

DC Stations, Section 14, Pipe Patching

Pipe Patching Overview Tip 001

Damage Control casualties can range from the simplest of leaks to large scale catastrophic casualties. While some of these casualties allow for easy pipe patching applications others will require more complex repairs, complete system isolation and system re-routing or bypassing. While every casualty provides its own unique characteristics and strategy to attack, there are some basics that can be applied to each and every casualty and the tactics, techniques and tips for each pipe patch and piece of pipe patching equipment will provide the user with a good working knowledge of pipe patches and pipe patching equipment.

Piping is everywhere onboard ships in every shape, size, and composition carrying fluids for everyday use. Whether the fluid being carried by the piping is for hotel services, system cooling or propulsion it plays a vital part to the overhaul operational readiness for combat effectiveness.

Leaks occur in shipboard piping quite frequently for various reasons such as failed fittings, improper installation, material degradation and casualties. Depending on the size, pressure and duration of a leak it can introduce flooding of significant quantities into shipboard compartments, tanks or voids. Some piping is covered by insulation/lagging compounding the problem when small leaks occur because the insulation/lagging tends to hide the leak. Improperly applied insulation and lagging may allow piping to sweat thereby causing condensation to form and drip. When insulation/lagging is wet or dripping it should always be further investigated to ensure no leaks are present. Lagging must be cut away to determine whether it is a leak or it is condensation forming. Minor leaks can turn into major leaks if initial actions are not acted upon quickly. Leaks to piping can cause additional catastrophic damage to other systems if left unattended.

There are many factors which must be considered when a leak is identified. First initial response is to always secure the flow of the leak. However if you are unfamiliar with the system and directional flow, isolation of the system could cause further damage and a loss to operational and combat effectiveness. Upon discovering a leak that cannot be immediately isolated without causing further damage, try to cover the leak and slow it down. If it is spraying try to deflect the leak so that it will not cause further damage to such items as electrical or electronic equipment.



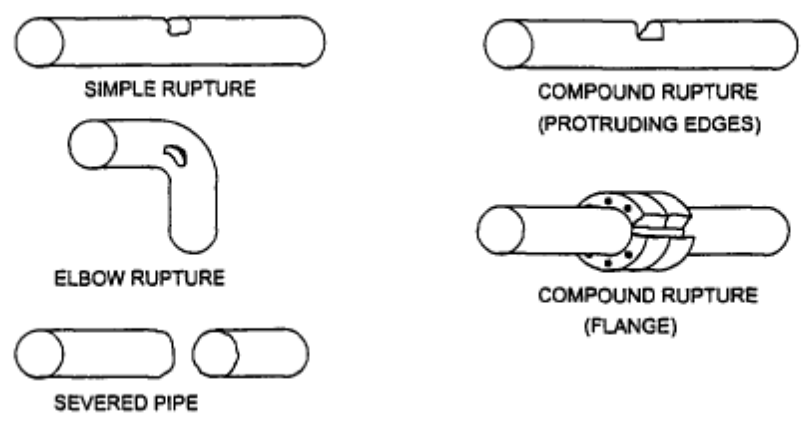
Always stay clear from leaking pressurized steam piping, high pressure air piping, and sewage piping. Severe burns, cuts, and toxic poisoning to personnel could result.

Determining what type of patch or repair is necessary can be determined by the immediate need to the system leaking. If the system is a vital system and is needed for the tactical situation then quickly patching the leak with a temporary patch is priority. If the system is non-vital then properly isolating the leak and determining a permanent repair maybe the solution.

Accurate system isolation can easily be accomplished by utilizing the specific system damage control diagrams located in Damage Control Central and the other controlling stations. These diagrams provide cut-out valve numbers and locations for quick and complete isolation to any system.

The type of leak or damage to the piping is the other major determining factor for how the piping will be temporarily patched. Piping damage or ruptures are categorized by severity and location. Definitions for the various types of ruptures that could occur to piping systems are as follows:

- a. Simple – a rupture with no protruding edges, located on a straight section of pipe.
- b. Elbow – a rupture with no protruding edges, located on a curved section of pipe.
- c. Severed – a section of pipe that has been completely separated.
- d. Compound – a rupture having protruding edges, ruptures in fittings, mangled pipes, and similar piping damage.



There are a number of pipe patches and equipment available within the DCRS to provide for emergency temporary pipe patching on various systems. Each patch having its own unique qualities, limitation and application procedures are listed as follows:

- Soft Patch
- Banding Patch
- Jubilee Patch
- Emergency Water Activated Repair Patch (EWARP)
- Pipe Jumper Hose System



NOTE

The Pipe Jumper Hose System is currently the only approved temporary patch for high pressure systems with the exception of steam

The unique qualities, limitation and application procedures for each type of patch are identified within their specific Pipe Patching evolution tips.

All pipe patching evolutions require the same simple steps

1. Isolate the leak unless the tactical situation prevents isolation.
2. Prepare the piping surface to accept the appropriate temporary patch.
3. Apply the patch.
4. Restore the isolated system checking for leaks.

The goal to pipe patching is to maintain system operability and stop or slow down the leak to manageable levels for fluid removal.

For large scale damage, pipe patching may not be practical and complete isolation maybe the only means to control flooding. If isolation valves to the damaged piping are ineffective it may be necessary to crimp the pipes to slow down or stop the leak to a manageable level. This type of damage will require the repair teams to think out of the box and apply variations of the pipe patches and techniques available. These complex evolutions can be found in the Complex Pipe Patching evolution tip.