In February 2026, the U.S. Chemical Safety Board released its case study into the serious incident at the PBF Energy Martinez Oil Refinery, California USA - an event that once again highlights how gaps in mechanical competency can directly compromise the integrity of bolted flange joints and the safety of major hazard sites.

Zulu Joint Integrity & Training Ltd is sharing this case study to reinforce a critical message: technical assurance is not achieved through procedures alone, but through the competence, capability, and confidence of the people applying them.

The lessons from Martinez are highly relevant to UK operators and maintenance support companies, demonstrating how avoidable failures in joint integrity practice can escalate into significant operational, environmental, and reputational consequences.

12. PBF Energy

Martinez, California

February 1, 2025

Incident Summary

On February 1, 2025, around 1:36 p.m., an explosion and fire occurred at the Martinez Refining Company refinery in Martinez, California (**Figure 1**), a subsidiary of PBF Holding Company LLC ("PBF Energy"). PBF Energy estimated that the incident caused approximately $924 million in property damage.

Figure 1. Fire at the Martinez Refining Company refinery in Martinez, California. (Credit: San Francisco Chronicle)

On February 1, 2025, PBF Energy tasked contract workers with installing an isolation blind at Flange A (**Figure 2**) to prepare a catalytic feed hydrotreater unit ("unit") for turnaround maintenance. A yellow tag was placed between Valve 2 and Valve 3 to indicate the location of the blind installation. After completing a field walkthrough to verify that the piping segment between Valve 1 and Valve 2 was empty, an operator issued a permit to the supervisor of the contractor work crew at 11:30 a.m.

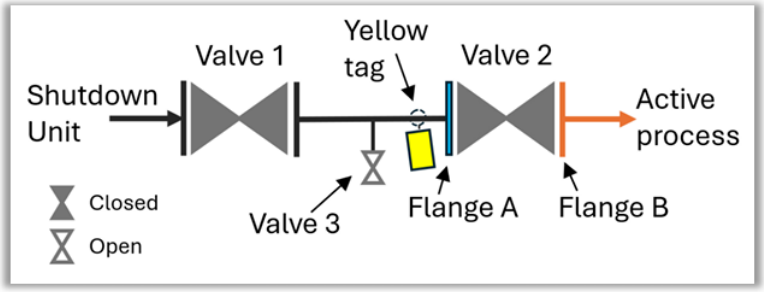

Figure 2. Existing isolation before blind installation (objects not to scale). (Credit: CSB)

When the work started, two contract workers were on a scaffold that provided access to the elevated equipment. In addition to their standard protective equipment, the two workers wore supplied-air respirators. Two standby workers from a different contract company were at ground level to monitor the breathing air equipment and observe the flange opening work. At approximately 1:25 p.m., the two contract workers began unbolting Flange B. At this time, neither the workers' supervisor nor the operator who issued the permit for the contractors to install the blind was present.

As Flange B was being unbolted, the contract workers' supervisor returned to the work area. From his vantage point, the supervisor could not see which flange the crew was working on. Shortly thereafter, the supervisor observed and heard a pressurized release and recognized that something was wrong. One of the standby workers activated an air horn to stop the work. The two contract workers disconnected from their supplied-air hoses, jumped from the scaffold, and evacuated the area. At about 1:30 p.m., the flammable material ignited and exploded with flames erupting from the area. Hot (above 600 degrees Fahrenheit) hydrocarbon material continued to be released from Flange B, fueling the fire. The extent of the fire escalated over three days and involved other equipment until emergency responders extinguished the fire on February 4, 2025. PBF Energy reported that approximately 50,000 gallons of flammable hydrocarbon material were released over three days.

PBF Energy's investigation found that the contract workers, hired specifically for the extra tasks during the turnaround, had not received training on the refinery's equipment opening policies and procedures. Consequently, these workers were not aware of PBF Energy's tagging system for identifying which flange should be opened. The company's investigation also revealed that installing this blind should have been treated as a "first break" (as written on the permit) under the refinery's policies, because this was the initial equipment opening for this system. First breaks required a qualified operator to be present during the work to ensure that maintenance workers open the proper equipment. However, because of a miscommunication between the workers, the operator was not present when the contract workers disassembled Flange B.

PBF Energy required maintenance crews to attach their personal locks or tags to all valves used for equipment isolation. The contractor crew did not apply locks or tags to Valve 1 or Valve 2. If the crew had done so, they could have had the opportunity to better understand the existing hazards by participating in the lockout/tagout process for these valves. The permit issued to the contractor supervisor stated that the equipment was out of service. The supervisor believed that all the equipment was empty and was unaware of the active (operating) process adjacent to Valve 2.

Because the work was on a scaffold, laser pointers were used to highlight Flange A during the field walk-throughs involving the operator, contract workers, and the contractor's supervisor. Although post-incident interviews with the operator and the contractor's supervisor revealed that two of the four walkdown participants understood that the blind should be installed in Flange A, it is evident that the contract workers believed that Flange B was the correct location.

Following the incident, PBF Energy revised its permitting procedure. For permits that require an operator to be present, operators must now issue one permit per isolation blind only after the workers are at the job site and prepared to start the task. This change was made to help ensure an operator is present to confirm that work is performed on the correct equipment.

Probable Cause

Based on PBF Energy's investigation, the CSB determined that the probable cause of the incident was the opening of a flange that was connected to an active process containing pressurized flammable liquid hydrocarbon. When the flange was loosened, the flammable material was released and ignited (autoignition or static discharge), resulting in a large fire. PBF Energy could have prevented the incident by having a knowledgeable person present to ensure that workers unfamiliar with the equipment disassembled the correct flange and were aware of the existing hazards. Additionally, PBF Energy would benefit from improving its tagging practice to make it obvious which equipment workers should disassemble.

Zulu Joint Integrity & Training Ltd delivers industry-approved, competency-based joint integrity and human performance training designed to raise standards, reduce risk, and strengthen operational assurance across the UK process industries.

Our courses combine rigorous technical instruction with hands-on practical assessment, ensuring personnel not only understand best practice for bolted flange joints but can consistently apply it in real-world conditions.

Built around recognised industry guidance and delivered by experienced specialists, our programmes provide a clear, auditable pathway to competence - supporting safer plants, more reliable assets, and a workforce equipped to protect the integrity of every bolted flange joint assembly.

Training Courses;

- **ECITB MJI10 MJI10** *Dismantle, Assemble and Hand Torque Flange Joint*
- **ECITB TMJI10 (Technical test)** *Dismantle, Assembly & Hand Torque Hub/Clamp Connectors*
- **ECITB TMJI11 (Technical test)** *Dismantle, Assembly & Hand Torque Hub/Clamp Connectors*
- **ECITB MJI18** *Hydraulic Tensioning Flanged Connections (April 2026)*
- **ECITB MJI19** *Hydraulic Torquing Flanged Connections (April 2026)*
- **ECITB MJI23** *Continuous Rotation (Powered Torque Gun)*
- **BS EN 1591-4:2013** *Qualification of personnel competency in the assembly of the bolted connections of critical service pressurized systems*
- **ASME PCC-1 2022** *Pressure Boundary Bolted Flange Joint Assembly*
- **Human Factors** *Chronic Unease*
- **ECITB HuP01** *Human Performance*

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