MARINE
Safety Forum

Safety Alert

Number: 24-05 **Published:** 26/06/2024

Subject: Serious Hand Injury Whilst Donning Breathing Apparatus

What Happened / Narrative

During a vessels fire drill, the fire team were being assisted with donning their Breathing Apparatus (BA) sets. The assisting crewmember opened the BA set valve resulting in a release of high-pressure air, as a result of the high-pressure air release the assisting crew members finger was impregnated by the air.

The finger that was impregnated showed immediate signs of swelling and the medical support teams advised medevac by helicopter.

The injured crew member required surgical treatment to confirm the extent of the injury and ensure there were no debris injected and reduce the risk of infection and tissue damage.

Why Did it Happen / Cause

The BA set involved was transferred ashore and tested. It was initially noted that the BA set, when landed ashore, still had a pressure reading of 270 bar of the original 300. The BA Technicians noted that all connections were secure.

To try to recreate the leak, they loosened the Cylinder Valve Handwheel (between the BA Set and the BA Cylinder Valve) and immediately there was a high-pressure air release from the Pilot Vent Hole on the Cylinder Valve. The Pilot Vent Hole is a safety feature in 300 bar rated Cylinder Valves that has several purposes:

- It allows for pressure equalization between BA and the bottle when the BA valve is initially opened.
- It reduces the risk of a high-pressure blowout by giving any excess pressure a means to vent.
- It serves as an indicator of the Cylinder Valves integrity. (i.e. if the valve is closed any air escape can be detected).
- It aids initial reduction from high pressure cylinder to equipment.

The Pilot Vent Hole is located on the Cylinder Valve so that any high-pressure release is in an upward direction and away from the BA Cylinder Valve Open/Close, where the person who is operating the Cylinder Valve hand would be. During the testing it was noted that when the Cylinder Valve Handwheel was tightened, "***hand-tight (no tools should be used)***" as per manufacturer's instructions, there was no escape of air from the Pilot Vent Hole. This only occurred when the Cylinder Hand Wheel was slackened slightly. The Cylinder Valve was then fully dismantled to check for any faults and no faults were identified.

It was confirmed that the escape of air was initially felt by the BA wearer on the ***"back of his legs"*** and only lasted around one second. The downward escape of air felt on the BA wearers legs, could only have been from the Cylinder Valve Handwheel connection not being secure. The injured crewmember could not recall the action, due to the timescale and shock, although he was the only one who could have stopped the leak, by tightening the Cylinder Valve Handwheel and in the process must have inadvertently placed his impregnated finger over the Pilot Vent Hole. When the Cylinder Valve Handwheel was tightened there was momentary release of pressure from the Pilot Vent Hole until the valve had full connection to the BA set and the BA Bottle pressures were equalised.

The information contained within this Safety Alert and the associated MSF web site is provided in good faith for the benefit of our members and does not constitute and is not intended to constitute professional advice or any form of formal representation on behalf of any MSF member or officer. The text as provided by submitting organisations may be amended to ensure that it is brief, informative and readable but will as far as reasonably practicable remain as per the intent of the original submission. For the avoidance of doubt, no liability whatsoever shall be attached to any guidance, recommendation or statement contained therein. Contents should be reviewed individually by recipients who will determine relevance to their own operations.

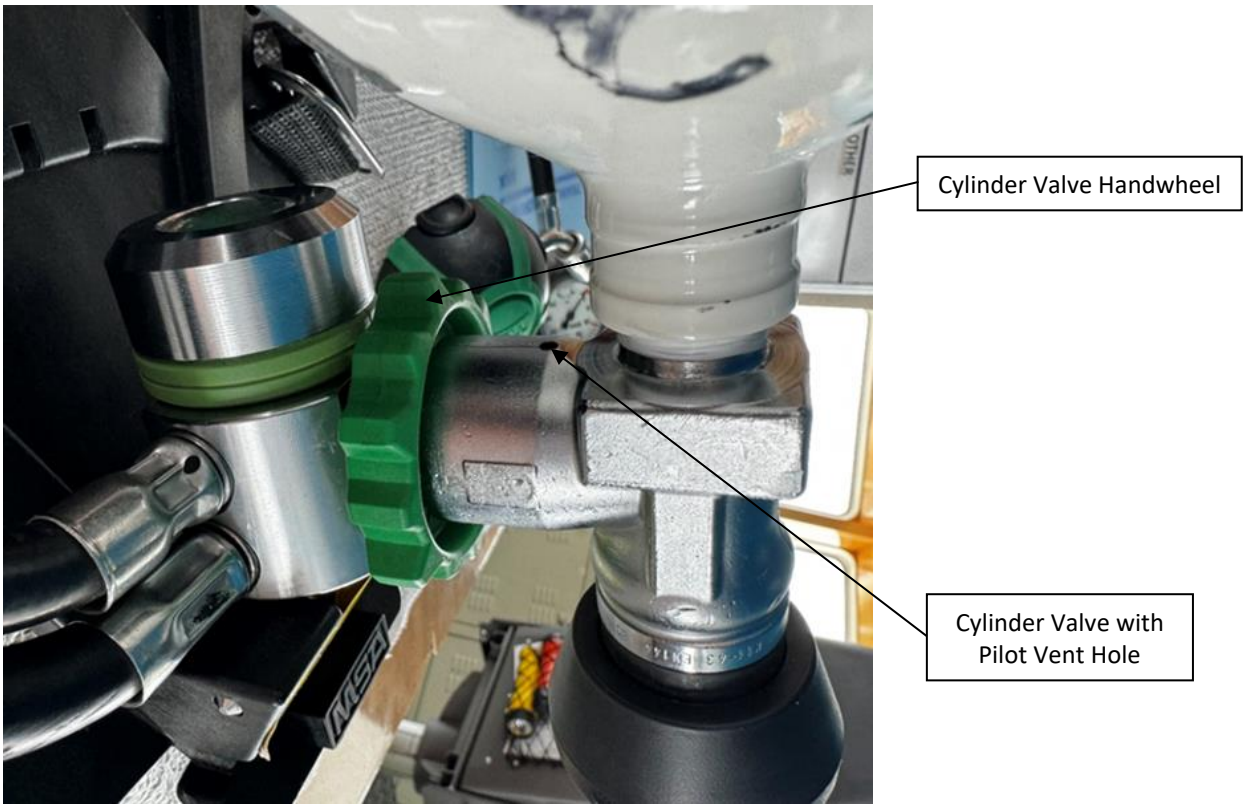
MARINE Safety Forum

Safety Alert

Corrective Actions Taken / Recommendations

1. When replacing a BA bottle on a BA set always ensure that the Cylinder Valve Handwheel connection its tightened as per manufacturer's instructions. hand-tight (no tools should be used).
2. After changing the BA bottle, pressurize the system and listen for any leaks. Apply soapy water to the connection points and check for any bubbles indicating a leak. Tighten connections, if necessary, but close the main valve first.
3. Ensure the pressure gauge reflects the correct pressure.
4. Conduct a breathing check by inhaling through the mask to ensure air is flowing correctly.
5. Verify the low-pressure alarm is functioning properly by momentarily turning off the air supply. When conducting planned maintenance checks the above should also be adhered to and checked.
6. When donning BA, manufacturer's instructions should be followed, and if any leaks are observed the main cylinder valve must be closed prior to tightening. Following the above checks when changing a BA bottle and conducting the planned maintenance should ensure that the integrity of BA connections is confirmed prior to using in Drill or Emergency.

Photographs / Supporting Information



The information contained within this Safety Alert and the associated MSF web site is provided in good faith for the benefit of our members and does not constitute and is not intended to constitute professional advice or any form of formal representation on behalf of any MSF member or officer. The text as provided by submitting organisations may be amended to ensure that it is brief, informative and readable but will as far as reasonably practicable remain as per the intent of the original submission. For the avoidance of doubt, no liability whatsoever shall be attached to any guidance, recommendation or statement contained therein. Contents should be reviewed individually by recipients who will determine relevance to their own operations.