TACOM

Mobility and Firepower for America's Army

NATO STANDARDIZATION

AC310/SGII: FUZING AND OTHER INITIATION SYSTEMS

NDIA ANNUAL FUZE MEETING
11-12 APRIL 2000

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OUTLINE

- BACKGROUND
- STANDARDIZATION PRINCIPLES
- STATUS OF FUZE SYSTEM STANAGS

BACKGROUND

- **NATO COLLABORATION AND JOINT OPERATIONS**
  - Identified potential problems in safety assessments
  - Interoperability
  - Purchase of foreign weapons
- **PROBLEMS FROM UNIQUE APPROACHES TO S3**
  - Testing
  - Assessment
- **AC310 PROVIDES FRAMEWORK FOR AGREEMENT**
  - Design Principles
  - Tests
  - Terminology
  - Environments

ESTABLISHMENT OF MUNITIONS GROUP

- **GROUP OF EXPERTS ON SAFETY ASPECTS OF STORAGE AND TRANSPORTATION OF AMMUNITION AND EXPLOSIVES**
  - Sub-Group of AC258 established 1978
  - Restructured as Group AC310

- **4 SUB-GROUPS FORMED AT FIRST MEETING DECEMBER 1979**

  SGI: Explosive Materials SGIII: Environment

  SGII: Fuzing Systems SGIV: Munition Systems

- **NAME CHANGED IN 1985:**

GROUP ON SAFETY AND SUITABILITY FOR SERVICE (S3) OF MUNITIONS AND EXPLOSIVES

NEED FOR S3 PRINCIPLES

- **CONSENSUS OF USERS AND DEVELOPERS**
  - Required for multinational use of munitions
  - S3 cannot be quantified precisely
  - Standards will define design requirements and provide detailed tests and methods
  - Allow verification by agreed Standards
- **DEVELOP SAFE FUZES USING NATIONS EXPERIENCE**
  - Produce, Transport, Handle, Store and Deploy

RESULT

- **PRINCIPLES DERIVED FROM EXPERIENCE**
- **STANAGs DEFINE GENERIC REQUIREMENTS**
  - Method of assessment
  - Testing
  - Environments
- **STANDARDS ALLOW INFORMED DECISIONS**
  - Well understood common test criteria
  - Uniform methods of assessment

DOCUMENTS

- **STANAG:** ***Standardizaton Agreement***

  Formal agreement by ratifying Nations

  defining the S3 assessment

- **AOP:** ***Allied Ordnance Publication***

  Guidance, general information, details of

  tests methods and processes to assess S3

GENERIC REQUIREMENTS

- **ASSESS S3 IN NORMAL / CREDIBLE ENVIRONMENTS**
  - Electromagnetic radiation
  - Sources of electrical, mechanical, thermal energy
  - Premature initiation of explosive train
  - After transport, handling, loading, and firing
- **EXPLOSIVE TRAIN**
  - Explosives qualified by STANAG 4170 (SGI)
  - Sensitive elements must be interrupted / out-of-line
  - In-line explosives with adequate safety margin
  - Munition must be safe to dispose (STANAG 4518)

SGII STANAGs/AOPs

STANAG/AOP	SUBJECT
ST 2916	Nose Fuze Contours /Interface (MIL-STD-333)
ST 4157/AOP-20	Qualification Tests (MIL-STD-331)
ST 4187/AOP-16	Design Req'ts (MIL-STD-1316)
ST 4363/AOP-21	Testing of Leads and Boosters
ST 4368	Electric and Laser Ignition Systems for Missile and Rocket Motors (MIL-STD-1901)

SGII STANAGs/AOPs

STANAG/AOP	SUBJECT
ST 4326/AOP-8	NATO Fuze Catalog
ST 4369/AOP-22	Inductive Setting: Large Cal
ST 4547	Inductive Setting: Med Cal
ST 4560	Initiators

CURRENT STATUS

STANAG	STATUS
• 2916	Promulgated. New edition to be developed as required.
• 4157/Ed.1	Promulgated
4157/Ed.2	*Final Draft in ratification process*
• 4187/Ed.1, 4187/Ed.2	Promulgated
4187/Ed.3	*Final Draft in ratification process*
4187/Ed.4	*In process in SGII*
• 4326	Promulgated
4326/Ed.2	*In process in SG II*

CURRENT STATUS

STANAG	STATUS
• 4363/Ed.1	Promulgated
4363/Ed.2	*Final Draft in ratification process*
4363/Ed.3	*In process in SGII*
• 4368/Ed.1	Promulgated
4368/Ed.2	*Final Draft in ratification process*
4368/Ed.3	*To be initiated*
• 4369/Ed.1	Promulgated
• 4547	*New draft under preparation in SGII*
• 4560	*New draft under preparation in SGII*

STANAG 2916

NOSE FUZE CONTOURS AND MATCHING CAVITIES FOR ARTILLERY AND MORTAR PROJECTILES

- **Derived from MIL-STD-333**
- **New contours developed will require a new edition**

STANAG 4157 AND AOP-20

FUZING SYSTEMS: TESTING REQUIREMENTS FOR ASSESSMENT OF SAFETY AND SUITABILITY FOR SERVICE

- **Derived from MIL-STD-331**
- **Ratification of STANAG 4157/Ed.2 is underway**
- **Mortar Double Loading Test will be Addendum to AOP-20**

The US FESWG and SGII agreed to maintain consistency between MIL-STD-331 and AOP-20. Notes are added for NATO users.

STANAG 4187 AND AOP-16

FUZING SYSTEMS - SAFETY DESIGN REQUIREMENTS

- **Derived from MIL-STD-1316**
- **Ratification of Ed. 3 is underway**
- **Topics for Edition 4 include smart mines, ESADs, and formal safety analyses**

STANAG 4326 AND AOP-8

NATO FUZE CHARACTERISTICS DATA

- **Catalog providing brief description with sketch of NATO Fuzes**
- **Includes information such as**
  - **dimensions**
  - **interface**
  - **NATO Stock Num**
  - **Dwg Num**
  - **major components**
  - **performance levels**
  - **explosive characteristics**
- **Provides description of operation**
- **Next edition in CD ROM format**

STANAG 4363 AND AOP-21

FUZING SYSTEMS: DEVELOPMENT TESTING FOR THE ASSESSMENT OF LEAD AND BOOSTER EXPLOSIVE COMPONENTS

- **Ed. 2 has entered ratification process**
- **Detonating Cord Water Gap test issues will be resolved for Ed.3**

STANAG 4368

ELECTRIC AND LASER IGNITION SYSTEMS FOR ROCKETS AND GUIDED MISSILE MOTORS -- SAFETY DESIGN REQUIREMENTS

- **Ed. 2 has entered ratification process**
- **Initiation of work on Ed. 3 to include requirements for low voltage laser initiation devices will be considered at next SGII meeting**

STANAG 4369 and AOP-22

DESIGN REQUIREMENTS FOR INDUCTIVE SETTING OF LARGE CALIBER PROJECTILE FUZES

- **Edition 1 has been promulgated**
- **Need for new edition to be discussed at next meeting of SGII**

STANAG 4547 (DRAFT)

DESIGN REQUIREMENTS FOR INDUCTIVE SETTING OF MEDIUM CALIBER PROJECTILE FUZES

- **A new draft of this new STANAG is in process**
- **Draft expected for next meeting of SGII**

STANAG 4560

ELECTRO-EXPLOSIVE DEVICE, ASSESSMENT AND TEST METHODS FOR CHARACTERIZATION

- **This is proposed title for new STANAG.**
- **Initially will be limited to EBW's and EFI's**
- **Existing National Tests will be referenced**
- **New draft is in process**

SUMMARY

- **Enable interoperability**
- **Facilitate procurement of Foreign munitions and weapons**
- **STANAGs assure adequate assessment for Safety and Suitability for Service**