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Correct Tool is Key to Safe Maintenance

Lessons from UK MAIB's Marine Accident Reports



The UK MAIB has issued its Safety Digest for this year including lessons learnt from maritime accidents. One case highlights how important is to always use the correct key for safe maintenance.

**The Incident**

A ship’s engineer tested a spare fuel injector prior to use and found that the atomisation pressure regulating screw had been incorrectly set. The manufacturer had provided a clamping device to hold the injector, and a key to adjust the pressure regulating screw. To access the screw, it was necessary to remove a counter nut. The manufacturer’s tool for removing the counter nut was not held on board, therefore an ad hoc tool had been fabricated by ship’s staff.

Despite his best efforts, the engineer was unable to loosen the counter nut with the ad hoc tool using the manufacturer’s clamping device. He then took the injector to the engine room workshop where he continued his efforts to release the counter nut with the injector secured in a vice. Again these efforts were unsuccessful as the tool constantly slipped out of the counter nut slot. After some consideration, the engineer thought he might be able to drill out the counter nut using the ship’s lathe. However, a senior colleague recommended against this idea as there would be a risk of causing damage to the injector.

Instead, he suggested clamping the injector in the lathe chuck and using the lathe tailstock to apply pressure to the tool to prevent it slipping from the counter nut slot as the tool was turned. The lathe would be used purely as a vice to support the injector and would not be operated under power at any point.

The engineer isolated the lathe from its power source, clamped the injector in the chuck and set the tool in place. To prevent the lathe from rotating when the tool was turned, he set the lathe to its lowest speed which would give the most resistance to turning. To confirm that the gear was engaged, he attempted to rock the chuck using the chuck key as a lever. The gear had not properly engaged and the chuck rotated freely with more momentum than he expected.

As a result of the chuck’s rapid rotation, one of the engineer’s fingers became trapped between the chuck key handle and the lathe’s bedplate, causing the near amputation of the fingertip.

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| **Lessons learnt** |
| * Overhaul of a fuel injector is a normal part of a vessel’s routine maintenance, and had been completed using the ad hoc tool on numerous previous occasions. There is no evidence that the correct tool for removing the counter nut had ever been held on board. Lack of knowledge of a manufacturer’s tool could be expected in a junior engineer, but the absence of a correct tool on board should have been identified by senior engineering staff. Only the correct tools or equipment should be used for a particular task.
* The advice from a senior engineer to use the lathe as an ad hoc securing device demonstrates unsafe engineering practices and questions the underlying safety culture on board the vessel. The Code of Safe Working Practice for Merchant Seamen, Chapter 20 Use of Work Equipment, Paragraph 20.2.2 contains appropriate guidance.
* Using the lathe’s chuck key for any use other than its intended purpose for tightening the chuck is a particularly unsafe practice. Numerous accidents have occurred when lathes have inadvertently been started with the key still in the chuck. While this did not happen in this case, it remains a significant safety concern.
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**Source:**[**UK MAIB**](https://www.gov.uk/government/organisations/marine-accident-investigation-branch)