



**COMMANDER'S
GUIDE**
to the Safety
Engineer



**ARMY SAFE
IS ARMY STRONG**

Army Civilian Corps Creed

I am an Army Civilian — a member of the Army Team

I am dedicated to our Army, our Soldiers and Civilians

I will always support the mission

I provide stability and continuity during war and peace

I support and defend the Constitution of the United States
and consider it an honor to serve our Nation and our Army

I live the Army values of Loyalty, Duty, Respect, Selfless Service,
Honor, Integrity, and Personal Courage

I am an Army Civilian

ARMY SAFE
IS ARMY STRONG



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<https://safety.army.mil>

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Foreword

Readiness is at the forefront of accomplishing the Army mission, and accidental injury and death are devastating to overall readiness. The loss of a Soldier has a deep impact on unit morale, fellow Soldiers, Family members and the community and nation at large. Safety cannot be taken for granted; it must be what every member of the Army Team strives for on a daily basis. “Safety begins with you” is more than a slogan — it is the truth!

Commanders have an invaluable and indispensable asset in the safety engineer. These dedicated men and women use professional engineering knowledge, skill, abilities and experience in identifying, analyzing and controlling occupational and operational hazards. They apply knowledge of psychological and physiological factors to design safety features and controls to compensate for the possibility of human error in the man/machine/environment interface.

Safety engineers are highly trained and qualified to bring an engineering perspective to the risk management process. In addition to meeting Office of Personnel Management professional engineer qualifications, Army CP-12 safety engineers are required to complete core, functional, and continued training and education. Safety engineers are an integral component of the Army safety program and the Army’s strategy for loss prevention. Their expertise increases safety in our Army’s activities, reduces injuries and losses due to accidents, and enhances our readiness and warfighting capability.

A handwritten signature in black ink, appearing to read 'J. Farnsworth', with a stylized flourish at the end.

JEFFREY A. FARNSWORTH
Brigadier General, US Army
Director of Army Safety



The Safety Profession and Role of the Safety Engineer

The Army does not have a military occupational specialty for safety. Instead, Department of the Army Civilians specially trained in the Career Program-12 (CP-12) fill this critical need. Safety career fields include safety and occupational health specialist (0018), safety engineer (0803), industrial hygienist (0690), health physicist (1306), and air safety investigator (1815).

Army safety and occupational health professionals assist commanders in the prevention of accidents, incidents and events that harm Army personnel and cause damage to property and the environment. They use qualitative and quantitative analyses of both simple and complex products, systems, operations and activities to identify hazards. They evaluate hazards to identify what events might occur, the probability of occurrence and severity of results, risk levels (a combination of probability and severity), and potential loss incurred. They then consider these factors in making recommendations to commanders, managers, designers, employers, government agencies and other organizations on risk management and appropriate mitigation measures. Recommendations may include safe work practices and administrative controls (e.g., plans, policies, procedures, training, work breaks and worker rotation), engineering controls (e.g., redesigning facilities, equipment or processes to remove hazards or implement non-hazardous substitutes, enclosing the hazard or establishing barriers), and personal protective equipment.

In addition to the skills identified above, safety engineers employ engineering principles and practices to eliminate or control hazardous conditions resulting from human error, equipment and machine operations that might lead to personnel injury or property damage. Safety engineering requires the application of advanced mathematical techniques; professional engineering principles, methods and techniques; safety-related elements of the physical sciences, ergonomics, psychology and physiology; and general safety principles, standards, practices and analytical techniques. The safety engineer applies knowledge of psychological and physiological factors to design safety features and controls, compensating for the possibility of human error in the operation of machinery and equipment.

The safety engineer is concerned with the identification, analysis and control of occupational hazards requiring the application of professional engineering knowledge, skill and abilities. Typically, safety engineers are involved in:

- Advising on system safety requirements based on historical and anecdotal failure data, software failure analysis, and failure mode analysis of factors like fatigue, stability, and stress
- Developing and applying methods for the safe installation of storage and transmission systems for hazardous and toxic liquids and gases
- Designing protective equipment or safety devices, or redesigning machines and equipment to eliminate occupational hazards
- Designing site operation and storage facilities for ammunition and explosives
- Designing site protective structures and equipment for ordnance and explosives waste and hazardous and toxic waste remediation activities
- Reviewing engineering plans and specifications, and designing and implementing system/facility changes to improve life cycle safety
- Conducting field studies to identify potential hazards and design/validate adequacy of hazard control measures
- Providing hazard analyses, engineering assessments and mitigation solutions throughout the acquisitions life cycle (cradle to grave)
- Designing test protocols and evaluating results to validate system safety
- Reviewing proposed safety policies, guidelines and standards to determine consistency with accepted engineering principles and practices and recommend technical changes, as needed

A force of approximately 150 Department of the Army Civilian safety engineers support system and facility life cycle activities; research, design, test and evaluation; industrial base and infrastructure activities; process engineering; logistics; and operations involving hazardous materials.



Qualifications

Safety engineers must meet the following Office of Personnel Management qualifications for professional engineering positions:

■ Degree: Professional engineering. To be acceptable, the curriculum must (1) be from a school of engineering with at least one curriculum accredited by the Accreditation Board for Engineering and Technology as a professional engineering curriculum, or (2) include differential and integral calculus and courses more advanced than first-year physics and chemistry in five of the following seven areas of engineering science or physics: (a) statics, dynamics; (b) strength of materials (stress-strain relationships); (c) fluid mechanics, hydraulics; (d) thermodynamics; (e) electrical fields and circuits; (f) nature and properties of materials (relating particle and aggregate structure to properties); and (g) any other comparable area of fundamental engineering science or physics, such as optics, heat transfers, soil mechanics, or electronics.

Or

■ Combination of education and experience: College-level education, training and/or technical experience that furnished (1) a thorough knowledge of the physical and mathematical sciences underlying professional engineering, and (2) a good understanding, both theoretical and practical, of the engineering sciences and techniques and their applications to one of the branches of engineering.



In addition to meeting OPM qualifications, safety engineers must have safety engineering skills or education related to the position's duties and grade. Few college-level degree programs currently exist in safety engineering, but the number is increasing. Army CP-12 safety engineers are required to complete training requirements in several areas: core (common to all safety engineers), functional (to ensure competency in unique functional requirements), and continued training and education. Army CP-12 safety engineer training requirements are included in Table 1.

The Safety Management Career Field Guide, available online at <http://cpol.army.mil.library> and <http://www.opm.gov>, defines standards for the CP-12 safety and occupational health professional series. Qualification standards for professional engineering positions are available at <http://www.opm.gov/qualifications/standards/IORs/gs0800/0800.htm>.

Training requirements, career progression and other useful information may be accessed at <https://safety.army.mil/cp12online>. CP-12 hiring procedures and unique requirements may be found at <http://cpol.army.mil>. The senior safety director, in concert with the commander, will assemble hiring panels in accordance with CP-12 hiring practices and ensure the most qualified candidate is selected.

Table 1. Army CP-12 Safety Engineer Training Requirements

Level I (GS-7/9/11)

 Core – Mandatory1	 Core – Recommended1
<ul style="list-style-type: none"> - System Safety in Safety Engineering - System Safety and Analysis - Process Safety Management - Accident Investigation and Analysis for Engineers - Software Safety Engineering 	<ul style="list-style-type: none"> - Intermediate Systems Acquisition, Parts / A and B - Fundamentals of Systems Planning, Research, Development and Engineering - Intermediate Systems Planning, Research, Development and Engineering, Parts I and II - Fundamentals of Test and Evaluation - Intermediate Test and Evaluation - Advanced Test and Evaluation - OSHA 510, Occupational Safety and Health Standards for Construction - Applied Ergonomics or OSHA 2250, Ergonomics Applied to MSDs and Nerve Disorders - Basic Industrial Hygiene Techniques Course - Safety and Health for Engineers - Fire Safety in Building Design - Risk Management for the Safety Professional - Safety Program Management - Risk Management - ACQ 101, Fundamentals of System Acquisition Management - AMMO-45, Introduction to Ammunition - AMMO-63, U.S. Army Explosives Safety - AMMO-82, U.S. Army Explosives Safety - Quantity Distance and Site Planning - Explosives Safety for Safety

	<ul style="list-style-type: none"> Professionals - Range Safety - Introduction to Weapons Safety - Techniques for Hazard Recognition - Occupational Health - OSHA 511, Occupational Safety and Health Standards for General Industry - OSHA 2264, Permit-Required Confined Space Entry - OSHA 3095, Electrical Standards - Radiation Safety - Tactical Safety - Process Safety Management - Safety Inspections/Audits - Life Safety Code - Quantitative Methods in Safety Management - Theory and Application of Accident Prevention - Writing Techniques - Briefing Techniques - Contracting Orientation - Laboratory Design Review
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Table 1. Army CP-12 Safety Engineer Training Requirements (cont)
Level II (GS-11/12/13)

Mandatory	Recommended
<ul style="list-style-type: none"> - Completion of 40 hours in safety engineering-related subjects every two years 	<ul style="list-style-type: none"> - Level I recommended courses - Delivering a High-Performance Safety Management System - Managing the Business Aspects of Safety - Safety Communication and Training Techniques - Advanced Ergonomics - Cost Analysis for Optimal Safety and Health Decisions - Civilian Education System-Intermediate Course (DL + three week resident) - Strategic Planning - Decision Making/Problem Solving - Advanced - Project Management

Level III (GS-14/15)

Mandatory	Recommended
<ul style="list-style-type: none">- Completion of 40 hours in safety engineering-related subjects every two years	<ul style="list-style-type: none">- Level I and II recommended courses- Civilian Education System Advanced Course (DL + four weeks resident)- Senior Service College or Federal Executive Institute

★ Core training is applicable to all CP-12 safety engineers. In addition to core training, functional safety engineering training — both mandatory and recommended — will be defined by each Army headquarters with safety engineering functions to ensure competency of safety engineers in the Army headquarters’ unique functions and requirements. In the case of AMC, MSCs also will define functional training, both mandatory and recommended, to ensure competency of safety engineers in MSC-unique functions and requirements.

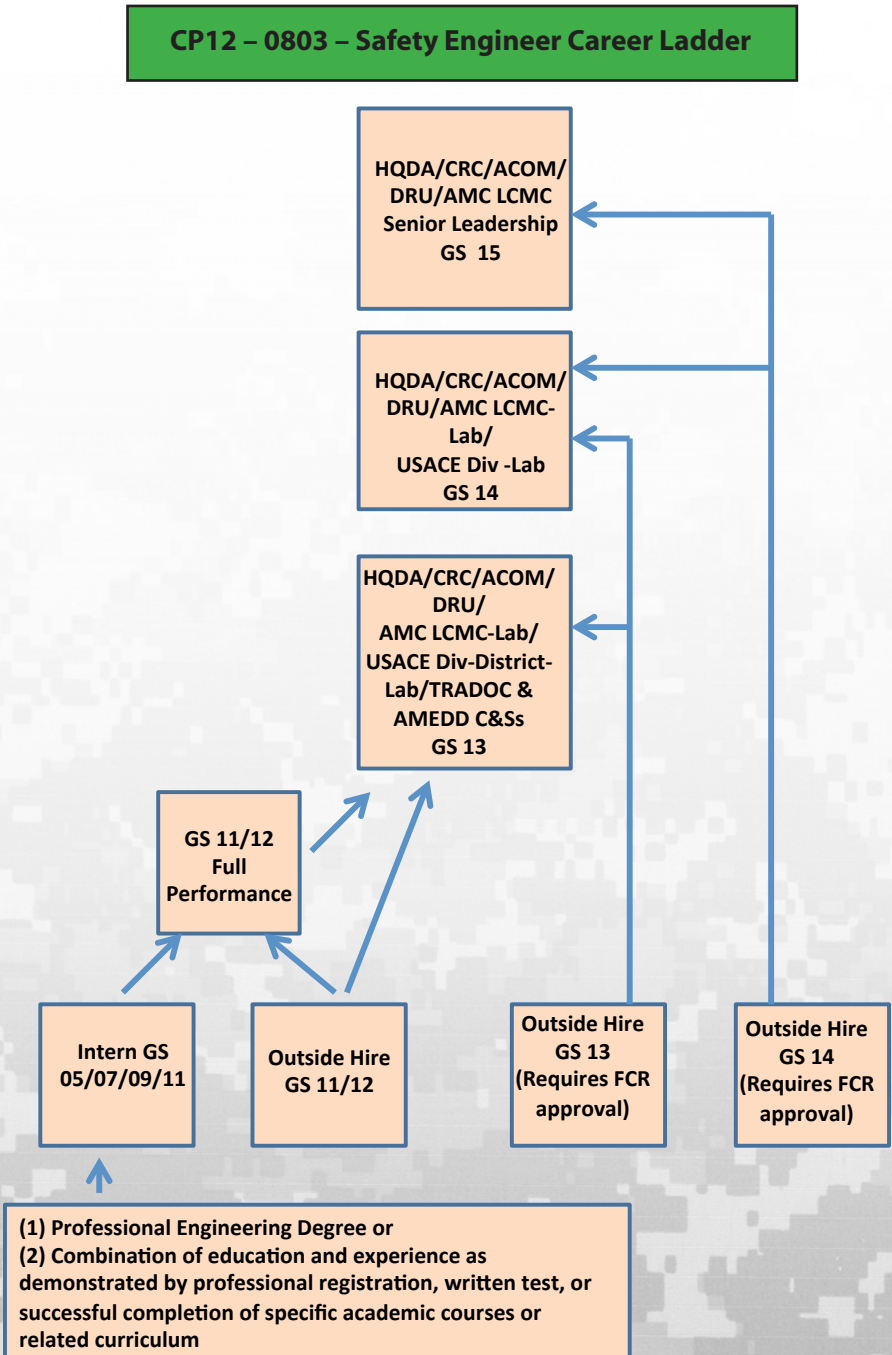
The typical career path for safety engineer professionals is as follows:

- Intern (GS-7/9/11)
- Journeyman (GS-11/12/13)
- Senior (GS-14/15)

See Figure 1.



Figure 1.



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Sample position description

Incumbent assists in planning and managing system safety engineering activities. For assigned safety program areas, the incumbent has the responsibility to support the command in the development and implementation of its in-house system safety and other safety programs. These responsibilities entail consideration and understanding of the various engineering principles, concepts, characteristics, capabilities, operations, uses, etc., of the total weapon or facility system as they affect feasibility and design concepts, and include ensuring that safety features are engineered into research, development and testing programs. Continued safety engineering emphasis is required throughout the system life cycle, with particular attention to basic hazard areas such as mechanical, explosive, chemical, electrical, personnel and composite hazards. Incumbent exercises professional knowledge primarily in safety engineering.

- Assists in developing plans for assigned areas and takes action to see that system safety operations are in consonance with staff and higher headquarters guidance, policy and standards, including procedures and other types of directives. Reviews plans for various major components, subcomponents, and subsystems to ensure the design of the system provides maximum safety consistent with operational requirements.

- Ensures safety features are incorporated in strategic defense systems to minimize hazards to personnel and damage to system equipment. Maintains continuous surveillance over assigned areas, providing advice, guidance and assistance on specific problem areas. Assists in developing and implementing corrective action in the form of new policy, directives, improved methods and procedures. Assists in developing technical criteria and provides guidance to command elements in the application of safety requirements for propellants, motors, explosive components, complete missile systems and facilities, including tactical siting (40percent).

- Assists in determining necessary controls and plans for assigned weapon systems to ensure effective consideration of all safety aspects involved in the design of safety features for system equipment. Assists in establishing system safety design criteria and requirements for strategic defense systems and new, rehabilitated or demolished facilities. Reviews systems design requirements to ensure appropriate safety requirements (including evaluation of the hardware/software interface to detect interactions that could lead to unsafe conditions). Reviews test requirements, methods and procedures to be used to verify the weapon system or facility performance to ensure that all safety-related issues are resolved (20percent).

■ Uses technical knowledge and understanding of occupational and explosive safety and accident prevention principles, methods and techniques to advise management on system safety program matters. Provides staff advice and technical assistance for assigned safety program areas requiring the development and application of new and unique facilities, safety devices, methods, techniques and safety standards. Provides staff advice and technical assistance in determining hazard classifications for strategic defense explosives and other dangerous items, to include transportation and storage classifications (20 percent).

■ Reviews accident and fire prevention and control for all assigned programs by performing surveys and inspection of areas, plants, test areas and tactical sites and buildings, structures, operations, facilities, machinery and equipment, mechanical processes, and personnel to ensure conformance with safety and fire prevention/protection rules, standards and regulations. Detects hazards and undesirable operational conditions, recommends corrective action. Reviews plans and specifications for new construction, buildings and alterations for compliance with safety codes, to ensure inclusion of safety and fire prevention/protection features, and to identify all risks associated with the facility (fall hazards, industrial hygiene issues, safe accesses, etc). Reviews proposed operational plans for identification and elimination of safety hazards (10 percent).

■ Reviews contractor safety programs, including program management, engineering, accident analysis and reporting. Assists/ leads accident investigations, obtains information from witnesses and studies operations, from resultant data determines accident causes, and recommends design changes, protective devices or changes in operation, which will eliminate or minimize hazards (10percent).

■ Performs other duties as assigned.





Keys to success

Leadership

- Rely on the safety expertise of the safety engineer in support of informed decision making
- Ensure the safety engineer is involved in all planning and/or coordination of meetings for training events and/or contingency operations
- Support the safety program through resources, personnel and time
- Ensure open lines of communication with the safety engineer through direct and unfiltered access by ensuring he or she is a member of the commander's special staff
- Establish the organization's safety culture through personal example and decisive engagement
- Hold the safety engineer accountable for the performance of duties listed in position descriptions
- Expect the safety engineer to identify and assess hazards and provide mitigation options for the commander's decision-making process
- Complete administrative responsibilities IAW local Civilian Personnel Advisory Center requirements

Individual

- Exploit advanced mathematical techniques and professional engineering principles, methods and techniques in identifying and evaluating hazards, assessing risk and developing controls to mitigate hazards
- Apply knowledge of psychological and physiological factors to design safety features and controls to compensate for the possibility of human error in the man/machine/environment interface
- Maintain focus on supporting the customer and Army mission

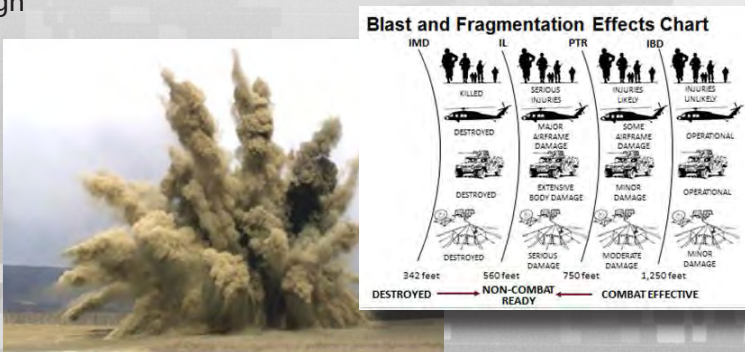
- Ensure safety assessments and recommendations are based on engineering principles and practices and appropriate Army regulations, DoD regulations and directives, OSHA standards and applicable federal law
- Use time with leadership effectively and keep him or her informed
- Resolve issues at the lowest level and prioritize those that need elevation
- Interface effectively with fellow staff members for day-to-day operations; be a team player
- Be visible
- Use safety engineering techniques and analyses and staff assistance visits as tools for evaluating compliance with safety codes and regulations
- Be proactive, not reactive
- Participate in in-progress reviews and provide safety oversight
- Participate in decision-making process briefings
- Pursue continuing education, obtain certifications appropriate for duties and responsibilities, and maintain required continuing education units
- Hold yourself accountable for performance of duties listed in the position description
- Participate/observe in exercises, operations, systems demonstrations and tests throughout life cycle to maintain familiarity with system and user requirements, risks and man/machine/environment interface
- Maintain professionalism

Performance Objectives: Examples

- Serve as highly specialized technical expert and as primary consultant to field operating activities with responsibility for planning, formulating , developing, implementing, reviewing, evaluating and

managing command-wide safety engineering activities to accomplish objectives of the hazardous/toxic waste program

- Adapt and apply state-of-the-art technologies within the scope of HTW remedial programs; use engineering approaches in applying expert knowledge, providing leadership, program advice and direction, developing and setting program priorities, standards and policy in the technical execution and management of safety and occupational health aspects of the Army's HTW mission activities
- As the technical expert in safety engineering with specific expertise in the properties and nature of hazardous and toxic wastes, the short- and long-term effects of these substances on humans and the environment, and proper disposal techniques or methods of mitigating these effects, contribute to the management of HTW program activities with specialized emphasis on OSHA, EPA's Superfund Amendments and Reauthorization Act of 1986, and other federal HTW requirements
- Serve as subject matter expert with program authority in the areas of toxic chemical agent safety, quantity distance criteria application, and chemical demilitarization facility design, construction, operation and closure
- Review engineering specifications and plans for inclusion of safety engineering, occupational health requirements, design codes and risk analyses; analyze specifications and plans for feasibility and effective safety measures; monitor planning, engineering and construction phases for inclusion and application of required safety measures
- Provide safety and occupational health input to request for proposals and final contract documents to ensure that safety engineering criteria, principles and techniques are considered in the development and procurement of contracted work
- Review/evaluate engineering concepts, designs, periodic and special reports on project scopes of work and contractor proposals; results of tests on various projects; processes and techniques relative to construction safety; and architectural design and in-house engineer design



- Review/comment on contractor-prepared safety engineering data generated during the concept definition, development and construction phases of any contract
- Advise/assist in evaluation of safety requirements for all new construction, major repairs, modifications or demolition of facilities for the installation and supported tenant activities
- Apply professional knowledge of the principles, methods and techniques of safety engineering and a thorough understanding of safety principles, standards, practices and analytical techniques against proposed designs, methods and procedures to ensure technical conformance with engineering criteria to eliminate or control hazardous conditions resulting from human error, equipment and machine operation
- Develop safety site plans and safety submissions for proposed new or modified explosives facilities to ensure appropriate design factors (i.e., construction, industrial hygiene, quantity distance, flow or material/personnel, regulations) are addressed; utilize computer-aided design programs and software aids whenever possible and practicable to improve efficiency and effectiveness
- Discuss proposed facilities with users to identify purpose and operations to be conducted within the facility, analyze potential safety hazards, and consider nearby facilities and their mission to determine safe distance zones for proposed facilities
- Participate in the life-cycle safety management of weapon and ammunition systems
- Review plans and specifications for facilities, equipment and operations for the manufacture, load storage, disposal and demilitarization of high-risk hazardous materials including ammunition and explosives
- Review/evaluate system safety engineering data for armament systems transitioning from research and development to production technology; coordinate with Army, Navy and Air Force research and development agencies and design contractors in preparation of item program requirements documents and material release actions, transition plans, type-classification actions, test programs, hazard classification data, safety statements, and design and analysis

principles to specify, predict and evaluate life cycle safety of transitioned armament systems and prevent or control hazards during the production, fielding, transportation, use, maintenance, storage, renovation and disposal of weapons, ammunition and components

- Provide technical safety engineering review during command configuration management of fielded ammunition systems and their components
- Participate in or review malfunction investigations to determine adequacy of corrective action; review quality deficiency reports, equipment improvement reports, product improvement proposals, engineering change proposals, request for waivers/deviations, and engineering study proposals to determine safety acceptability
- Confer with design engineers and contractors in evaluating and developing or accepting major configuration management changes in armament systems; represent command safety office at configuration control boards for armament systems
- Conduct highly technical, detailed safety surveys of diverse, nationwide industrial and explosive complexes, to include government/contractor performance evaluations, pre-operational surveys of high-hazard operations, pre- and post-award surveys to establish and monitor contractor compliance capabilities, and special surveys as required
- Evaluate facilities, equipment and methods to assess effectiveness and for conformance to OSH Act standards, safety rules, regulations and practices
- Determine compliance with quantity-distance requirements, compatibility, personnel and explosive limitations, actual or potential hazards to safety of personnel and for the utilization of protective clothing and prescribed safety materials and equipment
- Apply safety, scientific and engineering design and analysis principles to expand or modify existing standards/policies or develop new ones; confer with project managers, knowledgeable scientists and engineers to provide advice and justification for recommendations to protect mission capability, protect personnel and prevent equipment damage in the absence of regulatory guidance

- Report immediately to installations where disasters or severe incidents such as fires, explosions or release of hazardous materials have occurred to determine causes, extent of damage, and recommend corrective actions; make prompt reports so investigation board can notify other installations performing identical operations and using same types of ammunition of hazards involved
- Participate in the general overall development and revision of manuals, regulations and other publications to ensure inclusion of safety engineering principles, practices and hazard analysis techniques
- Review/evaluate test operating plans and hazard classification proposals
- Conduct highly technical engineering reviews and detailed safety surveys of diverse, nationwide, highly hazardous industrial and explosive complexes, to include government and contractor facilities and their performance in operating them
- Confer with expert scientists and engineers and apply scientific, engineering and safety principles to develop theories, principles, standards and policies for protecting mission capability, preventing equipment damage, and protecting the general public from Army operations in the absence of guidance or policy
- Evaluate project budget documents for incorporation of appropriate safety engineering criteria
- Serve as technical subject matter expert on munitions safety
- Develop policies and procedures to control critical system safety processes and for formulating office positions on DoD-wide munitions and weapon safety-related issues
- Interact with the supplier base in the areas of system requirements reviews, system/subsystem preliminary design reviews, system/subsystem critical design reviews, software block design reviews, integrated baseline reviews and system functional reviews
- Advise on system safety strengths and weaknesses and identify corrective actions and programs for continuous improvement in designated areas

- Serve on special agency, interagency and international committees, coordinating groups, etc., where decisions, commitments and conclusions are made independently and have considerable impact on the long-range planning and establishment of system safety issues
- Provide management and technical oversight to team of system safety engineers responsible for establishing and serving on program system safety working groups and safety integrated product teams, consisting of contractor and government members from various agencies and disciplines, to review/discuss technical safety issues, system safety efforts and status, and ensure safety program requirements and objectives are met
- Coordinate with members/advisors from the Army Fuze Safety Review Board, Ignition System Safety Review Board, U.S. Army Public Health Command, Developmental Test Command, and RDECOM ADREC Material Release Review Board to ensure system safety requirements, policies and procedures are adequately addressed
- Establish/evaluate safety qualification/verification test methodology and plans
- Ensure safety tests are conducted IAW established safety test criteria and safety assessment reports are fully and accurately developed to initiate testing; apply engineering and scientific principles to evaluate surface danger zone variables and produce appropriate requirements; coordinate with DTC and ensure safety releases and safety confirmations are issued as required in support of the program
- Direct activities involved in the compilation, presentation, dissemination and traceability of safety data to alert both private and government sectors involved in the procurement, production and use of ammunition, explosives and military-related hazardous materials
- Supervise review of all hazardous item contracts (technical data purchases and/or scopes of work) involved in the command's production/procurement, including requirement to serve as the single manager for conventional ammunition; ensure all hazardous materials, components and assemblies are identified; determine requirements for safety data to adequately present the hazards involved in fulfilling requirements of each hazardous item contract; conduct/assign literature searches and/or testing programs to obtain necessary

safety data; concur on safety data presented on each major component safety data statement; manage preparation of a schematic showing the relation of all drawings, specifications, MCSDS and all related documentation to a complete technical data package; maintain familiarity with testing, packaging, transportation, classification, safety standards, hazards analyses, etc, as they relate to the MCSDS, ammunition and explosives

- Conduct/direct test programs for acquisition of data required for hazard classification of ammunition, explosives and military-related hazardous materials
- Review test plans to ensure policies and procedures are followed and data generated will be adequate for hazard classification; design and set up unique altered test procedures when established guides are not appropriate or when novel situations are encountered; prepare/concur in reports of hazard classification test results
- Provide/validate recommendations for hazard classification based on analyses and interpretation of test data; assign interim hazard classification for the command to enable the performance of handling, shipping and storage of hazardous materials prior to tri-service coordination and assignment of classification
- Lead research and development activities involving munitions and equipment that may emit ionizing or non-ionizing radiation or contain radioactive material
- Establish/provide software system safety support for command, control and communications systems
- Develop/review new regulations, standards, policies and methods and make immediate decisions on software safety critical problems involving complex software-controlled systems
- Provide software safety design criteria and requirements for fire support, missile guidance and laser optic program, which involve safety-critical applications
- Prepare software safety design recommendations and oversee contractual software safety fault tree analyses, sneak circuit analyses, code walkthroughs and petri-net analyses to ensure all safety-critical software is identified

- Develop, witness and validate specialized software safety fail-safe design, test procedures and plans to verify software safety design is implemented and no safety-critical anomalies exist

- Ensure software safety characteristics, critical levels for testing, and acceptable risk levels are identified in conceptual documents and translation of these characteristics into performance and design requirements for specifications to ensure maximum integrated system safety program within the constraints of operational readiness, time and cost

- Serve on technical committees of professional societies and government groups

- Author or co-author bulletins, articles and papers describing achievements for publications in technical journals and/or presentation at meetings and conferences

- Evaluate safety of new power sources for use in existing and/or developmental communications and electronic equipment; develop new standards, policies and procedures and formulate recommendations to solve technical safety problems involving the integration of power source technologies into military systems; establish safety performance criteria and requirements for power sources used in C-E systems and other applications that require power sources

- Perform detailed safety risk analyses of electrical and electronic devices and associated power sources

- Develop/validate unique safety performance, design and testing requirements and oversee contractual or government testing/analysis to ensure the safety of C-E equipment when integrating new power sources

- Conduct investigations to determine the cause of failures or accidents involving C-E equipment and/or batteries

Utilize various analytical techniques (sneak circuit analysis, fault tree analysis, project evaluation tree analysis, failure mode, effect analysis, etc.) to identify and quantify the cause of incidents in C-E systems

- Participate in market surveys for C-E or power sources, provide safety procurement data, and evaluate technical proposals

- Obtain/evaluate safety data and make decisions regarding the safety suitability of equipment for release for testing and fielding
- Ensure the safe integration of power sources into equipment and that acceptable risk levels are identified in conceptual documents
- Ensure translation of safety characteristics into performance and design requirements for maximum safety within the constraints of operational readiness, time and cost
- Review technical base power source programs to ensure system safety needs are achievable, or recommend alternative approaches to allow timely development of safe design
- Initiate/review/evaluate special investigations and testing such as non-ionizing radiation protection studies, environmental testing, noise surveys, air sampling, and health hazard assessments
- Perform C-E equipment inspections and in-house hazard analysis to verify compliance with safety design requirements
- Prepare safety and health data sheets and risk assessments for milestone decision reviews
- Represent the Army as battery safety engineering expert on government and industrial committees and forums for products and systems
- Advise management and staff of power sources safety requirements for C-E systems in all stages of design, development, testing, production and sustainment
- Participate in the development of inter-service and inter-agency safety policies, criteria and standards
- Develop/prepare/present battery safety training programs to military users of C-E equipment



- Serve as senior system safety engineer, safety analyst and expert technical consultant, responsible for the execution of mounted system safety and health hazard programs involving multiple commodity areas
- Perform statistical and engineering analyses relating to system safety and health hazards; recommend/initiate new areas of study from analysis of incidents reported throughout the armor community to a central database
- Incorporate system safety and health hazard requirements in tactical ground maneuver joint capability integration and development system documents
- Manage the safety engineering aspects of life cycle management of materiel/weapon systems and troop testing of materiel
- Provide expert advice and consultant services for command functions related to safety engineering for combat developments, troop testing of materiel and system safety
- Conduct research pertaining to safety in military training, weaponry, fire control, hazard classification and transportation modes, as required
- Provide technical data as it impacts range safety for use by the program manager for range safety matters
- Provide technical life cycle safety engineering expertise to project managers, program executive offices and other military/non-military users regarding the design, development, modification and operation of C4ISR equipment
- Provide safety engineering advice on problems concerned with research, development, production and deployment of highly complex communications-electronics systems
- Use risk analysis, data statistical analysis, safety and design engineering knowledge, and knowledge of electrical, electronic, chemical, mechanical, environmental, radiological and industrial engineering to advise on safety engineering and modifications
- Review contractor specifications, proposals, designs, testing and safety-of-use criteria and ensure required data submissions and level of effort are appropriate for each phase of development
- Review existing equipment compatible for modifications to contain new or modified C4ISR equipment, to identify necessary safety and environmental health modifications to meet requirements; conduct risk assessments and hazard analysis and provide recommendations for planned modifications to ensure compliance

- Evaluate standard commercial items recommended by project managers to determine whether safety and equipment modifications can be made to convert equipment to meet requirements; prepare safety suitability for use/release statements prior to fielding systems
- Serve as chairman or co-chairman for system safety working groups for PM/PEO developmental programs for developed or procured systems; conduct system safety working group meetings to determine remaining actions required prior to materiel release
- Advise on system safety requirements documents, design reviews and transition plans, and develop documents for specification data requirements review boards and configuration control boards; develop documents and system safety requirements for procurement calls, ECPs, QDRs and EIRs
- Establish system safety design criteria and requirements for complex C-E systems and special projects; develop unique system safety design recommendations for ensuring safety of latest technologies; develop criteria that may lead to major changes in the design of critical items and development efforts to improve the safety of systems and equipment
- Review/evaluate engineering concepts, technical proposals, data items, equipment characteristics and technical contract scopes of work to identify hazards and initiate actions to eliminate or reduce risk to the lowest practical levels
- Ensure safety features are incorporated into design reviews and evaluate engineering concepts, technical proposals, test and evaluation of supported systems
- Apply scientific and engineering principles of design, analysis, specification and predictions for the timely identification of hazards and initiation of actions necessary to eliminate or reduce risk levels during the life cycle
- Ensure safety criteria and safety of use information is included in new equipment training courses and technical manuals
- Track safety hazards using the Hazard and Accident Tracking System and establish associated hazard risk indices and corrective actions
- Prepare/coordinate/track system safety risk assessments for all residual hazards

- Prepare/coordinate required safety, health and environmental documentation for all projects and provide recommendations to the materiel developer
- Prepare safety suitability for release statements
- Issue safety of use and ground precautionary messages on hazards identified in fielded equipment



Appendix A

Deployment Considerations

Duties

The deployed safety engineer provides safety engineering and management support in the design and operational use of military systems and facilities. Support includes reviewing system design and operational impacts on fielding, use of equipment and urgent operational needs statements for future design changes based on field input. Duties involve system safety aspects in the development and fielding of complex modern combat and weapon systems, and the management of risks during operational employment:

- Act as the primary point of contact for all system safety engineering for area of responsibility and CONUS program offices with respect to risk mitigation and technical design information
- Act as the primary point of contact for AOR, DoD system safety organizations, program acquisition/development system safety organizations, and the deployed tactical user
- Coordinate with theater logistics and acquisition LNOs on the movement of failed/damaged systems to CONUS bases/laboratories for engineering and scientific analysis
- Conduct evaluations of failure events requested by and in support of acquisition LNO
- Work with CONUS laboratories and engineering sections in the development of risk mitigation designs and techniques for hazards identified in the theater of operation with fielded combat systems
- Attend user working groups, system safety working groups, and technical working group meetings/ teleconferences
- Coordinate the transfer of system safety information and data between tactical users and program acquisition/development organizations
- Coordinate with DoD system safety review boards and program acquisition/development system safety organizations and appropriate program managers/project managers in the development and submission of system safety data packages for review and approval

The deployed safety engineer must have the familiarization and ability to coordinate and conduct detailed technical reviews among program management and various engineering staff.

This includes maintaining liaison with and visiting military and Civilian acquisition program activities to discuss design issues and potential solutions. The deployed safety engineer should, to the extent possible, participate in all phases of the systems engineering process, to include system safety requirements and system design and development, and integration and operational considerations. He or she must maintain professional proficiency and promote accident prevention by conducting, attending, and participating in meetings, conferences, seminars and professional development pertaining to safety engineering and system safety and associated engineering practices.

Duty hours

Authority for establishing and changing tours of duty is delegated to the commander of the organization employing Civilian personnel and IAW theater directed Civilian work schedules. Although the normal work week is 40 hours, safety professionals in support of or in deployment status may be assigned to different work hours. Notice must be given when employees are to be assigned to a different tour of duty or work week. Commanders must refer to Office of Personnel Management and Army guidelines for appropriate compensation.

Awards

There are several options available to recognize the accomplishments of safety professionals. This recognition may be honorary, such as an achievement medal, or monetary, such as a step increase. Information on these awards may be found in AR 672-20. Of special note are the following:

- The Global War on Terrorism Civilian Service Medal recognizes the contributions of civil service personnel in a foreign country designated by the military's GWOT Expeditionary Medal criteria.
- The Office of the Secretary of Defense Medal for Valor recognizes the act of heroism or sacrifice with voluntary risk of personal safety in the face of danger on or off the job.
- The Secretary of Defense Medal for the Defense of Freedom recognizes the sacrifice of those injured or killed due to hostile action against the United States or killed or wounded while rescuing or attempting to rescue any other employee or individual subjected to injuries suffered under such conditions.

Budget

Areas to consider when making budget decisions include the following:

- Designate salary for a 40-hour workweek, to include benefits and locality pay for region where the engineer is normally employed
- Comply with regulations when requesting overtime (approval and funding). Deployed budgets should include 196 hours of overtime as well as danger and hazardous duty pay. The theater may have a work schedule dictating normal workweek with overtime included, but the final decision for overtime rests with the immediate supervisor. Danger pay and hazardous duty pay (entitlements) may be paid, but are determined by the state department and are reviewed annually.
- Temporary duty for training, continuing education and conferences
- Uniform purchase and appropriate patches. Wearing of uniforms by Civilians will be determined by the theater commander and will be provided free of charge, if required. Per the director of contracting, government purchase cards may not be used to procure military uniforms for Civilians.
- Vehicles for travel required to support the unit's missions
- Printing for publications and informational materials
- Professional items
- Safety education enhances Army operations and improves safety awareness through recognition and promotion of individual and organizational accident prevention measures. Promotional materials such as posters, films and videos, technical publications, pamphlets, incentive items and related materials are proven cost-effective safety awareness tools and, therefore, should be budgeted for and used at all levels to promote safety.

Rating scheme

At the brigade level, the deployed safety professional's rating scheme should include his or her immediate supervisor as the rater, the division safety director as the intermediate rater, and the brigade commander as the senior rater.

Authority to deploy

Department of Defense Directive 1404.10 provides for the involuntary assignment of Civilian employees to emergency-essential positions as necessary to meet the exigencies of the circumstances and when unforeseen contingencies prevent prior identification of those positions as E-E. It is Army policy that Civilians will be used to support the military in carrying out their missions. Installations and activities will develop and implement plans required to support military contingency operations and all other levels of mobilization.

The objective of the Civilian Readiness Program is to ensure qualified Army Civilian employees are available in adequate numbers and with adequate skills to meet worldwide mission requirements during periods of national emergency, mobilization, war, military crisis or other contingencies.

An E-E employee is an incumbent of an overseas position or an individual who would be sent overseas during a crisis situation. The position ensures success of combat operations or supports essential combat systems after mobilization, evacuation order or other military crisis.

Deployed safety professionals are E-E employees. As such, deployed safety professionals must sign DD Form 2365, DoD Civilian Employee Overseas Emergency-Essential Position Agreement. Other requirements include an approved deployment common access card, approved SF-78 (Certification of Medical Examination) and deployment-related medical and dental examinations and immunizations. Medical treatment is authorized while deployed.

Commanders must integrate and document use of the Civilian workforce in all types of operations and contingency plans and ensure Civilian issues are addressed during execution. Positions classified as E-E should be pre-identified prior to filling, with the position description/vacancy announcement annotated and conditions of employment clearly defined.

Safety professionals must meet the following criteria prior to deployment:

- Security clearance verification
- Passport (government and Civilian)/visa/country clearance valid through deployment dates
- Current DoD Civilian identification card reflecting the Geneva Convention Status with dates covering the entire deployment period
- Appropriate travel orders (TDY, TCS, NATO, etc.)
- DD Form 93, Record of Emergency Data
- Validated deployment criteria checklists
- Deployment packet as directed by CPAC
- Deployment training requirements for a particular theater

Arrangements should be made to have the safety professional receive preventive dental treatment prior to deployment. Safety professionals should in/out process with their organization.

Clothing and equipment

The primary duty uniform for the safety professional in field, support and deployed environments, will be the same as the organization, unless otherwise directed. When wearing a military uniform, compliance with AR 670-1 is required. The primary duty uniform in garrison is appropriate attire that supports the organization.

Recommended equipment:

- Accident investigation kit
- Digital camera
- Video camera
- GPS
- Optic range finder
- Compass
- 100/25 foot measuring tape
- Pocket/universal toolkit with case
- Flashlight(s)
- Binoculars
- Night vision goggles
- Multi-meter
- Electrical circuit tester
- GFCI tester
- Sound meter
- Radiac meter
- General purpose tool bag
- Laptop computer(s), both SIPR and NIPR
- Printer/scanner
- BlackBerry in garrison and cell phone while deployed
- Vehicle, tactical/GSA
- Other uniform/equipment unique to the organization/operation (TA-50, Nomex, etc.)
- Transport cases, such as Pelican cases
- Safety vest
- Appropriate office supplies
- Steel-toed safety footwear for use in garrison
- Appropriate transportation for conditions in the operating environment
- Ohms meter, such as a Fluke Ohms meter with clamp tester
- Hardhat
- Infrared thermometer gun

- Oxygen analyzer meter
- Other personal protective equipment, as required (respirator, clothing, etc.)
- Eye protection
- Sunglasses

Entitlements

Deployed safety professionals are entitled to the following while in support of overseas contingency operations:

- Government-provided legal assistance (limited to matters related to deployment, such as preparation of wills and powers of attorney and basic income tax assistance)
- Family care plan preparation assistance (installation provides legal and other assistance as needed)
- Base exchange and commissary privileges in theater
- Use of Family, Morale, Welfare and Recreation facilities and activities
- Inclusion in the unit's Family Readiness Group to ensure spouse/Family support while deployed
- Additional training to meet deployment requirements, including combat lifesaver training, basic rifle marksmanship, etc.
- Eligible for and issued rapid fielding initiative equipment
- Medical/dental treatment as provided to military members, including free care for illness, disease or injury suffered during deployment
- Foreign post differential pay and possibly receive eminent danger pay. Civilians are provided compensation for deployments. Percentages are based upon the region they support, and all income is taxable.



Appendix B

Military/Civilian Rank Equivalency

As established in DoD Directive 4165.63-M, Table B-1 is based on the military and Civilian relationship established for Geneva Convention purposes. Non-appropriated fund positions shall be considered equivalent to their counterparts under the General Schedule and Wage System, and senior-level positions shall be considered equivalent to senior executive service positions. For the Wage System, when a more precise relationship to military rank or General Schedule grades is necessary, this shall be determined by the installation commander using the grade groupings in the table as a guide. Finally, equivalent grades for other Civilian employees not included in the table shall be determined by the installation commander using the table as a guide.

Regarding protocol issues, there is no set guidance from DoD with respect to GS and NSPS positions and their equivalence to military ranks as stated in DoD Memorandum, Subject: Revised Department of Defense Order of Precedence, Nov. 14, 2005. The DoD memorandum mentions only Civilian employees at the SES and DISES level.

At present, there is no prescribed equivalency for protocol, housing or Geneva Convention purposes for NSPS personnel.

The Department of the Army prescribes protocol rank equivalencies for selected GS personnel on its order of precedence, including them under Code 8 (not VIP ranked) as stated in DA Pam 600-60, Appendix D. Per DA Pam 600-60, the following equivalencies are established:

- GS-15 equivalent to colonel
- GS-14 between colonel and lieutenant colonel
- GS-13 equivalent to lieutenant colonel
- GS-12 equivalent to major
- GS-11 between major and captain
- GS-10 equivalent to captain
- GS-9 equivalent to first lieutenant

Table B-1, Military and Civilians

	Civilian Grade Group		
Military Grade Group	Senior Executive Service/ Senior Level	Merit Pay Employee	General Schedule
O-7 thru O-10	SES 1 thru 6 ES1 thru 6		
O6		GS-15	GS-15
O5		GS-13 and GS-14	GS-13 and GS-14
O4			GS-12
O3			GS-10 And GS-11
O-2 W-3 & W-4			GS-8 And GS-9

References

■ CP-12 Website

<https://safety.army.mil/cp12/Whoarewe/0803SafetyEngineer/tabid/2257/Default.aspx>

■ Commander's Guide to the Tactical Safety Professional

<https://safety.army.mil/LinkClick.aspx?fleticket=F73uO71OgMc%3d&t&abid=2297>

■ Engineering Qualification Standards <http://www.opm.gov/qualifications/standards/IORs/gs0800/0800.htm>

■ USAJOBS

<https://www.usajobs.gov/GetJob/ViewDetails/326954300>

■ Bureau of Labor Statistics

<http://www.bls.gov/ooh/architecture-and-engineering/health-and-safety-engineers.htm>

■ AR 385-10, The Army Safety Program

www.apd.army.mil/pdffiles/r385_10.pdf

■ DA PAM 385-10, The Army Safety Program

www.apd.army.mil/pdffiles/p385_10.pdf

■ DA PAM 385-16, System Safety Management Guide

http://www.apd.army.mil/pdffiles/p385_16.pdf

■ DA PAM 385-64, Ammunition and Explosives Safety Standards

http://www.apd.army.mil/pdffiles/p385_64.pdf

