport Association (ATA),
- operators,
- aircraft and component manufacturers, and
- regulatory authorities.

The selected members of the group comprised of representatives from regulatory authorities, aircraft manufacturers, and operators. The members of the group are:

<u>Task 7 HWG Membership</u>		<u>Co-Chairs: Anthony (Tony) Poole</u> Airbus (33) 561934921 <u>Tracey Johnson</u> Boeing <u>Replaced by Don Andersen</u> Boeing (206) 544-4087	
<u>Name</u>	<u>Organization</u>	<u>Name</u>	<u>Organization</u>
Brett Portwood	FAA	Dennis Lee	Air Canada
Dominique Mazzarino	Airbus	Chris Nichols	AirTran Airways
Phillippe Renhas		Robert (Bob) W. Sitz	Delta Air Lines Inc
Morris Frimer	Boeing	Robert (Bob) L. Barnett	Airborne Express
Dave Padilla		Greg Smith	United
Ramiro T. Esparza II	Boeing (Long Beach)	Scott Christian	SR Technics Ltd.
Ross Lloyd		Lukas Zuelling	NBAA
	Boeing	Elias "Eli" Cotti	Embraer
	Australia Ltd	Percy Constanti	

ATSRAC anticipated that the group’s activities would require the assistance of an ATA representative and this was reflected in the tasking statement. An ATA representative would have been able to provide valuable inputs to the work of the group and, secondly, be able to directly communicate the results of the working group to the relevant ATA Technical Information Coordination Committee. The participation of the ATA may have helped to resolve and shorten the relevant ATA committee decision-making process. Although a direct ATA representative did not participate in the HWG7, Bob Sitz of Delta represented both the ATA and the airlines in his participation on the team.

As a direct result of the tragic events of the 11th of September 2001, it was difficult for the operator representatives of the group to participate at some meeting locations. As the intent of the task is geared towards a better handling of the ESWPM by the “end-users” i.e. mainly the operators, this affected the required outputs of the group by limiting the discussions and debate at one crucial meeting to only those of the OAMs. Nevertheless, the OAMs were able to review HWG7 correspondence, and provided feedback on the HWG7 work outcome & progress. During the period of this HWG7, US co- chair Tracey Johnson (Boeing) resigned and was replaced by Don Andersen (Boeing) this change being documented in the ATSRAC meeting minutes of January 23-24, 2002. The group would like to take this opportunity to thank Ms Johnson for her dedication to the work of HWG7 during her period as co-chair.

Five meetings were held by HWG7. They were:

<u>HWG7 Meeting Schedule</u>	<u>Date</u>	<u>Location</u>
Meetings:	July 24, 2001 (Planning)	Seattle WA Boeing
	October 3 – 4, 2001	Toulouse, France Airbus
	December 11-13, 2001	Seattle, WA Boeing
	March 6-7, 2002	Washington, D.C. NEMA
	September 19, 20, 2002	San Francisco, CA

TASK 7.2: Coordination with other ATSRAC HWGs

In developing the report for ESWPM format, the ESWPM HWG must coordinate with:

- *the Wire System Certification HWG (addressing TASK 6)*
- *the Enhanced Maintenance Practices for Systems HWG (addressing TASK 9)*

Therefore, ATSRAC is tasked to develop a process for coordination between these working groups.

The HWG7 initially identified the following persons to coordinate with HWG6, HWG8 and HWG9 on a working level.

- Task 6 Dennis Lee, Christian Garros (Airbus alternate)
- Task 8 Ross Lloyd, Scott Christian
- Task 9 Bob Barnett

Subsequently, to ease the coordination process, ATSRAC created an integration team to address this subtask within each of the major tasking statements. The team is comprised of the following primary and backup individuals:

- HWG 6 - Vid Variakojs/Jack Evans
- HWG 7 - Tracey Johnson/Don Andersen
- HWG 8 - Paul Lapwood/Spencer Bennett
- HWG 9 - Randy Boren/Gil Palafox
- Leader - Mike Nancarrow

This integration team process was accepted by ATSRAC in July 2001.

The purpose of the integration team is to coordinate all activities and issues associated with Tasking Statements 6 through 9 in behalf of ATSRAC. The objectives of this function are to:

- Help achieve successful program completion by August 2002
- Provide ongoing program visibility to ATSRAC members
- Identify issues and solve problems with each working group before ATSRAC meetings
- Ensure all action items are properly addressed before ATSRAC meetings
- Be ready - provide all necessary data to ATSRAC members that will facilitate decision making

The integration team holds weekly teleconferences whereby inter-working group issues are addressed and information is exchanged. A periodic status report is provided to the ATSRAC membership via the integration team leader.

TASK 7.3: Define a Standard Format

ATSRAC is tasked with defining a standard format for the ESWPM that meets the following characteristics:

- *The ESWPM format and organization must provide operators of different aircraft types from different manufacturers the ability to retrieve standard wiring repair and maintenance information from the maintenance manual or wiring diagram manual.*
- *The information and data format must be useable and readily retrievable by field level technicians who are performing the maintenance and repairs.*
- *Human factor considerations must be taken into account when defining the structure of the manual, so that the potential for human error will be minimized in interpreting wiring practices information.*
- *The structure of the manual also must allow inclusion of wiring repair and maintenance information supplied by component manufacturers [e.g., line replaceable units (LRU) and other types of system equipment], such that wiring repair and maintenance information for entire wiring systems (including both aircraft wiring and system/subsystem wiring) can be readily retrievable.*
- *The structure and organization method must be developed to facilitate classification of wiring systems-related corrective action for reliability reporting.*

The discussions concerning the creation of a standard structure or format for the ESWPM resulted in the establishment of the following requirements:

- Ensure that the usability and readability of the ESWPM by field level technicians (line mechanic) working on different aircraft types from different manufacturers was improved.
- The information and data format must be useable and readily retrievable by field level technicians who are performing the maintenance and repairs.
- Ensure that the format allowed potential for ESWPM growth. The ideal format should align with the sequence of the end user's normal activity, i.e. starting with a general issue or question and then narrowing down with the specific information needed to answer the question or resolve the issue
- Ensure that consideration of any human factor concerns that may arise when using ESWPM where considered, e.g. to ensure that those users with English as a second language were considered when assigning titles to sections or groups of the ESWPM. Human factors considerations require that the manual be designed to accommodate those who use the manual as one would use a paper manual, i.e. referring to the manual TOC or the alphanumeric indexes to obtain the general location and then narrowing their search based upon the adjacent information.

The tasking statement also stipulated that the structure of the manual should include wiring repair and standard practices information supplied by component manufacturers (e.g. line replaceable units LRU and other types of system equipment etc).

The above wording of this task was considered at length and then altered by the group. The rationale for this change is that the Task 4 final report stated that “*The structure should also make provisions for use by component manufacturers*” which is interpreted differently than the Task 7.3 requirement. The HWG7 interpretation of the Task 4 phrasing is that it does not imply inclusion of vendor data in the ESWPM but, rather, that the ESWPM structure should be such that a supplier could use the standard format developed by HWG7 to structure their own electrical standard practices documentation.

That is, the vendor manuals supplied for workshop use when maintaining line replaceable units (LRUs) and other types of system equipment etc. should use the same basic structure/format as the ESWPM when describing electrical standard practices.

Therefore the group recommends that:

- A revision to the ATA specification (ATA 100, i2200) should be considered by the relevant ATA committees to revise the specification related to vendor component data structure/format.
- The format/structure of the wiring repair and standard practices information contained in component manufacturer’s documentation should use a specific chapter within each document using a structure/format that will conform to any ATA specification revisions that may result from the recommendations of HWG7.

To determine the best approach to use in defining a common format a complete analysis of various manufacturers’ ESWPMs was carried out. The manuals covered were:

- Boeing Puget Sound - Standard Wire Practices Manual (SWPM)
- Boeing Long Beach - Standard Wire Practices Manual (SWPM)
- Airbus - Electrical Standard Practices Manual (ESPM)
- Embraer WDM ATA 20
- Bombardier WDM ATA 20
- Dassault WDM ATA 20.

During the investigation of this task, the HWG7 had to account for three important aspects pertaining to technical publications in general and the ESWPM in particular i.e. :

- The breakdown (i.e. assignment of material)
- The numbering of the assigned material.
- The fact that, even though today the use of electronic documentation is widely used and continuing to rise, there are still a number of operators that continue to use paper documentation.

The investigation and subsequent analysis resulted in the creation of a HWG7 Working Document covering the current assignment of all topics provided within the different manufacturer’s ESWPMs that were studied. This document is contained within Appendix I.

This working document analysis revealed that, as a direct result of the lack of a precise specification provided by ATA covering the assignment of material to be included in an OAMs document, the breakdown or format of the documents differed considerably.

In fact, each OAM has established a format:

- In compliance with their own publication philosophy, while globally still complying to the spirit of the ATA specifications
- By applying their company policies covering the supply and the format of the documentation. This policy usually applies to all maintenance documentation produced and delivered by each OAM.
- By taking into account recommendations from their operators in order to improve the usability of their publications
- Using current publication software tools in use at the publication department of each OAM, including the development and introduction of new technology.

The definition of a new layout and chapter organization would therefore require each OAM to reorganize and to republish their ESWPM. Whether the OAM produces a stand alone manual (ESPM or SWPM) or provides the electrical standard practices as Chapter 20 of the wiring diagram manual, the resultant reorganization would result in a significant economic impact for the OAMs and the end users.

Therefore, it was important for HWG7 to define a solution which would take into account the consequences in term of:

- The technical publication philosophy of all considered OAMs,
- The economics of an immediate major manual overhaul,
- The disturbance caused to the end-users that have become accustomed to the current format they use.
- The possible competitive advantage which could be given to one OAM by forcing other OAMs to adopt a similar breakdown and structure as theirs. This would be detrimental to the end-user of that competitor's ESWPM forcing them to use an unfamiliar format.

The work direction of this group was therefore to define an acceptable compromise, acceptable to all OAMs, while satisfying the intent of the tasking by providing improved usability of the ESWPM for the end-user. The information and data format must be useable and readily retrievable by field level technicians who are performing the maintenance and repairs taking into account the traditional paper format ESWPM and also different OAM's electronic versions of the ESWPM. HWG7 also referred to the existing structures of the Airplane Maintenance Manual, the Wiring Diagram Manual, and the Structural Repair Manual but determined that since the ESWPM is not system oriented, development of a different format was necessary.

When using a traditional paper format ESWPM, the most efficient method of retrieving standard procedures and maintenance information from the ESWPMs is traditionally made by use of:

- the Table Of Contents (TOC) and/or
- the Indexes i.e. alpha-numerical index and/or numerical index

However, for aircraft maintenance technicians to locate and extract the pertinent and applicable data necessary to effect a satisfactory design modification or to perform a maintenance action,

locating the relevant data may be time consuming. This entry method relies heavily on the quality of the TOC and/or the Indexes.

The study of the OAM ESWPM manuals showed, for example, that the TOCs do not always provide detail and content for the subsections directly within the TOC, but at the head of each subsection. This illustrates a difference of publication philosophy between OAMs. As far as TOCs are concerned, one OAM will consider that a front TOC should be no larger than twenty pages to be used effectively, thus being possibly restrictive in the titles and limiting the search. Whereas another OAM will consider a TOC of fifty pages is acceptable, but possibly onerous to the reader-searcher.

The alpha-numerical indexes provided by some OAMs as an additional entry point have the benefit of narrowing the search criteria to the standard and/part number of the wiring component on which the reader requires information. This method is particularly efficient using a keyword search if the user has the correct information as it is this part or standard number that the reader uses to enter directly to the related information. It is therefore apparent that the entry points, TOC and alpha-numerical Indexes may fulfill their intended role if they correctly reflect the content of the ESWPM.

Because the current and future philosophy of some OAMs is to issue documentation (including the ESWPM) in an electronic format, the use of an “electronic ESWPM” that includes a search engine was considered. The use of an “electronic ESWPM” would negate the requirement for a user to rely on knowledge of the rules that cover assignment of the subject matter (ATA reference) as listed by the TOC. Instead the user would initiate an “electronic” search for required information. The success of the search is not dependent on a knowledge of the assignment of material, but more on the phrases used to initiate the search.

The opinion of the group was that, as there are users that continue to use a paper or portable document format-based ESWPM and will continue to do so for a considerable period of time, these users must be considered in the recommendations of the group. Also the recommended format should be acceptable and suitable for an ESWPM in a paper format while at the same time ensuring that the benefits of future electronic manuals are not impaired.

Accommodation

HWG7 recommends the use of a common format index identified as the Master Breakdown Index (MBI) for all existing standard wiring practices manuals. The content and arrangement of this index is contained within Appendix II (Table 1) to this report. The intent of the MBI is to supplement the TOC and existing indexes by providing to users a method of searching existing documents using topical information as well as by part number, alphabetic subject, or Chapter-Section-Subject reference. The arrangement of the MBI duplicates the basic standardized format developed by HWG7 but does not require complete rearrangement of legacy documents. The MBI acts as a conversion key used to effectively convert an existing document arrangement into the proposed arrangement. In essence the MBI duplicates in paper form for legacy documents the electronic search engine for HTML-based documents.

In order to address the human factors concern as contained in the tasking statement, HWG7 recommends that all electrical standard wiring practices documents adopt a similar format so as to facilitate the location of wiring repair and maintenance information.

However, we understand that adopting such a format/structure will be entirely voluntary on the part of the OAM. Understanding the voluntary nature of the program, and the high costs associated with a change in format (both directly associated with the ESWPM and the referencing documents) the HWG7 recommends the use of a Master Breakdown Index for existing documents that would preclude OAMs from ever having to adopt the recommended format. OAMs with documents based on paper would simply need to add an MBI to the document in place of the Table of Contents. OAMs with electronically-based documents could either adopt a similar approach or, because of the searchable nature of the electronic document, need not adopt an MBI as the structure of these electronically-based documents is transparent to the user and would at the same time address the human factors concern.

Standardized Format Recommendation

Therefore HWG7 recommends that a revision to the applicable ATA specifications (ATA 100, i2200) should be considered by the relevant ATA committees. This revision should provide the producers of electrical standard practices data with a specification that describes a standardized format covering the assignment of that data. This data may be contained in:

- The Wiring Diagram Manual (WDM), where Chapter 20 has been assigned for the purpose, or
- In a separate manual dedicated to aircraft electrical standard wiring practices

This revision to the ATA specification should provide details of a common format/structure of the wiring repair and maintenance standard practices information in accordance to the attached document contained in Appendix III . The implementation details are covered by the recommendations covered in Task 7.5 below.

Please note that Appendix III does not address aspects of documentation referred to as front matter, including but not limited to the Table of Contents, Indexes, Introduction, Manual Usage, etc. A complete definition of the ESWPM specification should include this information but was not considered by HWG7 as it is outside the scope of the technical content of the ESWPM.

TASK 7.4: Define a Standard Minimum Content

ATSRAC is tasked with defining the minimum content for the ESWPM. The minimum content will define standard categories to be included in the ESWPM. It will not define the actual procedures associated with the standard content that is pertinent to each manufacturer. The standard content will include the characteristics described below. The technical content is to use source data from ATA Spec 117 and applicable FAA Advisory Circulars, and must address the following subjects, as a minimum:

Cleaning Requirements and Methods:

“Protect, clean as you go” philosophy.

- *Non-destructive methods for cleaning dust, dirt, foreign object debris (FOD), lavatory fluid, and other contaminants produced by an aircraft environment from wiring systems*
- *Wire replacement guidelines when an accumulation of contaminants, either on the surface and/or imbedded in the wire bundle, cannot be safely removed*

Wire and Cable Identification.

- *Specify requirements for wire and cable identification and marking to provide safety of operation, safety to maintenance personnel, and ease of maintenance*

Specify methods of direct wire marking. Also, identify specific requirements and cautions associated with certain types of wire marking.

Wire and Cable Damage Limits.

Specify limits to positively identify the thresholds where damaged wire/cable replacement may be necessary and where repairs can be safely accomplished. Establish limits for each applicable wire/cable type, if necessary.

- *Include damage limits for terminals, studs, connectors, and other wiring system components, as necessary.*

Installation Clamping and Routing Requirements.

- *Specify the requirements for the installation of wiring systems with respect to physical attachment to the aircraft structure. These requirements must be compatible with the different environments applicable to aircraft and aircraft systems.*
- *Specify applicable methods of clamping, support, termination, and routing to facilitate installation, repair, and maintenance of wires, wire bundles, and cabling.*
- *Establish minimum bend radii for different types of wire and cable*
- *Specify minimum clearance between wiring and other aircraft systems and aircraft structure.*
- *Include the requirements for the installation of wiring conduit with respect to physical attachment, routing, bend radii, drain holes, and conduit end coverings.*
- *Emphasize special wiring protective features, such as spatial separation, drip loops, segregation, or shielding that are required to be maintained throughout the life of the aircraft.*

Repair and Replacement Procedures.

Describe methods to safely repair and/or replace wiring and wiring system components.

- *Include types and maximum numbers of splice repairs for wiring. When splicing wire, environmental splices are highly recommended over non-environmental splices. Guidance should be provided on how long a temporary splice may be left in the wire.*
- *Specify procedures for the repair, replacement, and maintenance of connectors, terminals, modular terminal blocks, and other wiring components.*

Inspection Methods.

In wiring inspection methods, include a general visual inspection (GVI), or a detailed inspection, as determined by the enhanced zonal analysis procedure. Typical damage includes heat damage, chafing, cracked insulation, arcing, insulation delaminating, corrosion, broken wire or terminal, loose terminals, incorrect bend radii, contamination, and deteriorated repairs

- *Identify detailed inspections and, where applicable, established and emerging new technologies non-destructive test methods to complement the visual inspection process. Whenever possible, ensure that inspection methods can detect wiring problems without compromising the integrity of the installation.*

The HWG7 agreed that a definition and description of ESWPM minimum content is necessary and should clarify which items must be included in the ESWPM giving operators and repair stations the information necessary to maintain their airplanes. HWG7 also understood and respected the manufacturer's electrical installation design philosophy concerning components, installation procedures, segregation rules, etc. and agreed that these should be included as part of the ESWPM minimum content. Inclusion of this information will enable the end-user to maintain the aircraft in a condition that conforms to the original or current manufacturer's electrical installation design philosophy.

In addition to the minimum content defined within the terms of reference, HWG7 also included as minimum ESWPM content procedures for the protection of wiring from moisture ingress as a result of the recommendations emanating from the Intrusive Inspection Working Group.

HWG7 agreed that the attached Detailed Minimum Content (Appendix IV, Table 3) covers the required minimum content as stated in the tasking statement listed above. In addition, we recommend that Table 3 be used as a reference when establishing the minimum content to be included in the MBI and ESWPM standard format. (Refer to Task 7.3 above)

TASK 7.5: Recommend Updates of Existing ESWPMs.

ATSRAC is tasked to consider and make recommendations to the FAA on whether to update ESWPMs already in use under existing airline and repair station programs. ATSRAC must provide adequate justification for their recommendations. If ATSRAC determines that existing manuals should be updated, the FAA requests that a proposed method and compliance schedule be included in the recommendation.

HWG7 recommends the use of a Master Breakdown Index (MBI) for all existing or legacy paper-based wiring practices manuals. The intent of the MBI is manifold, one of which is to provide an index whereby a technician could access the data within the legacy manual using the preferred document format. Once a MBI has been applied to all paper-based legacy documents, accessing the internal data becomes a matter of referring to the section of the MBI which collects the relevant information and then determining in which specific group of the manual the relevant information appears. Using the MBI on paper-based legacy manuals creates a common look that precludes the need to revise the entire contents of the legacy document. Using a MBI effectively recreates in paper form the process used by a electronic search engine when identifying the location of desired information. Documents created and used in electronic

ESWPM format, the minimum content to be contained within the ESWPM, and an implementation plan for existing and new ESWPM.

5) Recommendations

In addition to the conclusions and recommendations offered within the appendices to this report, HWG7 would also like to offer the following recommendations which, although not specifically related to the tasking statements, were nonetheless discussed and considered by the team during our deliberations:

With the expectation that with the HWG7 recommendation the ATA will develop a specification concerning the standard format, numbering, and content for electrical standard wiring practices manuals, HWG7 has developed a proposed numbering scheme using our industry knowledge and experience. Details of the proposed scheme are provided in Appendix V of this report.

Although acceptance of this report constitutes closure of the assigned tasks and disbanding of the HWG7, the working group recommends that OAMs advise the working group co-chairs of their forthcoming changes to legacy documents. The HWG7 believes that by doing so, industry can evaluate the effectiveness of these recommendations.

6) Appendices

Appendix I Compilation of Legacy Documents



HWG7 Working Document

Appendix II, Table 1 - Master Breakdown Index - Example



Table 1 - MBI Example

Appendix III, Table 2 -Standardized Format



Standardized Format.doc

Appendix IV, Table 3 - Minimum Content



Minimum
Content.doc

Appendix V - Recommended Group Numbering Assignments



Table 4 - Proposed
Numbering