INFO LETTER HSE-Q
QUICK-CHANGE DEVICES (QCD)

With quick-change devices (QCD), for example, an excavator operator can switch from backhoe bucket to pipe grab and then to attachment compactor in just a few moments without leaving his operator's platform. To do this, he guides the excavator's boom to the mounting shaft of the attachment and locks it at the touch of a button via the excavator's hydraulic system. Simple, convenient, but unfortunately not always safe and in some cases fatal.

Faulty locking

Between 2010 and 2016, the BG BAU recorded 45 accidents that caused by faulty locking of the QCD. Five of these accidents ended fatally for those affected. In 2017, two workers were killed and four seriously injured by falling attachments.
Accidents occurred exclusively with "simple" systems that work without an additional safety or testing mechanism. However, it is also possible for existing warning systems to be defective (incorrect display or malfunctioning alarm sound).
Operating errors mean that the QCD does not lock the attachment, such as an excavator bucket or demolition hammer weighing several hundred kilograms. The construction machine operator receives either no or incorrect feedback as to whether the attachment and boom are fully locked together.

He cannot check it with the naked eye from the control stand.

These are the three most common sources of error:

- **Locking does not take place**

Once the machine operator has brought the boom and attachment together, he must activate the locking mechanism by pressing a button. This is forgotten, for example, if the work cycle is interrupted. If the operator continues working, the attachment lies unsecured in the holder and falls out at the next opportunity.

- **Locking bolts engage over**

Locking bolts engage over

The machine operator starts the locking mechanism, but the bolts do not close exactly in the locating claws, but over them. He is unaware of this. Neither the continuous warning tone that sounds while the bolts extend nor the extended test pin give him any indication as to whether the bolts are seated correctly.

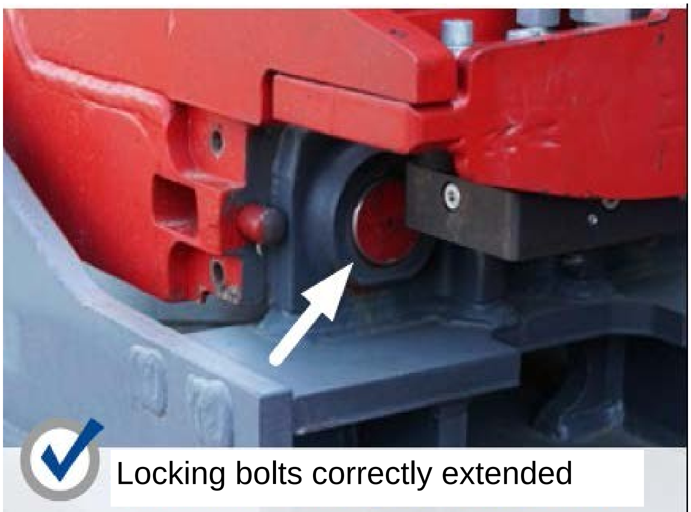
- **Locking bolts block the mounting claws**

Locking bolts block the mounting claws

Particularly tricky: The bolts extend, but rest on the lock of the mount. Incomplete locking may not be immediately noticeable. This is because the bolts press against the bracket, creating a clamping connection that is initially held in place by frictional forces. If the load on the attachment becomes too great, it falls off. These faults occur with systems from all manufacturers.

If the locking is correctly done and tested, generally speaking, all systems are safe.

What needs to be done?



Locking bolts correctly extended

A load test on the ground (**press the excavator/attachment against the ground every time it is changed = functional test**!) without endangering anyone, provides additional safety. Regardless of which QCD an earth-moving machine is equipped with, as a rule, nobody is allowed to be in the danger zone around the machine while it is working.

If the load test on the floor is not possible:
When quickly changing the attachment, the machine operators must leave their operating position when the boom and attachment are in the rest position and visually check that the locking mechanism is fully engaged.

Extract from BG BAU aktuell 1_2018 - Occupational safety