Chapter 6. Rapid Runway Repair Operations

RRR is an integral part of the BRAAT operations outlined in chapter 5. A type of large-scale, horizontal construction engineering operation, RRR is conducted on short notice but without the aid of construction drawings or standardized plans. After an enemy attack, the ACE must repair damage quickly to support aircraft launch and recovery operations. The ACE can expect to repair—

- Airfield surfaces (i.e., runways, taxiways, and parking aprons).
- Permanent structures.
- Communications facilities.
- Utilities (i.e., commercial and expeditionary).
- Base camp areas.
- Airfield support areas (e.g., ordnance, fuels, maintenance).

PLANNING

Actual repairs and damage estimates will be based on the threat munitions used during the attack and categories of damage. The goal of RRR planning is to be ready for the worst-case scenario. RRR planning is normally based on historical data to determine specific needs for a particular air base. The S-2 can provide the MWSS with additional information regarding threat munitions damage capabilities to assist in RRR planning.

Threat Munitions

Threats to an air base come from the following surface-to-surface and air-to-surface delivered ordnance:

- Conventional general-purpose bombs.
Runway cratering munitions.

Mines.

Antipersonnel submunitions.

Missiles.

Area denial munitions, (e.g., chemical and biological, naval gunfire, artillery, mortars).

The airfield may also be covered with large quantities of UXO, which vary in size and type and can significantly hinder BRAAT operations. The UXO must be identified and removed or rendered safe as quickly as possible if BRAAT and RRR are to be successful. The MWSS EOD personnel, as part of the DAT and DART teams, will be responsible for locating and clearing UXO after attack. EOR agents may augment the EOD team in locating UXOs per Joint Army Regulation 415-30/Air Force Regulation 93-10, Troop Construction and Engineering Support of the Air Force Overseas.

**Categories of Damage**

Threat munitions used to attack an airfield can create various forms of damage, which are classified into four categories. Appendix D contains graphic depictions of the following categories of damage.

**Spalls and Scabs**

Spalls and scabs are craters less than 5 feet in diameter that do not penetrate the runway base course and subgrade. This type of damage is generally caused by—

- Small bombs with air burst fuses.
- Small-caliber artillery fire.
- Small rocket fire.
Other small-caliber, contact-fused munitions.

**Small Craters**
Less than 20 feet in diameter, small craters penetrate the pavement, base course, and possibly the subgrade of the runway, but may not cause pavement upheaval. Small craters usually are caused by—

- Small bombs weighing less than 500 pounds.
- Specially designed bomblets.
- High-angle, medium-caliber naval gunfire with time-delay fuses.
- Large rocket fire.

**Large Craters**
These craters are 20 feet or more in diameter. Large craters penetrate the pavement, base course, and subgrade of the runway and always cause pavement upheaval. Large craters are caused by high-angle, large-caliber naval gunfire with time-delay fuses and medium to large bombs weighing 500 or more pounds.

**Camouflets**
Camouflets are deep, small diameter craters, which are normally caused by large penetration-type projectiles with time-delay fuses.

**Considerations**
An increase in the diversity and lethality of the threat’s air- and surface-launched weapons requires planning for RRR materials, procedures, and techniques to recover bomb-damaged runways and taxiways. RRR requirements are usually identified early in the BRAAT planning cycle to ensure personnel are trained and familiar with their duties following an attack. See the RRR Personnel and Equipment Requirements in appendix D. Planners must consider the requirements for and availability of personnel, equipment, and repair materials when developing an RRR organization plan.
**Personnel**
The ACE and MWSS will assign personnel to fill specific billets within the RRR organization. Under ideal situations, there should be one repair crew and one foreign object damage (FOD) cover crew for every crater that must be repaired. Units will normally supply the manpower their T/O allows. Other supported units on the airfield may be required to fill billets in the RRR organization.

**Equipment**
After personnel requirements and availability have been determined, the MWSS will determine equipment availability for RRR by using the Equipment Availability Matrix in appendix D.

**Repair Materials**
RRR repair materials include fill materials, FOD cover, spall repair materials, and other materials necessary for crater repairs. Based on the construction of the existing airfield, environmental factors, material availability, and FOD cover being used, RRR planners will ensure adequate quantities of repair material are ordered or on-hand to make the necessary repairs following an attack. The Material Availability Matrix, provided in appendix D, will assist in tracking and recording necessary quantities. Refer to U.S. Army Training Circular 5-340, *Air Base Damage Repair (Pavement Repair)*, and the Navy/Marine Corps Runway Crater Repair Handbook, which detail the procedures used for crater and spall repair and for FOD cover applications.

**ORGANIZATION**
The RRR is organized to rapidly repair airfield operating strips (figure 6-1). The AGSOC forwards the airfield recovery plan, depicting the MOS requiring immediate repair, to the RRR OIC. The RRR OIC is responsible for directing the field operations of the crater, support, and hauling crews during repair operations. In addition, the RRR OIC receives problem area information from the roving controller.
Crater Crew

The crater crew chief, typically an engineer, supervises and directs the actions of the crater repair crews and the FOD cover crews. The crater crew chief coordinates equipment in the field and ensures crater repairs are done correctly.

Crater Repair Crews

The crater repair crews are responsible for removing debris and ejecta from around the craters. The crews are also responsible for backfilling the craters in preparation for the installation of an FOD cover. The
number of crater repair crews depends on the availability of personnel and equipment at the airfield.

**Foreign Object Damage Cover Crews**
FOD cover crews are responsible for installing the operating surface over a crater repair. The number of FOD cover crews depends on the availability of personnel, equipment, and FOD cover material.

**Support Crew**
The support crew chief supervises and directs the actions of the support crew. The support crew consists of the crater support crew, the spall repair crews, and the aircraft recovery crew.

**Crater Support Crew.** This crew consists of an MT, maintenance, and fuels detachment. The crater support crew is responsible for additional MT support, field maintenance, and refueling of equipment supporting the RRR effort.

**Spall Repair Crews.** These crews are responsible for repairing spalls located on the MOS. The number of spall repair crews is based on the amount of damage and the availability of personnel and equipment.

**Aircraft Recovery Crew.** This crew consists of the clearing and sweeping crew, the MOS lighting and marking crew, and the arresting gear crew. This crew is responsible for the removal of debris from the MOS; placement of the runway remaining markings; centerline painting; edge markers and lighting on the MOS; and the placement, operation, and repairs of the aircraft arrestment gear.

**Hauling Crew**
The hauling crew chief supervises and directs the actions of the hauling crew. The hauling crew ensures adequate crater repair materials, including fill and FOD cover material, are delivered to the craters on time. The number of hauling crews depends on the availability of personnel and equipment at the airfield.