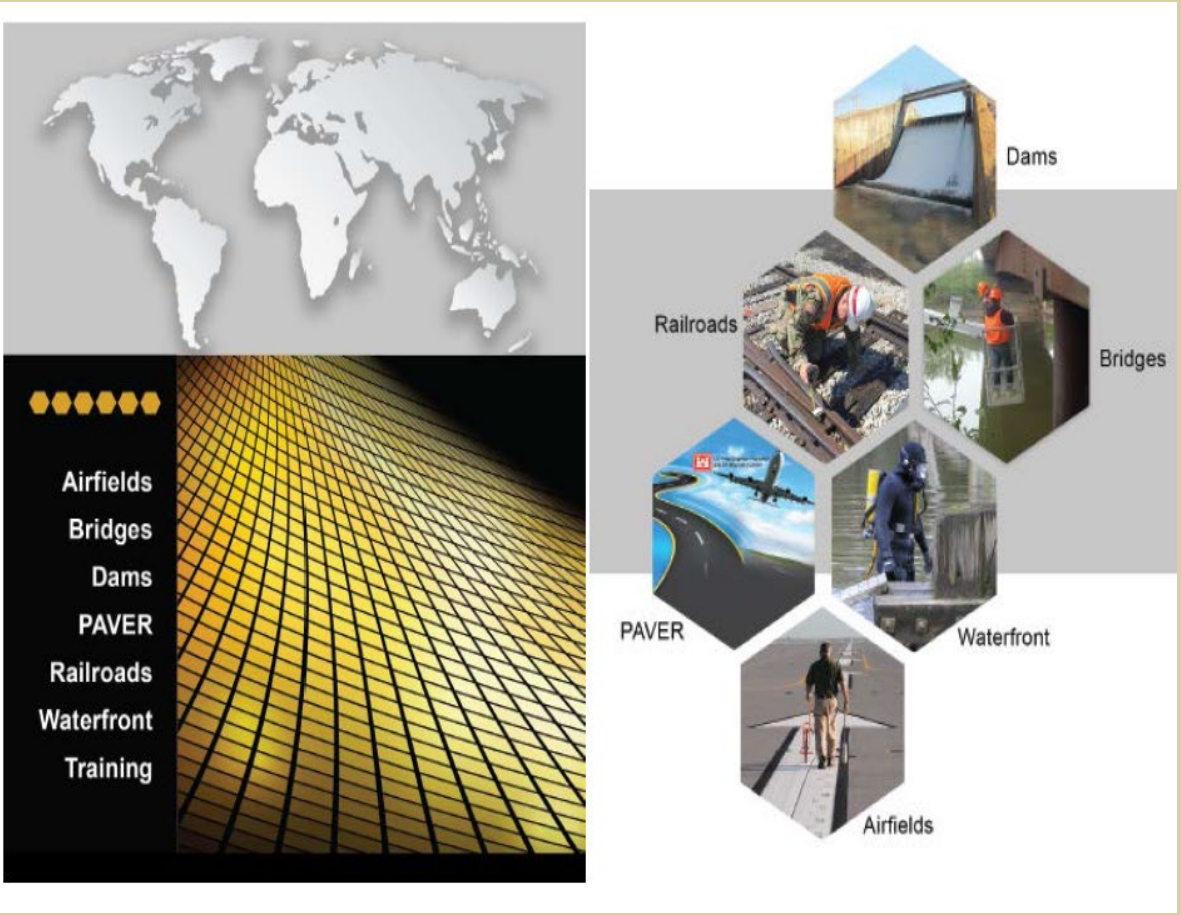
ADTIP

Army Dams and Transportation Infrastructure Program

Annex A (ADTIP Execution Strategy) to FRAGO 01 to OPORD 21-031: ADTIP Execution Strategy (U)



Execution Strategy

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Michael Andres
ADTIP Program Manager

1. Purpose: The Army Dams & Transportation Infrastructure Program (ADTIP) guards against the potential for loss of life and damage to property, strives to adhere to Federal and States statutory and regulatory requirements, ensures mission execution accomplishment through the safe use and operation of the infrastructure systems as required and protects the environment. Chapter 7 of AR 420-1 provides guidance on Army dams and transportation infrastructure management, Commander's responsibilities and reporting requirements. This execution strategy is applicable to IMCOM supported Army Materiel Command (AMC), U.S. Army Reserve and National Guard Bureau Installations. The ADTIP management guide will be updated as required to reflect changes in statutory and regulatory guidance. The following IMCOM procedures are provided to facilitate a standard approach in the management of Army dams and transportation infrastructures.

2. Program Management: IMCOM is the Army's execution agent for the scheduling and data reporting of the required statutory and regulatory inspection of dams and transportation infrastructures. The Command centrally manages and funds the field work and inspection report for its Installations and provides research, equipment and training of ADTIP personnel for the Army in partnership with the U.S. Army Engineer Research and Development Center (ERDC) and the U.S. Army Corps of Engineer, Transportation Systems Center (USACE-TSC). The following outlines the IMCOM CG's responsibility and delegated staff responsibilities to IMCOM G4.

a. Prepare project list and prioritization of critical ADTIP projects.

b. Development and use of Mission Readiness Assessment Matrix (MRAM).

c. Funding of ADTIP inspections (IMCOM Installations only)

d. Fielding of state of the art inspection tools, equipment and data repository.

e. Application of and training for pavements, bridges, dams, railroad tracks, waterfronts inventory management systems and safety inspections.

f. Represent the Army and IMCOM on dams and transportation infrastructure meetings, conferences, workshops.

g. Participate in the review and revisions of applicable Federal Guidance, Army Regulations and United Facilities Criteria (UFC).

h. Conduct ADTIP triennial review and bridge program Quality Assurance (QA) and Quality Control (QC).

i. Generation and tracking of ADTIP critical finding memo's and plan of actions (POA).

j. Development and scheduling of ADTIP courses.

3. Responsibilities for Repair and Mission Readiness Assessment:

a. IMCOM HQ G4 will inform the IMCOM CG annually on the status of high hazard/critical dams and transportation infrastructure and the associated risk to the Army.

b. IMCOM Directorates, with support from IMCOM HQ G4, will track the status of repairs of high hazard dams and associated risk to the Army. Critical findings identified during an ADTIP inspection requires a POA. Critical finding memos will be routed through the IMCOM Directorates.

c. IMCOM HQ G4 will generate a list of critical ADTIP projects to compete in the IMCOM R&M Integrated Priority List (IPL). Assignment of prioritization will be based on the result of MRAM and ISR-I rating.

d. The Installation will seek funds and execute repairs identified during an ADTIP inspection and any additional inspections/analysis not covered under the ADTIP. The determination of the resource prioritization of required repairs, mission readiness assessment and communication to affected tenants will be decided by the Installation Commander and approved by the Senior Commander.

e. The Installation is responsible for providing the initial input to MRAM, Following this the IMCOM ADTIP inspection teams will provide the final MRAM based on the most resent inspection results. The IMCOM/ERDC inspection teams will initiate the Mission Readiness Assessment Matrix (MRAM) and will be completed by the Installations.

4. <u>Procedures:</u>

a. Installations Commander/Manager will appoint a technically qualified DPW staff on orders to act as the overall ADTIP coordinator, bridge safety officer and dam safety officer (if applicable).

b. The designated ADTIP coordinator, bridge safety officer and dam safety officer will be an Army government employee, a general engineer with a strong background in civil engineering, and should have completed or be able to complete and pass the ADTIP courses on airfield pavement, safety inspection of in-service bridges, dam safety inspection and railroad tracks standard and maintenance. Refresher course is required every five years.

c. IMCOM HQ G4 and Directorates will notify the Installations of upcoming inspections In January of each year. The ADTIP inspection team will provide a pre-inspection memo 30 days before the scheduled inspection notifying the Installations of required support to the inspection team, provide a copy of the inspection inventory and request the Installations to review and validate the accuracy of the inspection inventory.

d. The Installations ADTIP coordinator will provide copies of DD 1354, DA4283, GIS maps, and other pertinent information to ADTIP inspection team during the pre-inspection briefing.

e. The Installations real property accountability officer (RPAO) is responsible for ensuring that ADTIP inspection inventory is accurate and inspection results and operational status are reflected in the real property records.

f. The Installations ADTIP coordinator will ensure that the RPAO is notified when a discrepancy exists between the inspection inventory and the real property records.

g. The ADTIP inspection team is not authorized to inspect facilities and structures that is not in the real property records. The IMCOM ADTIP program manager will provide exemption if the Installations RPAO demonstrate/show that they are actively updating the real property records.

h. The ADTIP inspection team will provide an out brief and a post inspection memo after the completion of the inspection. The post inspection memo will cover what was accomplished, identify any critical findings and request Installations' assistance in correcting/updating real property information. Installations Commander/Manager or designated representative will receive an out brief from the ADTIP inspection team if a critical finding is identified during the inspection.

i. If a critical defect is identified during an ADTIP inspection, the inspection team leader will initiate a draft POA and provide it to the Installation ADTIP POC. The Installation is responsible to complete the POA

and submit it to the IMCOM ADTIP POC within 45 days after receiving the IMCOM critical finding memo. A quarterly update to the IMCOM ADTIP POC is required until the deficiency is closed or completed.

j. Installations are required to use the results of the ADTIP inspection as one of the component/element in generating the ISR-I quality rating for transportation infrastructure and dams. The ISR-I quality rating should be updated to reflect the latest ADTIP inspection results.

k. Installations will validate the purpose and requirement for dams given the potential for liability to the Army. This validation will include a determination of whether the water level of high and significant hazard dams could be lowered in order to mitigate/reduce the risk. Dams not needed or not economically justified will be considered for decommissioning.

l. Installations will use ADTIP provided inventory and data management system as specified on each of the ADTIP programs.

m. Annually, Installations will provide to the IMCOM HQ G4 ADTIP POC the name of the individuals appointed and their training certificates/recertification under par 4.a. and 4.b. and the last update and exercise dates of the dam emergency action plans (EAP).

n. Installations are required to use the IMCOM enterprise ADTIP for their inspection requirements. The HQ IMCOM ADTIP program manager can grant exemption to the use of contractors, and local supporting USACE Districts on a case by case basis.

5. Army Bridge Safety Management Program:

a. All bridges, water crossings and major culverts on Army Installations will be inspected at regular intervals not to exceed 24 months. The Army bridge program is managed IAW AR420-1 and UFC 3-310-08. HQ IMCOM is the Army's executive agent and centrally funds the scheduling of inspections, data management and the required bridge certification class. HQ IMCOM centrally funds the inspection requirements for IMCOM Installations, Non-IMCOM Installations are responsible for the cost of inspections and funding in coordination with ERDC.

b. All Army bridge inspections are managed by HQIMCOM and executed by ERDC-GSL. Inspections will be performed by qualified and certified in-house personnel and the ADTIP bridge inspection team. The HQ IMCOM ADTIP program manager can grant exemption to the use of contractors, and local supporting USACE Districts on a case by case basis. All inspection reports will be reviewed by HQIMCOM and ERDC, and must be in the format provided by HQIMCOM to ensure consistency. Installations that cannot meet the required inspection schedule must inform the HQ IMCOM ADTIP program manager, as to the reason why and when the inspection will be rescheduled.

c. The IMCOM G4 centrally managed bridge inspection program covers reportable and non-reportable bridges that requires inspections. All CONUS railroad bridges will be inspected on a 12 month cycle. All OCONUS bridges will be inspected on a 48 month cycle. Host Nation bridge inspections/reporting requirements are not covered under this program.

d. The definition of reportable and non-reportable bridges on paragraph 5e and 5f applies only to the bridge inspection program and cannot be used to determine if a bridge/structure is added into the real property records.

e. A reportable bridge is a structure including supports erected over a depression or an obstruction and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or

extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. This definition includes railroad Track Bridges with a span equal or greater than 10 feet.

f. A non-reportable bridge is a structure including supports erected over a depression or an obstruction and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 6 feet less but than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. This definition includes railroad Track Bridge with a span equal or greater than 6 feet but less than 10 feet.

g. The inspection of structures less than 6 feet is the Installations responsibility unless the HQ IMCOM ADTIP program manager approves including those structures into the bridge inspection inventory. The inspection requirements should follow the DA Pam 420-1-3 guidance on inspection of structures and appurtenances under the Installations' preventive maintenance program.

h. Certain bridges may require inspection at more frequent intervals, based on their age, traffic considerations and known deficiencies. Bridges closed to traffic do not require routine inspection until the bridge is re-opened to traffic. An initial inspection is required before reopening vehicular bridges to traffic. Certain vehicular bridges subject to NBIS requirements may be inspected at less frequent intervals, not to exceed 48 months, provided that the extension is justified by inspection results with supporting analysis and the HQ IMCOM ADTIP program manager written approval. Initial Inventory inspection will be required 90 days after opening a brand new bridge. The HQ IMCOM ADTIP program manager must be notified of the closure/opening of any reportable bridge within 30 days.

i. The standard maximum interval for underwater structural element inspections is 60 months. Underwater inspection for bridges currently open to traffic with an NBI substructure condition rating of 4 or lower, or have an NBI Scour rating of U, 6, 3, 2, 1, 0 shall not exceed an interval of 24 months. Bridges closed to traffic do not require underwater inspection until the bridge is reopened to traffic. An initial inspection is required before reopening vehicular bridges to traffic.

j. Damage inspections are event driven inspections that normally follow a critical finding. Damage inspection frequency is normally determined by the (but not limited to) severity of the event, members affected and bridge type. The HQ IMCOM ADTIP program manager shall be notified of all damage inspections.

k. In-depth and special inspection frequency is determined by the scope and risk of the component being inspected. In-depth inspections and special inspections are normally scheduled on an as needed basis.

l. Critical deficiencies identified during inspections will require a plan of action (POA) that will be submitted to the HQ IMCOM ADTIP program manager within 45 days after the completion of the inspection. Safety deficiencies will be corrected immediately and reported to HQ IMCOM ADTIP program manager when completed. For all other non-critical deficiencies, the DPW should develop a current Fiscal Year (FY) and/or future FY project acquisition strategy addressing all deficiencies found. Future FY projects should be identified in the General Funds Enterprise Business System cProjects for potential Army funding support.

m. Bridges that are considered unsafe by the Installations Bridge Safety Officer (BSO) will be "PROPERLY CLOSED" and cannot be opened until deficiencies are corrected and verified by the BSO. In certain cases, the BSO in consultation with the Army load rating engineer may recommend a reduction of posted speed limits and/or a reduction of the capacity with a posted weight limit in lieu of recommending a bridge closure. Bridges closed or opened will be immediately reported to HQ IMCOM ADTIP program manager by email. To be considered "PROPERLY CLOSED", a bridge must be posted with signage and blocked so that no vehicle and pedestrian can get on the bridge by going over or around the barrier.

n. All bridge closing and reopening for routine maintenance or repairs for more than one week will be reported immediately to HQ IMCOM ADTIP program manager by email notification. All accidents involving major damage to a bridge or loss of life will be reported through the proper channels immediately and the Installations bridge manager will notify HQ IMCOM ADTIP program manager. The Installations BSO is responsible for the review and in consultation with the RPAO validates the Army Bridge Inventory System (ABIS). Structures missing in ABIS will be added and structures in ABIS not showing on the real property records will be immediately process IAW with the Installations RPAO guidance.

o. The ADTIP bridge inspection team will review the real property records and compare it to the ABIS prior to the bridge inspection and notify the Installations BSO if a discrepancy exist.

p. The Installations BSO is responsible in ensuring that the latest bridge inspection report is used as one of the components/elements in generating the ISR-I quality rating. The HQ IMCOM ISR-I program manager will generate an ISR-I quality rating report for bridges annually and notify those Installations that are not updating the rating based on the latest inspection report.

q. The DPW will have a bridge file maintained, either electronically or hard copy, it is composed of:

(1) Inventory Inspections
(2) Routine Inspections
(3) Special Inspections
(4) Fracture Critical Inspections
(5) Underwater Inspections
(6) Drawings
(7) Load Ratings
(8) Scour Evaluations
(9) Plan of Actions (for scour, critical findings, repair, etc.)
(10) Maintenance & Repair Records (DD1354, DA4283, DD1391)
(11) Opening/Closure of Structures
(12) Accidents & ADT Data
(13) ISR Data
(14) ACOMs Reviews

r. Every Installations that has bridges will have a Bridge Safety Officer (BSO). The BSO must attend and pass the ARMY SAFETY INSPECTION OF IN-SERVICE BRIDGES training. Recertification is required every 5 years.

s. Bridge Quality Control and Quality Assurance:

(1) Quality control (QC) and quality assurance (QA) measures will be implemented in conjunction with the ADTIP triennial review in order to maintain the accuracy and consistency of bridge inspections, inspection reports, computations and data entered into the Army and National Bridge Inventory (NBI) data bases. For the purposes of this document, QC is defined as procedures that insure the uniformity, correctness and completeness of the performance and review of inspections, reports, computations and final data.

(2) Each agency employed for the purpose of conducting bridge inspections and evaluations is responsible for following appropriate QC procedures.

(3) IMCOM ADTIP QA procedures are in the ADTIP's "Bridge Safety Quality Assurance Standard Operating Procedures", (QAR-SOP-20), July 2020 which is available on the ADTIP website.

t. A triennial on-site review of the Installations' bridge maintenance program by HQIMCOM engineer staff is required. IMCOM triennial on-site review procedures are in the ADTIP's "Triennial Review Binder" (TRI-BIN-20), July 2020 is available on the ADTIP website.

u. Mission/Readiness Assessment Matrix (MRAM): Bridges: Installations will provide the consequences of closure and the ADTIP inspection team leader will generate the final MRAM.

Mission/Readiness Assessment Matrix (MRAM): Bridges

Mission / Readiness Assessment Matrix	Overall Condition of Structure				
	Critical Condition	Serious Condition	Poor Condition	Fair Condition	Good Condition
Extremely High Impact: Catastrophic: Mission failure, unit readiness impacted, death, unacceptable loss or damage will occur or is likely to occur. Significantly degrade unit readiness, or mission capability, severe injury illness, loss, or damage will occur.	EH	EH	H	M	L
High Impact: Significantly degraded unit readiness or mission capability, severe injury illness, loss, or damage likely to occur. Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage will occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.	EH	H	H	M	L
Moderate Impact: Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage likely to occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.	H	H	M	L	L
Negligible Impact: Little or no impact to mission or unit readiness, minimal injury, loss, or illness. Property damage limited to the owner's property.	M	M	L	L	L
Legend: EH-Extremely High Priority H-High Priority M-Moderate Priority L-Low Priority					

Note: The term "mission" in the expected consequences refers to both military and civilian loads. If the bridge is closed, the default potential will be *Low Priority*

Condition: Include NBI Item #58: Deck, Item #59: Superstructure, Item #60: Substructure, Item #61: Channel/Channel Protection, Item #62: Culvert.

Good: Bridge Component NBI Rating are all 7-9 or non-applicable.

Fair: at least 1 of the Bridge Component has an NBI rating of 5 or 6.

Poor: at least 1 of the Bridge Component has an NBI rating of 3 or 4.

Serious: at least 1 of the Bridge Component has an NBI rating of 2.

Critical: at least 1 of the Bridge Component has an NBI rating of 1 or 0.

v. Mandatory Timeframe for Load Posting of Bridges: Reference FHWA memo dated April 17, 2019 (ACTION: Timeframe for Installing Load Posting Signs at Bridges): It states, "bridge load postings are to be made as soon as possible but no later than 30 days after a load rating determines a need for such posting." This new policy becomes effective on October 1, 2019. The Army interprets this to mean that the 30 day count down starts once the load rating document has undergone final Quality Control review and been signed by the Army's Load Rating Engineer. If the resulting load rating shows that the allowable bridge loading must be reduced from its current state (i.e. a new or lower/different posting is required):

(1) At time of signing the report, the Army's Load Rating Engineer will write/send a memo as the Load Rating Engineer for DCS G9 to the Bridge Safety Officer (BSO) at the Installations; cc the ADTIP PM, the Army Bridge PM, and the Army's Bridge Inventory Manager and the ERDC ADTIP Program Coordinator. A copy of the signed load rating report will also be included. The memo will instruct the BSO to post temporary signs if permanent signs cannot be placed within the 30-day timeframe. It will also request a Plan of Action (POA) for the posting requirement within 7 days of receipt of the memo. The POA should include a description of the process and timeline for installation of the permanent signage as well as plans for temporary signs if necessary.

(2) If the Installations BSO does not respond in 7 days, the Army's Load Rating Engineer will elevate the notification to the HQ IMCOM ADTIP program manager who will notify the Director of DPW.

(3) The item will be marked complete when an email with photo documentation of permanent posting sign is received from the BSO. This will be archived in Army- and Installations load rating files.

w. Bridge Scour Management Program:

(1) Bridge Scour Management Program (BSMP) is implemented by the ADTIP to address the potential of scour at bridges in an effort to fully comply with the 23 CFR 650.313(e), (e3) regulation. The program provides guidance on the development of systematic means to ensure the structural integrity and public safety while minimizing the adverse consequences that may produce a bridge closure or failure to the Army Installations mission. In addition, the program provides definition, implementation and integration of the aspects that comprise scour on basis of the following elements:

- Procedures for planning and prioritizing the maintenance of bridges over tidal and riverine waterways to prevent the negative effects of scour.

- Protocols to ensure the proper scour and channel stability periodically inspections to maintain all waterways bridges in an optimal and safe level of service.

- Scour assessments or evaluations at the appropriate level to identify bridges that are susceptible to scour.

- Recommendations of corrective actions and countermeasures to protect against future flood damage, potential loss of human life or real property.

(2) Management Procedures. Bridges over waterways will be assessed, inspected, maintained, and rehabilitated according to the guidelines provided by FHWA Hydraulic Engineering Circular No. 18 (HEC-18), Evaluating Scour at Bridges, Hydraulic Engineering Circular No. 20 (HEC-20), Stream Stability at Highway Structures, and Engineering Circular No. 23 (HEC-23), Bridge Scour and Stream Instability Countermeasures and ERDC Technical Reports.

(3) Applicability. The BSMP include those bridges within the 50 States, District of Columbia, and U.S. territories-installation facilities in which the feature being spanned is a river, stream or coastal waterways with a total structure length equal or greater than:.

- 20 feet for vehicular and pedestrian bridges.
- 10 feet for railroad bridges.

(4) Qualifications. The scour assessment shall be conducted by an interdisciplinary team of hydraulic, geotechnical and structural engineers who can decide by calculation or assessment, the potential of scour at the bridge. All assessment of scour potential shall be reviewed and approved by a qualified, licensed Professional Engineer. The responsible engineer of the scour assessment must be qualified to conduct the work and as a minimum must have completed NHI Course No. 135046, Stream Stability and Scour at Highway Bridges and NHI Course No.13048, Countermeasure Design for Bridge Scour and Stream Instability. The bridge inspector shall recognize and understand the relation between the physical conditions of the waterway bed and the bridge, and the factors that produce scour problems. Bridge inspectors shall meet the minimum qualifications stated DA Pam 420-1-3.

(5) Routine Inspections. As part of the routine inspection performed every 24 months the inspectors shall carefully identify, record and classify site-specific present factors that may affect the channel

stability, and/or may produce potential scour problems. The following elements shall be considered for the inspection of the present conditions of the bridge in terms of scour:

- Substructure Condition: The scour conditions around the substructure elements shall be reflected in the coding of NBI Item 60-Substructure. For this, the inspector shall be particularly focused in visible signs of scour holes, exposure of foundations or piles, undermining of foundations, damage to scour countermeasures, accumulation of debris, movement of abutments and piers, and degradation or aggradation of the streambed. If scour critical conditions are identified by the inspector during the inspection then a new scour assessment shall be performed by the interdisciplinary team to address the scour potential. NBI Item 60 shall be consistent with the one given to NBI Item 113 whenever a rating factor of 2 or below is determined for the NBI Item 113.

- Adequacy of Opening: The inspector shall document evidence of overtopping of approach roads or bridge, debris lodge in superstructure, erosion of embankments, and evidence of high water marks. Condition of the waterway opening shall be reflected in the coding of NBI Item 71 – Waterway Adequacy.

- Channel Stability: This is a critical component to define the vulnerability or potential of scour. The inspector shall assess the condition of the channel upstream and downstream from the bridge for lateral and vertical stability. The inspector is responsible to document any visible signs of channel degradation/aggradation, obstructions, debris accumulation, stream alignment, and banks erosion that may compromise the structural stability of the bridge. The code and rating of the NBI Item 61- Channel and Channel Protection shall be in accordance to the present stability condition of the channel.

- Streambed Profile: All bridges over waterways shall have a streambed profile. Inspectors shall perform measurements of channel cross sections upstream and downstream from the bridge and include them as part of the Routine Bridge Inspection Report.

- NBI Item 113 Scour Critical Bridges: The code rating of this item shall be based on a documented scour assessment performed by the interdisciplinary team by examining site characteristics, geomorphic factors, hydrologic and hydraulic features, or considering the structural stability based on comparison of the theoretical future scour depths, and/or current streambed elevations with the foundations depth. Bridge inspectors shall not update the NBI Item 113 rating unless field conditions indicates that the foundation units are unstable.

(6) Assessment of Scour Potential. Under the Metric 18 of the NBIS all bridges over water with a total structure length equal or greater than 20 feet shall have a documented scour evaluation and bridges that are scour critical or with unknown foundation shall have and been monitored in accordance a Plan of Action (POA). Assessment should be performed considering the site characteristics, hydrologic and hydraulic features and geomorphic factors at the bridge site. The evaluations are site specific; any additional site information may be required to do an accurate study. Every bridge shall have a documented scour assessment to ensure the proper coding of NBI Item 113.The documented assessment shall be incorporated into the permanent bridge file and shall include the data used for the analysis, calculations, engineering judgements, the resulting NBI Item 113, bridge vulnerability classification and if needed a plan of action to mitigate scour problems.

(7) Scour Inspections. The purpose of the scour inspections is to collect all the needed information and data to perform an assessment of scour potential. Field visits will be conducted to collect bridge and channel characteristics information that are considered relevant to the potential of a bridge to scour or the stability of the channel. The data to be collected in the inspection includes, but is not limited to: channel morphology, vegetation, hydraulic and geometric characteristics, soil samples, photographic documentation, and floodplain characteristics. The frequency of the scour inspections shall be dependent on the bridge scour

vulnerability and scour condition observed during the routine bridge inspection. The scour inspection shall be conducted:

- A bridge does not have a documented scour assessment, NBI Item 113 code as 6.

- The routinely bridge inspection reveals a scour critical condition, NBI Item 113 less than 3 or if the inspector find a scour condition or channel stability problem during the routine bridge inspection that warrant a revision of the NBI Item 113 rating.

- When a bridge have a documented scour assessment the frequency of the scour inspection shall not exceed: 60 months for bridges classified as low risk with NBI Item 113 code as 5, 7 or 8 and no changes in channel alignment and streambed cross section are found in the routine bridge inspections since the date of the scour assessment. 24 months for bridges classified as high risk with NBI Item 113 code as 4 or 5 and no changes in channel alignment and streambed cross section are found in the routine bridge inspections since the date of the scour assessment. 12 months for bridges classified as scour critical with NBI Item 113 code as 3.

(8) Unknown Foundation. A bridge is identified with unknown foundation if: (1) the foundation type and depth is unknown, or (2) the foundation type is known but the depth is unknown. If the scour potential cannot be determined due to unknown foundation then the foundation characteristics should be determined. Potential methods that may be used to evaluate the foundation characteristics are: Reverse Engineering, Inference from site conditions, and Non Destructive Methods. If the foundation depth cannot be determined using available methods the NBI Item 113 for the bridge shall be rate as U and a POA shall be developed and implemented.

(9) Plan of Actions. Scour Plan of Actions are required by 23 CFR 650.313 for bridges coded as Scour Critical, NBI Item 113 codes as 3 or less, or with Unknown Foundations, NBI Item 113 code as U. These structures must have a Plan of Action (POA) to ensure the structural integrity and public safety. The POA is intended to provide guidance and recommended actions to the Installations in order to address the scour vulnerability or critical conditions of the bridges that crosses waterways. The POA shall enable Bridge Safety Officer and Installations' maintenance personnel to be prepare to monitor and/or protect any bridge that may be threatened by scour. The Installations is responsible for the documentation and execution of the necessary corrective actions to prevent possible development of more serious problems and comply with the FHWA and NBIS regulations. All scour critical bridges and bridge with unknown foundations shall be monitored in accordance to the POA. The POA shall be implemented for a specific period, once the final date is achieved a review and update of the POA shall be conducted.

6. <u>Army Dam Safety Management Program (ADSMP):</u>

a. Overview of ADSMP: The guiding principles for the ADSMP are to ensure that senior leadership, land holding commands (LHC), Installations leadership and technical experts remain involved with, committed to, and engaged appropriately in the ADSMP. Life safety remains paramount. The ADSMP is to be continuingly updated and evaluated. Existing dams, proposed modifications or new dams will be properly designed, operated and maintained. Dam safety inspections will be performed in compliance with Federal Guidelines with regard to frequency, scope and inspector qualifications. Army dams will be properly managed and/or operated during high water/extreme events. The Army maintains a strong sense of urgency to reduce risk for critical dams by immediately taking safety actions. The Army will prioritize critical studies, investigations, dam safety modifications and construction activities at the installation and LHCs.

b. Subsequent paragraphs will focus on defining the roles and responsibilities of key Army individuals and organizations within the Army command structure; the existing hazard potential and the classification system to be used on each Army dam; the need to continually assess the Army interest associated with each

dam; consideration of dam decommissioning if appropriate; identification of mission essential low hazard dams and the identification of installation standard or routine dam safety workload.

c. Roles and Responsibilities for the ADSMP:

(1) Commanders at each level of Army have the responsibility for dams' safety within their commands. Higher commands have the responsibility to ensure, through QA, that the appropriate actions are being taken by subordinate offices. Each Installations and Senior Commander having the responsibility for Army dams must ensure that the organization has a viable dams safety program that is in compliance with AR 420-1 and DA PAM 420-1-3, as supplemented with this guidance. Senior Commanders will appoint an Installation Dams Safety Officer (DSO) whose key responsibilities are to synchronize all installation-related dams' safety activities and coordinate with the HQ IMCOM ADTIP program manager.

(2) To maintain appropriate coordination and communication of any dam incident, it is critically important that the chain of command, dam safety program leadership, emergency management officials, project operations personnel, installation staff, upstream and downstream stakeholders, and potentially impacted off-installation emergency management officials and communities are kept informed. Key Army roles and responsibilities follow:

- Senior Commander: The Senior Commander declares and manages project incidents and emergencies. The Commander is responsible for deciding coursed of action to assure life safety, to reduce risk of project failure and for coordinating decisions with higher command when regional or national impacts may occur.

- Installation DSO: The Installation DSO will serve as principal technical advisor to the Installations Commander for dam safety incidents. Coordinates dam safety responses for the installation and is the primary technical point of contact (POC) for current activities connected to the incident.

- Emergency Manager: The installation Emergency Manager serves as principal advisor to the Commander for disasters and emergencies, and serves as the primary POC with the appropriate state and local incident manger(s).

- Operations Manager: The Operations Manager is responsible for the monitoring, observing and performing the actionable activities as described I the specific dams' Operations and Maintenance Manual, the Water Control Manual (WCM-if appropriate), Standard Operating Procedures (SOP-if appropriate), and the Emergency Action Plan (EAP-if appropriate), for developing ongoing incident or actual emergency response. The Operations Manager will ensure that installation operations and maintenance personnel are familiar with the activities as described within the above appropriate manuals.

- Exercise and Training: Training and regular exercises will be performed at the installation to maintain proper operational readiness and vigilance in understanding a developing solution at an Army dam. Installation personnel will be trained to identify when the timely need for immediate or corrective action is required, while also notifying the Army chain of command (on installation and upward reporting). Dam safety training materials for incident management will be designed to test installation personnel awareness of prescribed incident management processes, procedures and responsibilities. Project-specific dam safety training materials for installation project personnel should address the incident management approach to ensure understanding and responsibilities at all organizational levels.

- Incident Reporting: When evidence of distress is reported, the installation DSO shall confirm the situation and determine if an engineering evaluation of the condition is needed, or if timely remedial measures should be taken. If further action is warranted, the installation DSO shall coordinate with the emergency manager on development of the Serious Incident Report, Situational Reports, and initiate the

upward reporting notifications (Commander, LHC CDSO and ADSO) by telephone, with follow-up documentation and digital photos via email. For evidence of distress on dams, the installation DSO is also responsible to submit to the LHC CDSO an endorsed narrative summary of the incident including an assessment of risks and appropriate photographs.

(3) For the ADSMP to be fully successful, it is imperative that all assigned technical and managerial stall be qualified personnel. Decision-making must be based upon the best technical information available to protect human life, property and the environment with life safety being the primary concern. Installation activities are to include the day-to-day operations at each dam; performing or acquiring qualified inspectors to meet inspection requirements and timelines; performing or acquiring support in maintaining the dams; and promptly budgeting for planning, design and construction related activities necessary to make repairs, take corrective actions or construct structural modifications that ensure the structural integrity and full functionality of each dam. Personnel working around dams will be trained using the Training Aids for Dam Safety (TADS).

(4) Technical staff will have specialized dam safety training to enable their successful performance of duties associated within this program. Each organizational level is to be staffed with qualified personnel, as specified in paragraph iii. For the duties assigned and performed.

Key DSPM Positions and Awareness within Army:

i. Army Dams Safety Officer (ADSO): Army will appoint an ADSO at DCS, G-9. The designated ADSO will be an Army government employee having full responsibility for program management. The ADSO will lead and champion the ADSMP. The ADSO must be a civil engineer or general engineer and be competent in the areas related to the maintenance, inspection and evaluation of dams. The ADSO should understand adverse dam incidents and the potential causes and consequences of dam failure. The ADSO is the Army Program Manager as related to dam safety activities across all organizational elements and is responsible for ensuring that the Army maintains a highly-effective ADSMP, implementing all practices and procedures as outlined in the appropriate or governing regulations and preparing and promulgating guidance. The ADSO ensures that programs to implement dam safety are firmly established and adhered to while monitoring activities with Army, particularly at the installation level. This will be accomplished by the ADSO and LHC Dam Safety Officer (CDSO) conducting site visits to Installations.

ii. LHC Dams Safety Officer (CDSO): The Land Holding Commander will appoint a CDSO at the Command Headquarters. The designated CDSO will possess all the qualifications as described for the ADSO. For the LHC centralized dams safety activities or non-routine workload, the CDSO establishes the priorities for dam safety related work; identifies and defends the list of dam safety work priority items that impact the safety, operation and structural integrity of projects; ensures that adequate and appropriate independent technical reviews for inspection, evaluation and design for dams and appurtenant structures are accomplished; and ensures that dam safety products are developed in accordance with Army policy and guidance.

iii. Installation Dams Safety Officer (DSO): Installations Commanders will appoint a DSO at each installation with a dam. The installation DSO will be an Army government employee with dam safety assigned as part time duties. To be qualified, the DSO must be an engineer and have attended and passed the U.S. Army Dams Safety Inspection Certification Course. If the Installations does not have a qualified DSO, the Director of Public Works (DPW) may consider support from a DSO from a nearby Army installation. The DSO will oversee the daily activities of the dam safety program at the installation and coordinate actions by providing briefings to installation counterparts. As appropriate, these actions are to include the ADSO and CDSOs. The DSO works with the installation’s budget managers to ensure that dam safety requirements are included and properly prioritized within the installation budget submissions. The DSO reports to the Installations Commander and the CDSO with regard to dam safety activities being performed on the installation.

iv. For the decentralized activities or routine workload, the DSO has primary responsibility to confirm that dam safety project related execution is occurring. This includes oversight of key maintenance, inspections and operational activities that ensures the dam(s) can function in a safe and reliable fashion. The DSO follows up by: preparing in-house, other agency or contractor inspection teams; scheduling and participating (as appropriate) on the dam and ancillary facilities; reporting and providing vertical coordination, and interfacing with federal agencies, partners, stakeholders and customers. The DSO builds the 5-year dam safety program and tracks project schedules and budget for all on-going dam safety related workload on the installation. The DSO reports on all items of distress and unusual behavior or movement at dams on the installation to the DPW.

v. For the centralized activities or non-routine workload, the DSO monitors all dam safety related activities being performed by others on the installation. The DSO leads the data collection efforts associated with gathering project documentation, prior inspection reports, historical photographs/videos, as-built drawings, construction modification drawings, update to Damwatch, etc. The DSO assists, to the extent possible, the dam safety design personnel in gaining a full and complete understanding of the project issues as related to life safety, potential property damage, loss of use of the facility and environmental concerns. The DSO is to be a team member for any activity that is considering corrective action/structural modifications to a dam on the installation. The DSO also coordinates and briefs appropriate installation personnel ensuring their participation on a dam's safety project.

(5) Installation Dams Safety Awareness: Installations will annually recognize and commemorate the National Dam Safety Awareness Day on the 31 of May. The DSO is the installation focal point for the dissemination and coordination of dam safety related information/activities. The DSO will brief installation counterparts on dam safety activities, as scheduled and integrated as an agenda item, at either an Installation Master Planning Group or DPW staff meeting, annually. The DSO will brief, at least annually, the following individuals or organizations: Senior Commander, Installations Commander, DPW, environmental office, operations office, Fire Marshall, security office, Public Affairs Office, Engineering, Plans and Services Office, Emergency Management Office, Master Planner, the Office of the Staff Judge Advocate, and others associated with working around the dams to enhance understanding of the structural integrity of dams and the continued need during the next FY to inspect, maintain and operate the facility in a safe and reliable manner (meeting Federal Guidelines for Dam Safety). Key activities to be discussed could include:

- Maintenance and operational requirements
- Past year's operational performance
- Continued need for the dam
- Current hazard potential and known downstream floodplain(s) for master planning purposes
- Hazard potential impacts/changes based upon installation proposed projects(s) or any proposed off-base residential, industrial or commercial development(s)
- Latest inspection reports-status of corrective actions required (if any)
- Emergency Action Plans (EAPs)-verification of notification procedures and contact information (on and off base), location and availability for stockpiling of materials, location of earth moving and/or heavy equipment
- Development of the annual funding requirements and submission of critical projects to the HQIMCOM Integrated Priority List (IPL)

(6) Hazard Potential Classification System: The Army has adopted the hazard potential classification system identified within FEMA-33, “Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams”, dated April 2004. Army installation personnel will review the hazard potential classification assigned to each dam in the inventory during each formal inspection. The timeline to perform the review varies and is dependent upon the rate of infrastructure change in the downstream impact areas on the installation, along the downstream river or creek or within the downstream communities. Hazard potential classification upgrades (i.e., change from low to significant or from significant to high) would result in a more adverse consequence of failure scenario and may signal the need to either create or revise the EAP.

(7) Hazard Classification: The following paragraphs summarize the key aspects of the hazard potential classification system to be used in conjunction with the Army inventory of dams and the Federal hazard classification assigned. Three hazard classification levels are adopted from the Federal Guidelines for Dam Safety as: Low, Significant and High. Hazard potential is based on an order of increasing adverse incremental consequences with an understanding that the failure of any dam or water-retaining structure, no matter what size, could present a danger to downstream life, property and environment. The Federal dam hazard potential classification system categorizes a dam based on the probable loss of human life and impacts to economic, environmental, transportation, and communication interests. Improbable life loss exists where persons are only temporarily in the potential inundation area. This hazard potential classification system does not contemplate the improbable life loss of the occasional recreational user of the river and downstream lands, passer-by or non-overnight outdoor user of downstream lands. It should be understood that in any classification system, all possibilities cannot be completely defined and therefore, high usage areas of any type should be considered and evaluated appropriately. Judgment and common sense must ultimately be a part of any decision on the classification assigned. Further, not allowances for evacuation or other emergency actions by the population should be considered because emergency procedures should not be a substitute for appropriate design, construction, and maintenance of dam structures. Hazard potential categories follow:

- Low Hazard Potential – Dams are classified as Low Hazard where failure or mis-operation would result in no probable loss of human life and low economic and/or environmental losses. Potential losses or impacts could be limited or confined to the Army installation, but could also include off installation impacts.

- Significant Hazard Potential – Dams are classified as Significant Hazard where failure or mis-operation results in no probable loss of human life, but could cause economic loss, environmental damage, disruption of mission execution, loss of transportation and communication facilities, or could impact other concerns. Significant Hazard potential classification hams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

- High Hazard Potential – Dams are classified as High Hazard where failure or mis-operation will probably cause loss of human life.

(8) Condition Assessments: Army installations will annually review and update the condition assessment section of the National Inventory of Dams (NID). The NID is a nationally centralized database of dams that can be used to rapidly acquire key informational facts on all identified dams. The Federal agencies have been strongly encouraged to keep information current for reliable use during times of emergency. The Army NID database is maintained at USACE’s Engineer Research and Development Center (ERDC) for the HQ IMCOM ADTIP program manager. Army current conditional assessments and the date of that assessment are to be entered into the database that best describe the condition of the dam based on the latest available information. Rating categories and definitions, as accepted by the National Dam Safety Review Board (NDSRB), are as follows:

- Satisfactory – No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the applicable hydrologic and seismic regulatory criteria and meet applicable tolerable risk criteria.

- Fair – No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

- Poor – A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. Poor may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Further investigations and studies are necessary.

- Unsatisfactory – Critical: Failure of the dam is imminent and requires immediate or emergency remedial action for problem resolution. Major structural, operational and maintenance deficiencies exist under normal operating conditions. Major repair or rehabilitation is necessary to restore the dam, spillway, and/or appurtenant works to original design or current design standards. Access should be restricted until repair/rehabilitation is performed. Repairs may need to be carried out on a very high priority basis with strong urgency.

- Unsatisfactory – Serious: A dam deficiency is recognized and immediate remedial action is recommended for problem resolution. The safety of dams with such deficiencies cannot be assured. Among the deficiencies which could result in this rating are developing seepage problems, structural problems related to structural stability inadequacies, or a seriously inadequate spillway capacity. Access may be restricted until problem resolution. Repairs may need to be carried out on a high priority basis with urgency.

- Not Rated – Dams not rated may not have been inspected, or are under state jurisdiction or may have other reasons to be in this category. Unless decommissioned and breached or removed, dams with the pool lowered or no water visible are still rated.

- When prioritizing dam safety needs at the installation, condition assessments of Army dams are to be used in combination with documented dam safety inspections, technical assessments, determination of a continued Federal interest and the dam's criticality in meeting the installation's mission.

(9) Continued Army Interest/Need for an Army Dam. Army installation personnel will review, during formal inspections, the continued need for each dam identified within the inventory of dams. This assessment is intended to be a simplified assessment of the continued Army interest in operating, maintaining, inspecting and repairing the dam over the next year or foreseeable future.

- Army Interest: The Army interest test would be met if the dam is essential or required to properly execute mission at the installation, is required to meet any other non-mission critical or essential need, or another Federal entity has an interest in the structure. For example, if the reservoir behind the dam provides a reliable source of non-potable water for fire protection purposes that cannot be acquired by other reasonable means (in a timely or efficient manner), then that dam could potentially be retained since it meets a non-mission critical or essential need for the installation. If a continued Army interest is determined, the dam is to be identified for funding within the 5-year program for operations, maintenance, inspections, and repairs made as necessary.

- No Army Interest: If an existing Army dam is no longer needed or not required to execute mission at the installation and not required for any other non-missions critical or essential need on the installation and no other Federal agency has involvement, then, that dam could be considered a candidate for removal or decommissioning.

(10) Removal or Decommissioning of a Dam: Any dam (Low, Significant or High Hazard potential) within the Army inventory may be considered for potential removal or decommissioning. This is particularly the case if the dam no longer has any Army or Federal interest. The pathway to remove or decommission a dam is highly dependent upon the hazard potential classification and the consequences of a dam failure. Coordination with the LHCs is essential.

(11) Army Dams Safety Responsibilities and Risk Management: Dams safety responsibilities for Army Low Hazard dams will be decentralized. This means responsibility and execution will be at the installation command level. Responsibilities for High and Significant Hazard potential dams that are not in a Critical or Serious condition will also remain at the installation command level. High or Significant Hazard potential dams in Critical or Serious condition will be reported to the LHC with current status and a developed Remedial Action Plan and Risk Assessments. For dams beyond the resources or authority of the installations, the LHC will determine the actions to be taken and the priority of funding using a Simplified Risk Informed decision methodology.

- Program Administration – Routine dam safety workload will be performed at the installation/base level. This includes all annual inspections, operational and maintenance activities, instrumentation, reporting and record keeping.

- Inspections of Dams and Appurtenant Facilities – (as modified from FEMA 93 guidance). The purpose of the Army Dam Safety Inspection Program is to verify, throughout the operating life of the dam, the structural integrity of the dam and appurtenant structures. Program goals are to assure protection to human life, property, use of the facility and protection to the environment. Periodic inspections can identify or uncover developing situations that could be detrimental to the safe operation of the facility. When inspections reveal potential issues, the installation will perform studies and/or analysis to determine the adequacy of the structure and evaluate its ability to function as intended. Inspections can also reveal the level of extent of any physical, functional or operational deterioration that may have occurred to initiate the proper planning, design, maintenance, repairs or rehabilitation efforts necessary to correct the deficiencies. The following principles and guidelines for the inspection program will be used by Army for all dams.

- DSOs are to ensure that dam's maintenance activities are performed within a reasonable time period prior to physical inspections. Maintenance and vegetation management practices performed in advance of the inspection, significantly enhance the effectiveness of the inspection and the ability of inspectors to see and evaluate the actual condition of the facility.

- The required inspection types, frequency interval and inspector qualifications are presented in AR 420-1. All existing dams with a Significant or High Hazard classification potential shall have a safety evaluation performed based on current technical guidelines and criteria. Improvements in dam technology require that dams and appurtenant structures be periodically reassessed to assure that adequate dam safety practices/procedures are being followed while checking to determine if more stringent design and materials criteria have been released. Any new dams added to the Army inventory and this inspection program are to be planned, designed and constructed in accordance with current guidance and technical criteria.

- To ensure that the dam inspection program objectives are being met, the installation will develop a rolling 5-year Dam Safety Program that identifies among other items, the year in which each programmable dam inspection type will be performed and identify when the exercising of EAP will be performed.

(12) Correction of Inspection Deficiencies: The inspection program could potentially reveal deficiencies which, if uncorrected, could lead to failure of the dam. Deficiencies may vary from emergency type items where immediate action is required, to non-emergency items which must be corrected in a timely manner

but do not present an immediate danger to the safety of the structure. In all cases, corrective action will be made under the supervision of qualified personnel.

- High Priority Corrective Actions: High Priority Corrective Actions are required when a dam has Critical or Serious conditions. High and Significant Hazard dams, with Critical or Serious conditions, will be reported to the LHC immediately with corrective actions taken. These actions are required to be taken for correcting deficiencies which could result in failure of the dam within a short period of time. High priority requests will be made immediately for resourcing requirements to accomplish corrective actions in cases where time constraints will not permit allocation through the normal programming and budget processes. Procedures for seeking transfer authority, beyond that delegated to the Army, or request for supplemental appropriations, will be reviewed to ensure requests can be forwarded quickly with all necessary supporting documentation to enable expeditious action by those outside of the Army. Lowering the pool (dewatering) should be accomplished until these deficiencies are corrected. In certain instances, a risk informed analysis will be required that evaluates the need for each corrective action taken. Thus, ensuring these features are properly analyzed and sequenced to achieve the goal of reducing risk to life loss, property and the environment.

- Non-emergency Corrective Actions: These actions will be taken when there is no immediate threat to the safety or operation of the dam and not a threat to life or property downstream. The corrective action will be scheduled one year in advance of the fiscal year in which the work is expected to be performed. Advance scheduling will allow time for the planning, resourcing requirements (through the normal budgeting process), and arranging for special reservoir operations, if required. Some minor deficiencies could be corrected through the regular operation and maintenance program with existing budgets.

- Follow-up Actions: Periodic inspection reports will continue to list previously identified deficiencies, identify newly discovered deficiencies and show the current status of all corrective actions to be taken or required. Appropriate inspection personnel will make frequent field examinations as long as the problem exists to ensure that all corrective measures are being completed as timely as possible. If deficiencies are not corrected in a reasonable length of time, the installation DSO will investigate to determine the reason for delay and notify the Senior Commander and the LHC DSO to assist in expediting these remaining actions.

(13) Operations and Maintenance (O&M): O&M manuals are required for all dams regardless of the hazard potential. In addition, a Standing Operating Procedure (SOP) is required for Low Hazard dams. The O&M manual will contain a narrative summary of the critical features of the dam, including design features with safety limits, equipment operating and test procedures, instrumentation requirements, potential failure modes, a historical identification of problems and description of how those problems could adversely affect the structure under loadings or stress. O&M manuals are to be prepared during the construction phase and updated as features are added, when equipment is replaced, or when changes in project operations are implemented. The transition from construction to operation may consist of overlapping activities but, it is critical that problems encountered during construction be adequately documented and resolved prior to the turn-over of the facility to the installation. Rigorous and continuous vigilance, checking and visual inspection, for as long as the dam is operational, are necessary for dam safety, as problems have been known to occur following many years of safe and reliable operation. Project/installation personnel form the first line of defense in any successful dam safety program; as they are typically the most familiar with the project through their daily, weekly or monthly site visits, and have an understanding on how the dam responds to precipitations events that include rainfall and snow melt run off (for norther tier dams) form temperature variations. It is, therefore, imperative that these staff members be provided the most relevant or appropriate dam safety training to enhance their ability to identify a developing adverse situation at a project site, and fully understand the significance of rapidly reporting those observations or findings to the installation DSO.

(14) High or Significant Hazard Potential Dams: All Army dams within this category shall have a Water Control Manual (WCM) or SOP.

• WCMs are required for an Army dam classified as a High or Significant Hazard potential with large scale operational/movable gate features (comparing flow releases to downstream channel capacity).

• SOPs: SOPs are required for all Army High or Significant Hazard potential dams that do not require a WCM. Dams in this category have either a limited low level outlet capacity or operate in a self-regulating mode (i.e. – no human intervention required – structures have no operating components, movable gates or facilities to adjust or reset during an event). For these dams, SPs will be developed to identify and explain installation activities to be taken during normal, flooding or other hazardous conditions. The SOP will establish pre-planned minor low level gate outlet operations (if appropriate) as well as identify any key surveillance and monitoring procedures to be followed by operations personnel during a given condition. The SOP is intended to ensure that low level gate outlet operations and project monitoring occurs. The DSO with operations personnel to support shall ensure that key installation offices and off base authorities are alerted in timely fashion if unusual conditions are developing as identified with the EAP.

(15) Low Hazard Potential Dams: WCMs are not required for Army Low Hazard potential dams.

• With Limited Operational/Movable Gate Capability – Event Operation Procedure (EOP). Army Low Hazard potential dams with outlet operations are to have key operational criteria developed to identify and explain installation activities to be taken during normal, flooding or other hazardous conditions. The EOP is to be a scaled down version of the SOP and will be used to establish pre-planned minor low level gate outlet operations as well as the surveillance and monitoring procedures to be followed during a given condition. Gate setting operations and monitoring frequency of the facility are to be determined by the DSO and installation operations personnel. EAPs are not required for Low Hazard potential dams. These dams will have a SOP covering notifications and procedures for possible dam failure.

• Self-regulating Mode Dams – Army Low Hazard potential dams that operate in a self-regulating mode require no human intervention to operate. However, these structures are to have surveillance and monitoring plans developed with the frequency of these activities pre-established and determined by the DSO and installation operations personnel for normal, flooding or other hazardous conditions. EAPs are not required for Low Hazard potential dams. These dams will have a SOP covering notifications and procedures for possible dam failure.

(16) Reservoir Filling: Reservoir filling is the process of impounding water as storage to meet dam purposes. This could be a continuing process as successively higher pools are attained. For larger dams and reservoirs, this may take place over months to several years, but once complete there will be an initial test of the dam to perform to its design function.

• For Army, a few dams have yet to reach or exceed the spillway crest level or design pool, so guidance contained or referenced within this section is appropriate to those facilities. Existing reservoirs which have not yet experienced their design pool are actually undergoing a type of initial filling each time they achieve a new pool of record. Furthermore, significant repairs or modifications to a dam might also necessitate the need to view the project as an initial fill.

• Reservoir Filling Plan: A reservoir filling plan is to be developed on a case-by-case basis for all reservoirs which are new, which have been significantly modified, or those which have yet to be filled to their design evaluation. In general, the objective is to provide a planned program which allows adequate time for monitoring and evaluating the performance of the dam and its foundation as the reservoir is being filled (or as it achieves periodic record pool levels). Key factors to be considered when new or record impoundments are anticipated include:

i. Purposes of the new, modified or existing reservoir

ii. Risks associated with the filling – including potential failure modes

iii. Hazard potential both upstream and downstream

iv. Type of dam

v. Geology and seismicity in the vicinity of the dam/reservoir

vi. Landslide potential along the bank (both upstream and downstream)

vii. Inflow characteristics (controlled or uncontrolled)

viii. Hydrology of the river/basin as it relates to the time necessary to fill the reservoir

ix. Releases required to meet project minimum requirements

x. Potential for flood releases

xi. Flood emergency plan and associated requirements

xii. Amount/type of instrumentation installed

xiii. Provisions for monitoring/evaluating the instrumentation

(17) Maintenance Activities and Procedures - Recurring maintenance for dams safety includes: maintenance of instrumentation; cleaning and flushing of toe drains and relief wells; removal of debris and the blockage of outlet works, trash racks, intakes and spillways are to be cleared and open for operation; cutting of vegetation on, along or adjacent to the embankments and abutment (cleared at least twice a year across the entire structure and within 15 feet of the downstream toe and abutment contact); repairing of erosional ditches and swales with appropriate fill on upstream slopes, upstream abutments and contacts, downstream embankment slopes, downstream abutments and contacts; riprap protection in wave action zone; seepage monitoring ad repair (as recommended in the Routine Maintenance Report); greasing of gate valves stems; checking of hydraulic fluids (as recommended by manufactures of equipment), etc. Operations activities for dam's safety also includes instrumentation readings and evaluations.

(18) USACE Support to Emergency Conditions or Incidents:

- General: USACE as requested, will assist installation personnel by providing technical resources in response to emergency conditions, as available. Technical support can span the response and recovery phase of the activity, incident or developing condition. USACE is uniquely organized, through its emergency management function, to provide technical assistance prior to (i.e. – anticipated – utilization of advance measures), during and following the actual event and/or incident. USACE resources may include on-site deployed technical resources, home district technical support, emergency contracting capability or the development of streamlined upward reporting material from the Installation Dam Safety Officer (DSO), to Installations Commander, to the Senior Commander, to the LHC CDSO, and the Army ASCIM ADSO.

- Informational data exchange between HQ Army and USACE: When a USACE District is requested to provide emergency technical assistance for a flood fighting situation, a developing condition or during the post event recovery phase, USACE will request the HHC CDSO (dam owner) to provide all pertinent/available information relation to the dam. Information requested by USACE shall include, but not be limited to: project pertinent data; inspections reports; operational photographs; construction photographs;

technical designs documents; plans and specifications; as-built construction drawings; instrumentation data; special studies; risk assessment and analysis; and other documents, as appropriate for the dam under review.

• Release of information to Entities External to the Army: USACE will not release, transmit, distribute or pass along emergency management or operational information outside of designated Army command elements within which it is providing upward reporting information. All dam/incident specific informational request will be redirected to the LHC CDSO and/or Public Affairs Officer assigned to the event at the installation.

• A triennial on-site review of the Installations' dam's maintenance program by the HQIMCOM engineer staff is required.

(19) Mission/Readiness Assessment Matrix (MRAM) Dams: Installations will provide the consequences of closure and the ADTIP inspection team leader will generate the final MRAM.

Mission/Readiness Assessment Matrix (MRAM): Dams

Dams Mission Readiness Assessment Matrix Consequences	Hazard Class	Overall Condition of Structure				
		Critical Condition- Failure Imminent	Serious Condition- Failure Likely	Poor Condition- Failure Unlikely	Fair Condition- Low Probability of Failure	Satisfactory Condition- Low Probability of Failure
Extremely High Consequence: Catastrophic: Mission Failure, unit readiness impacted, death, unacceptable loss or damage will occur or is likely to occur. Critical: Significantly degraded unit readiness or mission capability, severe injury illness, loss, or damage will occur.	High	EH	H	M	L	L
High Consequence: Critical: Significantly degraded unit readiness or mission capability, severe injury illness, loss, or damage likely to occur. Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage will occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.	Significant	H	H	M	L	L
Moderate Consequence: Moderate: Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage likely to occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.	Significant	M	M	L	L	L
Negligible Consequence: Little or no impact to mission or unit readiness, minimal injury, loss, or illness. Property damage limited to the owner's property.	Low	L	L	L	L	L

Legend: **EH**-Extremely High Risk **H**-High Risk **M**-Moderate Risk **L**-Low Risk

7. Pavement Management Program:

a. The Installation pavement network consists of all surfaced areas that provide access ways for ground or air traffic, including roadways, parking areas, hardstands, storage areas and airfield pavements. The pavement network will be divided into manageable sections for performing pavement inspections and determining maintenance and repair requirements.

b. Inspections of pavement and appurtenances will be performed by qualified technical personnel using inspection techniques and distress identification described in ASTM D 5340 and D 6433. Detailed pavement inspections provide the basis for determining causes of failures and appropriate corrective actions. PAVER is used in these investigations. The frequency of road and parking lots inspections is based on individual section condition and rate of deterioration, but should not exceed 3 years from the last inspection.

c. The PAVER system is used for the management of airfield pavements, roads and parking lots. This system provides engineering analysis tools to generate the Pavement Condition Index (PCI) and for the development of short and long range maintenance programs and project development. HQ IMCOM has funded

the initial implementation of PAVER for roads and parking lots and provides the oversight and contracting mechanism for the Installations to complete the required data update every 3 years from the last inspection.

d. Installations are required to use the IMCOM enterprise PAVER for roads and parking lot contract under the USACE- Transportation System Center (TSC) in support of the required PAVER data update, technical assistance and training.

e. The Army Airfield (AAF) Pavement Evaluation Program is managed by HQIMCOM and executed by ERDC-GSL. Inspections will be performed by qualified ADTIP/ERDC airfield inspection personnel. All inspection reports will be reviewed by HQIMCOM to ensure consistency. Installations that cannot meet the required inspection schedule must inform the HQIMCOM ADTIP program manager as to the reason why and when the inspection will be rescheduled.

f. The AAF Pavement Evaluation Program determines the overall mission readiness of the AAF to support current and projected aircraft missions. HQIMCOM is responsible for the inspection of 55 AAF's throughout the United States and the world. Standardized airfield pavement evaluation procedures and PAVER are utilized to determine structural capacity in terms of Pavement Classification Number (PCN), Pavement Condition Index (PCI), and Installation Status Report (ISR) element and maintenance and repair recommendations. These evaluations for structural capacity and pavement condition assist IMCOM in repair decision analysis, the programming process, and ultimately, the wise investment of funds to support installations in managing their airfield pavement infrastructure.

g. Army airfields and instrumented heliports, which are identified by the U.S. Army Aeronautical Services Agency (USAASA), shall have a pavement condition survey performed every four years, and a structural evaluation (NDT) performed every eight years. Installations mission airfields shall have a pavement condition survey every four years and a structural evaluation (NDT) performed on an as needed basis. Funding for the inspection of these airfields is the responsibility of the mission.

h. The following Pavement Condition Index (PCI) are the minimum acceptable service levels for pavement:

(1) Vehicular pavements: primary roads-60, secondary roads-50 and tertiary roads-45

(2) Airfield pavement: runway-greater than 70, primary taxiways-greater than or equal to 60, all aprons and secondary taxiways-greater than 55.

The above minimums shouldn't be confused with the economic based Critical PCI used in PAVER for triggering the need of major M&R for a given pavement section. If the economic critical PCI is less than the listed minimums above, then the critical PCI should be raised to equal the listed minimums.

i. Vehicular traffic signs, signals, pavement markings and delineators will be inspected twice per year to ensure compliance with the Army IDS and the latest edition of the Manual on Uniform Traffic Control Devices (Federal and State) or host country standards whichever is the most stringent. Guardrails, impact attenuators.

j. A triennial on-site review of the Installations' pavement maintenance program by the HQIMCOM engineer staff is required.

k. Mission/Readiness Assessment Matrix (MRAM) Pavements: Installations will provide the consequences of closure and the ADTIP inspection team leader will generate the final MRAM.

Mission/Readiness Assessment Matrix (MRAM): Airfields

Airfield Pavement Mission Readiness Assessment Matrix	Condition	Potential for Structure Closure				
		High	Medium-High	Medium	Medium-Low	Low
	PCI, Surface Condition	0-25 Serious or Failed	26-40 Very Poor	40-55 Poor	56-70 Fair	71-100 Good or Satisfactory
	ACN/PCN, Structural Adequacy	>1.4 Extreme Overloading	>1.1-1.4 Overloading		1.0-1.1 Acceptable Loading	<1.0 Structurally Adequate
Expected Mission Frequency		A	B	C	D	E
EH-Extremely high: Operations at 100% mission capacity: Mission Failure, unit readiness impacted, unacceptable loss or damage will occur or is likely to occur.	1	EH	EH	H	M	L
H-High: Operations at 75% mission capacity: Significantly degraded unit readiness or mission capability, severe damage likely to occur.	2	EH	H	M	L	L
M- Moderate: Operations at 50% mission capacity: Somewhat degraded unit readiness or mission capability, minor damage likely to occur.	3	H	M	L	L	L
L-Negligible: Operations at 25% mission capacity: Little or no impact to mission or unit readiness.	4	M	L	L	L	L
Legend: **EH**-Extremely High Priority **H**-High Priority **M**-Moderate Priority **L**-Low Priority						

Mission/Readiness Assessment Matrix (MRAM): Vehicular Pavements

Vehicular Pavement Mission Readiness Assessment Matrix	Overall Condition of Structure				
	Failed Condition	Very Poor Condition	Poor Condition	Fair Condition	Satisfactory Condition
Extremely High Impact: Mission Failure, unit readiness impacted, unacceptable loss or damage will occur or is likey to occur.	EH	EH	H	M	L
High Impact: Significantly degraded unit readiness or mission capability, severe damage likely to occur.	EH	H	M	M	L
Moderate Impact: Somewhat degraded unit readiness or mission capability, minor damgae likely to occur.	H	M	M	L	L
Negligible Impact: Little or no impact to mission or unit readiness.	L	L	L	L	L
Legend: **EH**-Extremely High Priority **H**-High Priority **M**-Moderate Priority **L**-Low Priority					

Condition:
Satisfactory Condition is a PCI > 70
Fair Condition is a PCI from 56 to 70
Poor Condition is a PCI from 41 to 55
Very Poor Condition is a PCI from 26 - 40
Failed Condition is a PCI <25

8. Railroad Track Maintenance Program:

a. Railroad track inspections will be conducted IAW UFC 4-860-03, to identify defective conditions and to determine the relative severity of those defects. A track inspector meeting the qualification requirements listed in appendix L of AR 420-1 and has completed and passed the IMCOM tack inspector certification program will conduct track inspections.

b. The Railroad Track Inspection management systems (ERIDS- Electronic Railroad Inspection Database System, MREST- Military Railroad Electronic Safety Tracking System and DEFCOM- Defect Communication System) develop by ERDC for IMCOM will be used for the management of Army railroad track. These systems provides engineering analysis tools for development of short and long range maintenance

programs and for project development. All correspondence, including program presentation and project justification will use the standard terminology and railroad track management concepts contained in UFC 4-860-03 (Railroad Track Maintenance and Safety Standards).

c. The systematic application of preventive maintenance of railroads and appurtenances provides a safe working environment and protects railroad investments by providing a means for early detection of any apparent deterioration of the facility. As an aspect of preventive maintenance, evaluation of trackage by consideration of assigned track categories and their condition levels provides the means of determining the relative seriousness of defects and establishing priorities of repair work.

d. Army railroad tracks at all CONUS, AK, HI and U.S. possession Installations shall be maintained in accordance with the following categories:

Category	Types Of Track & Use	Minimum FRA Class of Track Safety Standard
A	All active mainline track, or other active track with speed greater than 10 mph	2
B	Active passing track, sidings, yard tracks, holding track, classification yard or storage track	2
C	Inactive track; no current mobilization requirements	0

e. Track category is the use of the track not the condition of the track. Track category normally does not change after it is classified. All track is classified by the Installations Commander and maintained under one of the categories listed above as established by UFC 4-860-03. Track categories should be re-evaluated and updated as necessary whenever a change in an installation’s mission affects its railroad track.

f. Host nation safety standards, if more stringent than UFC 4-860-03, shall apply to railroad tracks at all OCONUS sites. However, track inspection and routine maintenance programs for OCONUS sites will conform to the requirements of UFC 4-860-03, but in no instance less than the host nation standard.

g. The standards in UFC 4-860-03 are not to be used as specifications for new construction or major track rehabilitation projects. UFC 4-860-01FA and the American Railway Engineering and Maintenance of Way Association (AREMA) Manual for Railway Engineering and/or host nation industry and government standard will apply.

h. Categories of inspection:

(1) Continuous Operator Inspection: Safety checks shall be conducted daily or before use. In addition, on-the-job observations shall be going on at all times when equipment is working. Railroad operations personnel shall be encouraged to observe and report track problems, deficiencies, obstructions and the “feel” of the track. Items to be aware of are broken rails and other rail defects, faulty switch point closure, indication of wide gage, poor alignment or surface (profile), loose crossing planks, wheel flanges hitting frog points and joint bars, working spikes and loose joints, rail pull-a-parts, evidence of imminent track buckling, blocked drainage, scour at bridges, and the threat of slides. All these things can contribute to train derailments and should be brought to the attention of the responsible person for correction.

(2) Preventive Maintenance Inspection: Preventive maintenance is a continuous working inspection, examination of component parts, lubrication, adjustment and minor repair. If not affecting the full compliance level, maintenance defects shall be corrected during the next maintenance cycle.

(3) Safety Inspection: Safety inspection is the inspection of track performed in accordance with paragraphs 213.233, 213.235 and 213.239 of the Federal Rail Administration (FRA) Track Safety Standards and UFC 4-860-03. The purpose of this inspection is to identify defects that require restricted operations or no operations on the track being inspected. As a minimum, track shall be inspected at the following interval:

Track Category	Traffic Frequency	Minimum Required Inspection Frequency	Inspection performed by
A & B	Two or more movements per week	Monthly	Installations CTI
A & B	Greater than one movement per month but less than two movements per week	Quarterly	Installations CTI
A & B	One movement or less per month	Semi-annual	Installations CTI
C	No movement or inactive	Annual detailed inspection only	Installations CTI

(4) Detailed track inspection: A detailed inspection shall be made to support sustainment, restoration and maintenance. Detailed inspections are conducted annually by the Installations. Detailed inspections will be supported by engineering evaluations when there is any doubt of physical condition. The purpose of the detailed inspection is to identify all track defects including those exceeding maintenance standards provided in UFC 4-860-03. Results of this inspection will not only be used to establish urgent repairs, but by using the inspection reports and relating them the activity's basic trackage requirements, its in-house capabilities, priorities, available funding, and other factors, the annual log-range trackage maintenance and repair programs are developed and programmed.

(5) Electric/Electromechanical Grade Crossing Signals: The inspection and testing of electric/electromechanical signals at road-railroad grade crossings shall be performed at the frequency specified in chapter 10 of UFC 4-860-03.

(6) Internal Rail Defect Inspection: Internal rail defect inspection is executed by HQIMCOM supported by USACE-ERDC and shall be performed on class A and B railroad tracks at four-year intervals.

(7) Testing of railroad track base is executed by HQIMCOM and supported by USACE-ERDC and shall be performed on class A and B railroad tracks at four-year intervals.

(8) Special Safety Inspections:

- Infrequently Used Track: Track that has not been used for a period of six months or more shall be inspected prior to the first movement over the track.

- Mass Rail Movement: For track that has not been inspected within the last two months, a track inspection is recommended before any mass rail movement (15 cars or more).

- Unusual Occurrences: Track inspections shall be conducted following unusual occurrences such as derailment, accident, flood, fire, earthquake, severe storm, or other occurrence that could have an adverse effect on the track structure. These inspections shall be conducted before the first movement over the track following the unusual occurrence.

(9) A triennial on-site review of the Installations' railroad track maintenance program by the HQIMCOM engineer staff is required.

(10) Mission/Readiness Assessment Matrix (MRAM) Railroad Tracks: Installations will provide the consequences of closure and the ADTIP inspection team leader will generate the final MRAM.

Mission/Readiness Assessment Matrix (MRAM): Railroad Tracks

Consequence of Track Closure	Track Condition Based on Operating Restrictions			
	Critical Condition (CTT)	Restricted Condition (10/5 mph)	Maintenance Condition (A/B)	Defect Fee Condition
Extremely High Consequence: Catastrophic: Mission Failure, unit readiness impacted, death, unacceptable loss or damage will occur or is likely to occur. Category A track connected to a serving railroad with a single point of entry.	EH	EH	H	L
High Consequence: Critical: Significantly degraded unit readiness or mission capability, severe injury illness, loss, or damage likely to occur. Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage will occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Category A track not connected to a serving railroad or is not the only point of entry.	EH	H	H	L
Moderate Consequence: Moderate: Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage likely to occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Category B tracks.	H	H	M	L
Negligible Consequence: Little impact to mission or unit readiness, minimal injury, loss, or illness. Property damage limited to the owner's property. Category C tracks that are connected to other rails.	M	M	L	L
No Consequence: No impact to mission or unit readiness. Category C track that is not connected to other rails and is abandoned in place.	M	L	L	L
Legend: **EH**-Extremely High Risk **H**-High Risk **M**-Moderate Risk **L**-Low Risk				

9. Waterfronts Management Program:

a. The policy is to manage waterfront facilities and related structures by:

(1) Inventorying, inspecting and assessing condition of all structures.

(2) Establishing and executing work plans to reach and maintain predetermined facility conditions.

(3) Performing preventive maintenance systematically.

(4) Developing maintenance and repair strategies to protect investment in structures, make best use of available resources, and meet mission requirements.

(5) Establish quality standards to ensure the structures designed purpose and preserve the real property to continue to meet its assigned mission.

(6) For waterfront facilities work classification guidance, see DA PAM 420-11:

- A waterfront facility is an artificial landing place where ships can moor to perform loading and unloading operations, commonly referred to as piers and wharves and any other associated structures like dolphins and fenders. These facilities are used primarily for the transfer of cargo between ships and shore

facilities. Activities that typically take place on piers and wharves are personnel transfers, maintenance, crew training, cargo transfer, light repair work and waste handling.

b. Waterfront Performance Standards:

(1) Compliance of all waterfront facilities and/or components with a minimum level of service is mandatory. The minimum level of performance provided should identify the waterfront structure as acceptable and safe to accomplish its designed function. Failure to meet an appropriate level of service could lead to higher maintenance cost, delays or compromise of mission and/or loss of or damage to property.

(2) Standards should be based on the specific structure or component and its current purpose and/or remaining service life.

(3) Waterfront structures and components shall withstand its design capacity, particularly the live loads. If the structure will experience a significant increment in allowable loads, then an appropriate structural assessment should be performed by a registered, professional engineer.

c. Waterfront Management Requirements:

(1) The management of the maintenance and operation of the Army Waterfront Facilities should be done in accordance with the UFC 4-150-07. Such manual provides related or extensive information on guidance and standards for inspection, maintenance and repair of waterfront structures and related facilities.

(2) The management program shall provide specific guidelines and detailed scope of work to prevent and/or prompt detection of ongoing deterioration or potential problems of waterfront facilities with the intent of extending its useful life of service.

(3) Appropriate development, assistance and coordination in performing maintenance are encouraged at higher levels of command, as necessary, in the interest of optimizing the utilization of available resources.

(4) If the deterioration or deficiencies in the structures is deemed significant, the structure or component should be scheduled for repair and/or be closed. Replacement or rehabilitation of deficiencies or damaged structures should be treated with urgency and prioritized by means of importance and severity of deficiencies.

d. Waterfront Management Applicability:

(1) The waterfront policies apply to structures used for logistics and Army support and are considered to be part of the Army Real Property on all Installations'. Waterfront structures are divided in categories according to their function and comprise the structures that secure and provide access to ships and boats to load and unload supplies and/or structures used to prevent erosion of shoreline, see DA PAM 415-28.

(2) In the event that the structure is not in the Army Real Property and does not possess an appropriate CATCD, then the Installations real property office shall request and coordinate the assignment of a CATCD, see DA PAM 415-28. Otherwise, the structure will not be covered by the waterfront management policies. For management purposes, only after a structure is added to the Army Real Property, shall it be coordinated to periodic inspection.

e. Waterfront Inventory:

(1) In the management of waterfront facilities thorough consideration shall be given to the general inventory of structures. Documentation of inventory is for identifying working waterfront facilities and/or structure that shall be considered for preservation.

(2) The Installations DPW is responsible for the provision and maintenance of inventory records. The inventory data may range from a simple component structure, up to the entire facility. The inventory shall be prepared and updated, as necessary, and documented.

(3) All working and eligible waterfront facilities shall be identified, added and/or maintained on real property inventory.

(4) Waterfront facilities to be covered (by the management policies) includes, but is not limited to:

- CATCD 15110: Pier
- CATCD 15210: Wharf
- CATCD 15410: Bulkheads
- CATCD 15420: Quay Walls
- CATCD 15430: Sea Walls
- CATCD 15432: Riprap
- CATCD 15510: Small Craft Berthing
- CATCD 15930: Ferry Slip
- CATCD 16310: Offshore Mooring Facility
- CATCD 16410: Breakwater
- CATCD 16420: Groin
- CATCD 16430: Levee
- CATCD 16440: Jetty
- CATCD 16450: Mole

(5) Components of waterfront facilities that may not have category codes as defined by DA PAM 415-28, but should be part of inventory:

- Fender Systems
- Piling Dolphins
- Deck and Mooring Hardware
- Utility Distribution Systems

(6) For detailed descriptions of waterfront facilities and structures that should be maintained in inventory see DA PAM 415-28 and UFC 4-150-07.

f. Waterfront inspections: The Installations DPW is responsible for the periodic inspection of the waterfront facilities in order to visually determine the degree of maintenance involved with each facility. The inspections shall be performed according to the guidelines provided in the UFC 4-150-07.

(1) Purpose of inspections: Assess the structure condition to report damage, deficiencies and/or deterioration, if any, of the above water and under water portions of the structures. Condition is the capacity, safety and rate of deterioration of the facility, structure or component. Condition should be checked as part of a routine inspection of the facility.

(2) Applicable structures: Waterfront facilities, structures and components to be inspected are defined in section 7-63.

(3) Frequency of inspections: In general, routine inspections should be performed on a 4-year cycle, unless otherwise stated. More frequent inspections may be required depending on the condition and status of a specific facility or structure. It should be modified when the circumstances and structure condition require special attention. A change in the maximum inspection interval should be dependent on material type, age of structure, expected rate of deterioration, deficiencies, damages, type of service, and environment. Environment is defined as:

- Benign – freshwater with low to moderate currents (current <0.75 knots).

- Aggressive – includes brackish water, seawater, polluted water or waters with currents >0.75 knots. Facilities that handle chemicals containing elements detrimental to the structure's durability; such as chlorides, sulfates or alkalis are aggressive environments. Before a change is made in the inspection frequency, the engineer responsible for that request is to document the rationale, place it in the Waterfront Facility Inventory File, and forward a request to Land Holding Command, IMCOM Army Transportation Infrastructure Inspection Program (ADTIP) PM, ERDC, and OCS G9 for review and concurrence (maximum of 6 years).

(4) Type of inspections: The type of inspections conducted will be identified according to the requirements of the above water and underwater structures and the scope of work to be met. The following are the types of inspections that may be performed during the life of the structures:

- Baseline Inspection: This type of inspection is an approach commonly used to verify whether a new waterfront facility or component was constructed as stated in the as-built drawings and that the physical condition of the structure does not possess any deficiency. Generally, the inspections shall be performed before owner acceptance. It may be conducted at the same time as the first routine inspection if not conducted at the time of original construction.

- Routine Inspection: This type of inspection is intended to determine the current physical and structural condition of the structure based on field observations and measurements. Routine inspections shall be conducted on a cyclical basis and represent a proactive approach to maintenance. The information gathered in this inspection allows to identify changes from previous documented conditions and determine if the structure needs a more detailed inspection or repairs.

- Repair Inspection: These inspections should be performed during the execution of repair projects to ensure proper quality of repairs, resolve field problems and assure impartial documentation of payment quantities.

- Special Inspection: These inspections are conducted to gather more detailed information than commonly gathered during a routine or structural repair or upgrade design inspection. Such information may be needed to understand the nature and/or extent of deterioration prior to deciding the need for and type of repairs. Special inspections may also be executed to estimate the remaining useful life of structure.

- Post-Event Inspection: This type of inspection should be conducted following a substantial, potentially damage-causing event such as a flood, earthquake, vessel impact or tsunami. The main purpose of a post-event inspection is to quickly assess the structural stability of the structure and/or to determine if further attention to the structure is needed as a consequence of the event.

(5) Level of inspections: According to the UFC 4-150-07, these are the three levels of inspections that depends of the detail of information obtained and are described as follows:

• Level I – General Visual Inspection. This inspection involves no cleaning of any structural elements and, therefore, is the most rapid of the three levels of inspections. The purpose of the Level I inspection is to confirm as-built structural plans, provide initial input for an inspection strategy, and detect obvious major damage or deterioration due to overstress, impacts, severe corrosion, or extensive biological growth and attack.

• Level II – Close-up Visual Inspection. This inspection is directed toward detecting and identifying damaged or deteriorated areas that may be hidden by surface biofouling or deterioration and obtaining a limited amount of deterioration measurements. The data obtained should help estimate the facility's load capacity. Level II inspections will often require cleaning the structural elements. Since cleaning is time consuming, it is generally restricted to areas that are critical or which may be representative of the entire structure. The amount and thoroughness of cleaning to be done is governed by what is necessary to determine the general condition of the overall facility.

• Level III – Highly Detailed Inspection. It is recommended that a Level III above and under water inspection be performed on piers identified for mooring use during heavy weather conditions. This inspection normally includes underwater inspections and will often require the use of nondestructive testing (NDT) techniques. It may also require using partially destructive techniques, such as core sampling of concrete and wood structures, physical material sampling, or surface hardness testing. The purpose of this type of inspection is to detect hidden or interior damage, loss in cross-sectional area, and material homogeneity. A Level III examination will normally require cleaning. The use of NDT techniques are usually limited to key structural areas, areas that may be suspect, or structural members that may be representative of the underwater structure. Level III inspections require more experience and training that Level I or Level II inspections, and should be done by qualified engineering or nondestructive testing personnel.

(6) Inspectors:

• Team Leader: The Team Leader shall be a registered/licensed professional engineer, specializing in civil, structural, environmental or coastal engineering, with at least five years of experience in a responsible capacity in the inspection or design of the system being inspected. If the inspection work includes underwater inspection, the team leader should also be a certified diver, with commercial training, and should perform a minimum of 25% of the diving inspection work. The team leader shall be at the site for the duration of the field inspection and shall personally direct the inspection team to assure that each component is properly inspected and its condition is properly documented. When unusual structural problems or details are encountered the team leader shall personally observe and evaluate the situation and, where applicable, seek assistance from subject matters experts.

• Diving Inspector/Engineer Divers: Divers shall be certified, preferably with commercial training, and shall have experience diving in low visibility, high currents and areas with limited space. At a minimum, the divers should hold a certification from a recognized training organization such as the Association of Diving Contractor International (ADCI) or International Marine Contractors Association (IMCA), and should have a minimum of two years of in-water diving experience being employed under conditions similar to the inspection site. The divers should have documented experience and/or training to make determinations of the condition of materials, retrieve samples, perform non-destructive testing, and take underwater photographs and measurements.

• Inspector: Engineers or technicians with at least 12 months of experience and a working knowledge of timber, steel and concrete construction/inspection. If the inspection includes wetlands, a working knowledge of marsh vegetation, wetland hydrology and soils is also required.

g. Inspection Limitations: The inspection is mostly limited to assess the condition of structures and components that are readily accessible.

(1) Waterfront Facilities Closures: In the event the condition of a waterfront facility requires closing or restricting to traffic, the engineer responsible for the waterfront will notify the Senior Commander, Land Holding Command, IMCOM ADTIP PM, ERDC, and OCS G9 (DAIM-ODF) within 7 days. Email is considered sufficient. The notification will include the structure identification number, the event, component that caused the emergency closure or restriction, and intended emergency remedial action. Reopening of the structure will also require the engineer responsible for the facility to notify the Senior Commander, Land Holding Command, IMCOM ADTIP PM, ERDC, and DCS G9 (DAIM-ODF) within 7 days.

(2) Waterfront Facilities Safety: Work on waterfront facilities involves hazards associated with use of heavy equipment and movement of traffic. Necessary safety measures will be taken on waterfront facilities as outlined in the UFC 4-150-07, EM 385-1-1, and TM 5-624. These measure will be taken during all inspections involving maintenance, repair and construction operations by both in-house and contract forces.

(3) Quality Assurance (QA): The inspection of maintenance, repair and construction work in progress, whether by in-house forces or AE services, will be on a timely basis with special attention to QA. Random monitoring may be used for work performed in-house. Continuous inspection shall be provided for work performed by an outside contractor. Inspectors will have demonstrated knowledge of proper maintenance, repair and construction procedures.

h. Waterfront Recordkeeping and Project Closeout:

(1) Waterfront Facility Inventory File: The Installations DPW shall maintain a permanent inventory file for each waterfront facility of component of waterfront structures. As a minimum, the file will contain the following:

- Inspection reports
- Structural and load rating analysis
- Maintenance, repair history and AWP (copies of DA Form 4283 and DD Form 1391)
- As-built drawings
- Inspection data sheets
- Photographs

(2) Waterfront Facility Project File: A permanent file will be maintained for every project with a record of data relevant to that project. Relevant data will include the following:

- Project number
- Project description
- Facility number and branch
- Project location
- Category code (5-digit)
- Dimensions and area
- Facility age
- Condition
- Feasible M&R strategies
- Life-cycle costs
- Documentation of project analysis shall be included in the project files for each bridge project more than $50,000

(3) Closeout actions: In addition to retaining the above folder, real property records and the GFEBSADTIP/ database will be updated upon project closeout.

(4) The responsibilities on privately owned, but Army used, waterfront facilities on leased land will be governed by the terms of the lease, permit, easement or other action conveying property rights and the provisions of AR 405-45.

(5) A triennial on-site review of the Installations' waterfront facilities maintenance program by the HQIMCOM engineer staff is required.

(6) Mission/Readiness Assessment Matrix (MRAM) Waterfronts: Installations will provide the consequences of closure and the ADTIP inspection team leader will generate the final MRAM.

Mission/Readiness Assessment Matrix (MRAM): Waterfronts

Mission / Readiness Assessment Matrix	Overall Condition of Structure				
	Critical Condition	Serious Condition	Poor Condition	Fair Condition	Good Condition
Extremely High Impact: Catastrophic: Mission failure, unit readiness impacted, death, unacceptable loss or damage will occur or is likely to occur. Significantly degrade unit readiness, or mission capability, severe injury illness, loss, or damage will occur.	EH	EH	H	M	L
High Impact: Significantly degraded unit readiness or mission capability, severe injury illness, loss, or damage likely to occur. Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage will occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.	EH	H	H	M	L
Moderate Impact: Somewhat degraded unit readiness or mission capability, minor injury. Illness, loss or damage likely to occur. Failure or misoperation can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.	H	H	M	L	L
Negligible Impact: Little or no impact to mission or unit readiness, minimal injury, loss, or illness. Property damage limited to the owner's property.	M	M	L	L	L
Legend: EH-Extremely High Priority H-High Priority M-Moderate Priority L-Low Priority					

Note: The term "mission" in the expected consequences refers to both military and civilian loads. If the facility is closed, the default potential will be *Low Priority*

Condition: Based on ASCE 130

Good: No visible damage or only minor damage noted. Structural elements may show ve1y minor deterioration, but no overstressing is observed. No Repairs required.
Satisfactory: Limited minor to moderate detects or deterioration are observed, but no overstressing is observed. No Repairs required.
Fair: All primary structural elements are sound, but minor to moderate defects or deteriorations are observed. Localized areas of moderate to advance deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
Poor: Advanced deterioration or overstressing is observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of primary structural components. Repairs may need to be carried out with moderate urgency.
Serious: Advance deterioration, overstressing, or breakage may have significantly affected the load bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repair may need to be carried out on a high-priority basis with urgency.
Critical: Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high priority basis with strong urgency.

10. ADTIP Inventory Management and Inspections Tools:

PAVER (airfield pavement, roads and parking lots)

The Pavement Maintenance Management System (PAVER) was originally developed in the late 1970's to help the Department of Defense (DoD) manage M&R for its vast inventory of pavements. It uses inspection data and a pavement condition index (PCI) rating from zero (failed) to 100 (excellent) for consistently describing a pavement's condition and for predicting its M&R needs many years into the future.

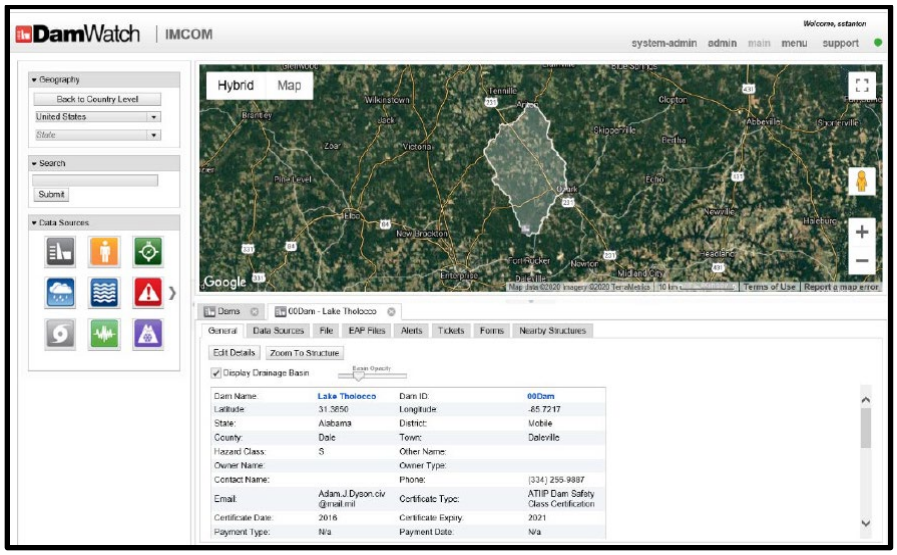
PCASE (airfield pavement)

The Pavement-Transportation Computer Assisted Structural Engineering is a program use in the design and evaluation of airfield pavements. The program generates the pavement classification number (PCN) which expresses the relative load-carrying capacity of a pavement for a given pavement life in terms of a standard single-wheel load.

InspectTech (bridges)

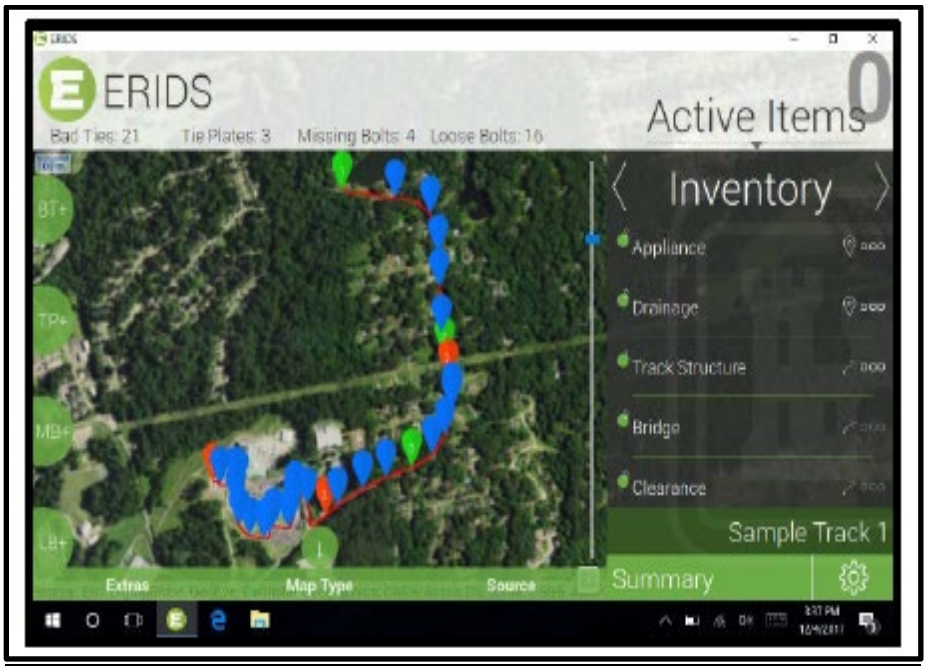
InspectTech is a commercial of the shelf (COTS) software acquired by ERDC to manage Army bridges. It's a comprehensive software solution for inspection, maintenance, and management of bridges. The software gives universal access to asset data – from the field, on the road, or in the office. InspectTech integrates asset data that is useful for multiple operational needs, from inspecting and reporting to capital-project decision making. Using InspectTech, inspectors can quickly and effectively collect, analyze, manage, and report inspection data while working in the field, the office, or anywhere in between using mobile tablets. The software significantly

improves the quality, usability, and amount of data available to make key decisions while preventing errors and avoiding mistakes. The use of the software is currently limited to the ADTIP/ERDC bridge inspection team.



DamWatch (dams)

DamWatch is a software-as-a-service (SaaS) platform, it provides a platform to display various live sensor data, local weather data, and seismic data for each dam in the IMCOM portfolio. Event thresholds can be set allowing alerts to be sent out automatically in the event of an emergency. The software serve as a tool for DPWs to be able to store information on each of their dams to include Annual and Periodic inspection reports, photographs, instrumentation readings, as-built drawings, Emergency Action Plans (EAP) and video files. Installations DSO have been provided access to the site however there are some instances where the local NEC protocols will restrict access to the site.



ERIDS (rail)

The Electronic Railroad Inspection Database System (ERIDS) is a GPS field data application used by the ADTIP/ERDC railroad track inspection team during detailed visual and ultrasonic inspections. This system creates a RAILER geodatabase on-the-fly.

MREST (rail)

The Military Railroad Electronic Safety Tracking System (MREST) is a spinoff of ERIDS and is geared towards the Installations to perform safety inspections IAW UFC 4-860-03. It allows for the tracking of repair to Close To Traffic (CTT) defects identified during the ADTIP/ERDC inspections. A centralized inventory and inspection database is maintained by ERDC. Plans are in place to acquire tablets/computers to be distributed to the Installations Certified Track Inspectors (CTI's).

AG Mag 1

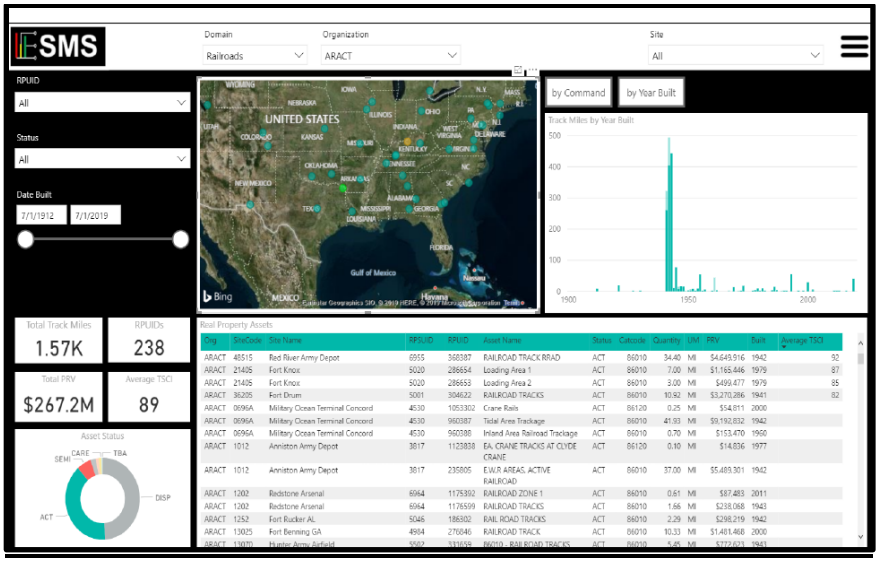
Area: None — Track Category: E
Track: AG Mag 1 — Report No.: 90

Defect	Rail	Meas (in.)	Qty	Date Inspected	Notes
OTM					
Bolts, Missing Or Broken, All on Rail End	L	--	1	17-Oct-2020	
Bolts, Missing Or Broken, All on Rail End	L	--	1	17-Oct-2020	
Bolts, Missing Or Broken, All on Rail End	L	--	1	17-Oct-2020	
Geometry					
Gauge	R	55.875	--	17-Oct-2020	
Ties					
Defective Jt Tie Cluster (3 Ties w/2 Jt Tie	--	--	1	17-Oct-2020	
Defective Jt Tie Cluster (3 Ties w/2 Jt Tie	--	--	1	17-Oct-2020	
Defective Jt Tie Cluster (4 Ties w/2 Jt Tie	--	--	1	17-Oct-2020	
Defective Jt Tie Cluster (5 Ties w/2 Jt Tie	--	--	1	17-Oct-2020	
Isolated Defective Tie Cluster (5 Ties)	--	--	1	17-Oct-2020	
Isolated Defective Tie Cluster (5 Ties)	--	--	1	17-Oct-2020	
Isolated Defective Tie Cluster (5 Ties)	--	--	1	17-Oct-2020	
Isolated Defective Tie Cluster (5 Ties)	--	--	1	17-Oct-2020	
Isolated Defective Tie Cluster (5 Ties)	--	--	1	17-Oct-2020	

Total Critical Defects: 13

DEFCOM (rail)

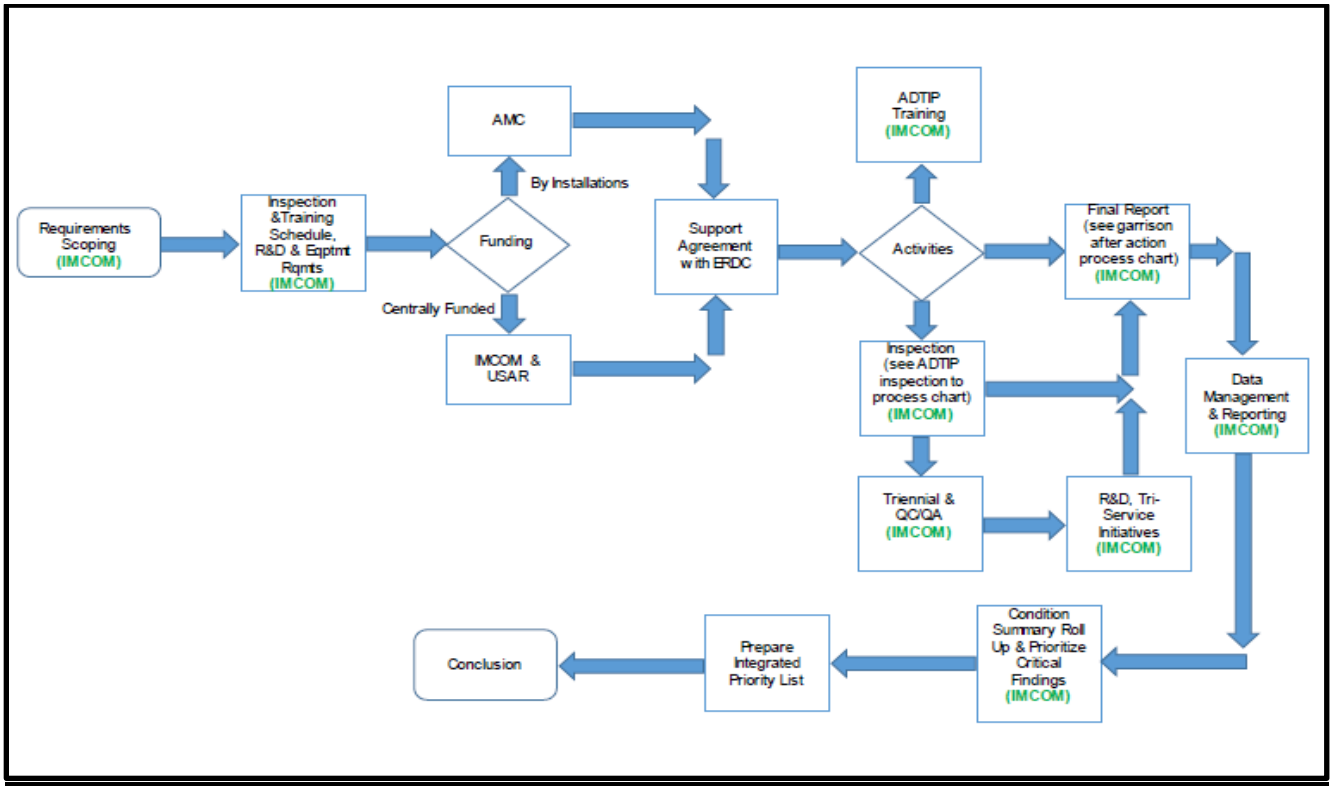
The Defect Communication System (DEFCOM) is an automated email notification system used to communicate to the Installations CTI critical findings daily during the ADTIP/ERDC railroad track inspection. The notification system allows the Installation to start the repair process and make a determination if resources are available.



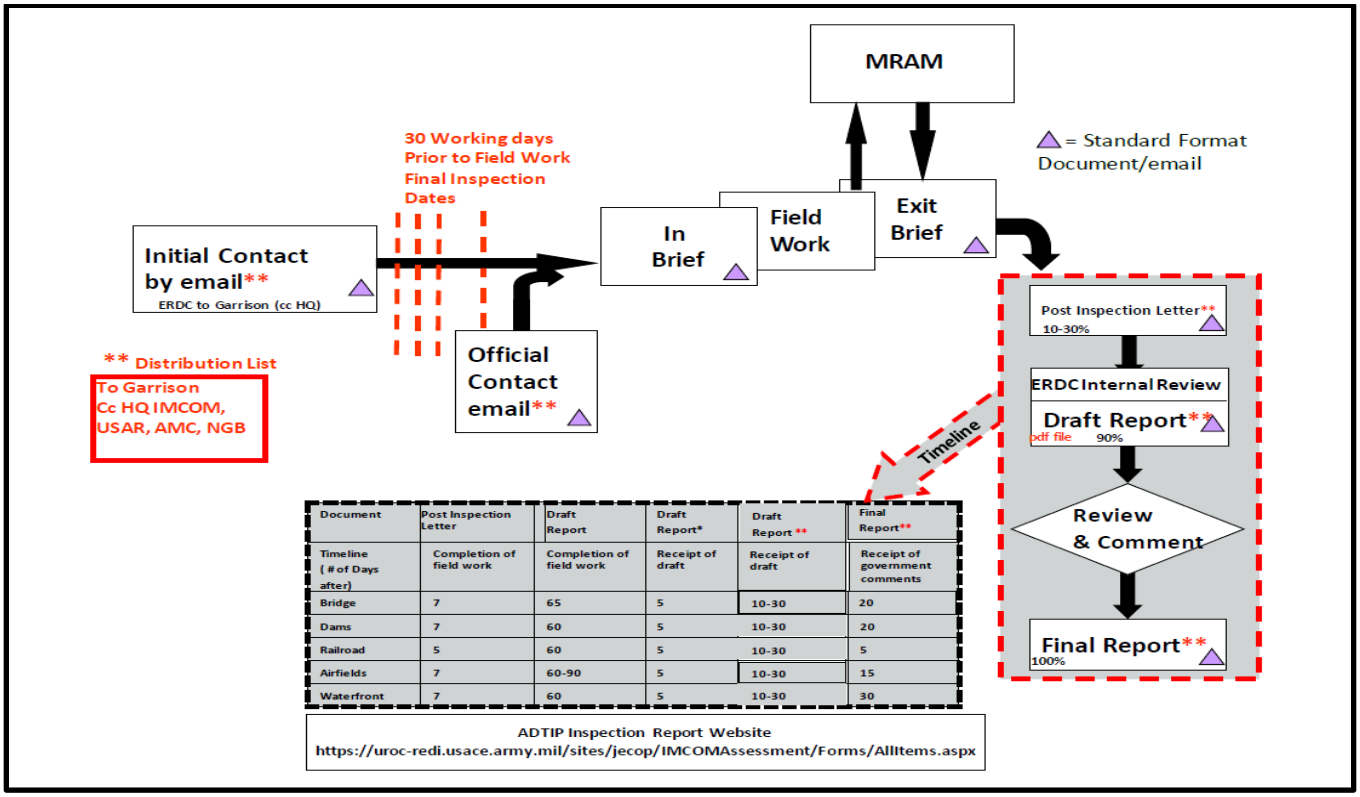
ESMS- Rail Domain (rail)

The legacy RAILER desktop capabilities has been migrated to the Enterprise Sustainment Management System (ESMS) Rail domain. Request access through the website at https://esms-staging.erdc.dren.mil/.

11. ADTIP Program Management Process:

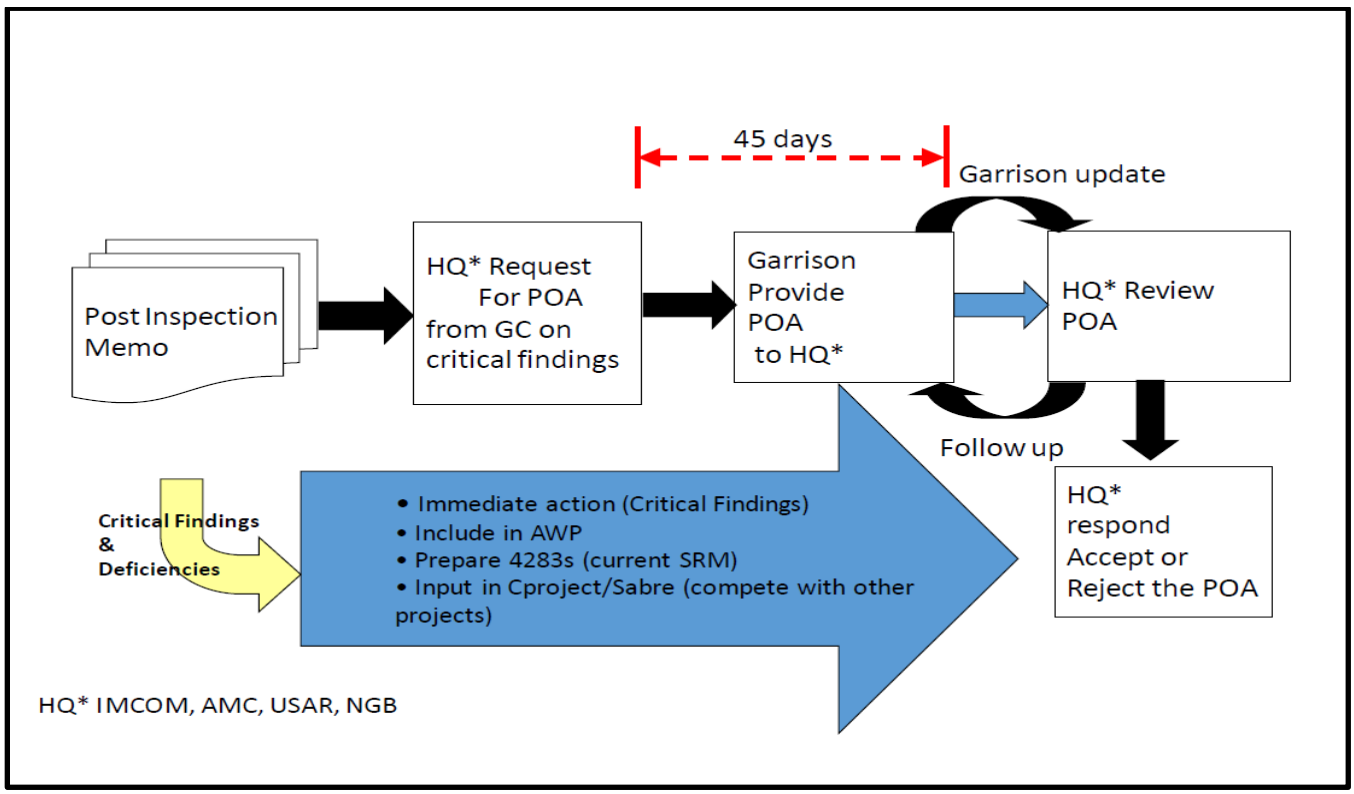


12. ADTIP Inspection to Report Process



Document	Post Inspection Letter	Draft Report	Draft Report*	Draft Report **	Final Report**
Timeline (# of Days after)	Completion of field work	Completion of field work	Receipt of draft	Receipt of draft	Receipt of government comments
Bridge	7	65	5	10-30	20
Dams	7	60	5	10-30	20
Railroad	5	60	5	10-30	5
Airfields	7	60-90	5	10-30	15
Waterfront	7	60	5	10-30	30

13. Transportation Infrastructure & Dams Installations After Action Process:



14. ADTIP CY2021 Inspection Calendar:

https://transportation.erdc.dren.mil/imcomadtip/resources/2020_ADTIP_Master_Schedule.pdf

15. CY2021 ADTIP Training Class Description and Schedule:
https://transportation.erdc.dren.mil/imcomadtip/Default.aspx

16. ADTIP Triennial Review and Bridge Program:
https://transportation.erdc.dren.mil/imcomadtip/triennial_review.aspx

17. ADTIP Triennial Review Binder and Bridge Program QA/QC SOP:
https://transportation.erdc.dren.mil/imcomadtip/triennial_review.aspx