

## 9) Torquing

Something that is very much underestimated by most EV technicians is the need to use a torque wrench to torque high current items inside for example batteries and power distribution modules.



*HV Torque wrench 5 to 50Nm*

### **Incorrect torque consequences**

On a high current busbar which is torqued to light, the high current can heat up the bolt holding the busbar. That heat will expand the bolt reducing its tension further, letting go of the electrical connection it is meant to make. The bad electrical connection causes arcing, heat and pitting, making a high resistance connection. Next application where high current is required the resistance becomes too great and flash over arcing (fire) likely will occur.

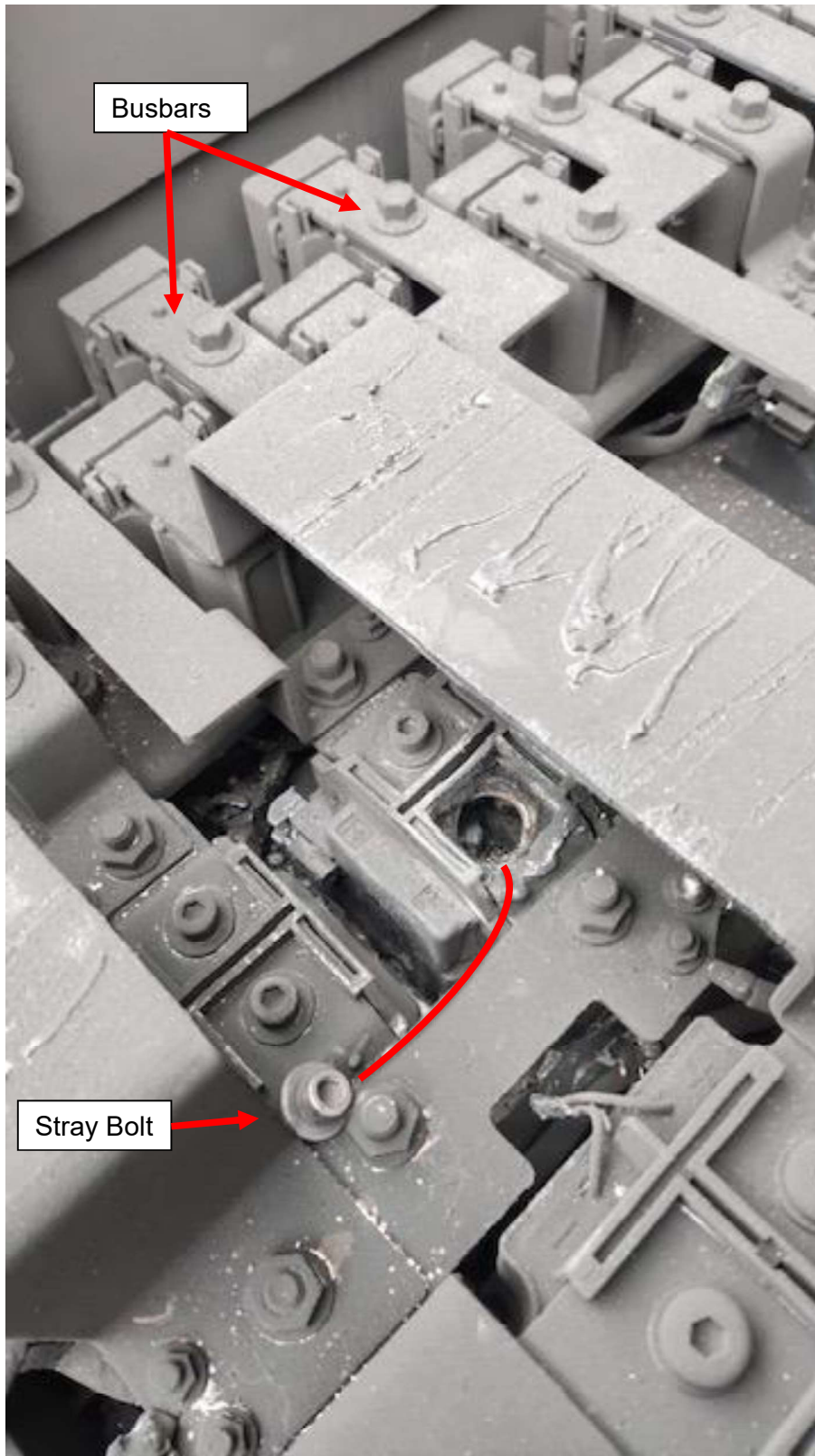
On a high current busbar which is torqued to tight, the high current heats up the bolt holding the busbar, reducing its strength. The tension combined with the heat causes the bolt to shear off, or stretch (past yield). The electrical connection which the bolt is meant to make will be lost. The small airgap between the two items that should be bolted together will be a space for arcing resulting in high heat (fire).

If for example a bolt explodes out of its position, due to the flash arcing, the bolt it self will be a further source of short circuits.

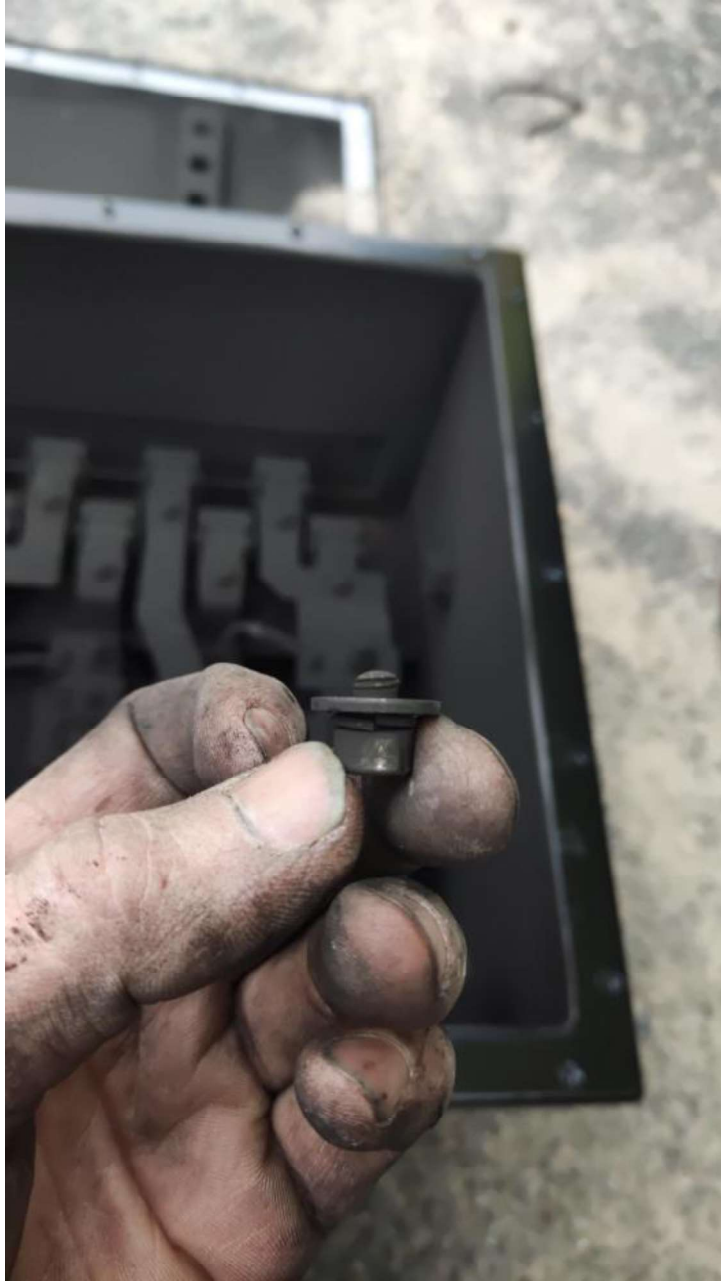
**Note:**  
**All current carrying connections need to be torqued to the correct settings!**



*Inside of a Li-ion HV battery*



*Colour picture of the consequences of an incorrectly torqued bolt*



*Stray bolt in detail, note the molten thread*

Stay safe and work safe. Electricity does not announce that something is about to go wrong.  
Errors can be costly and harmful.

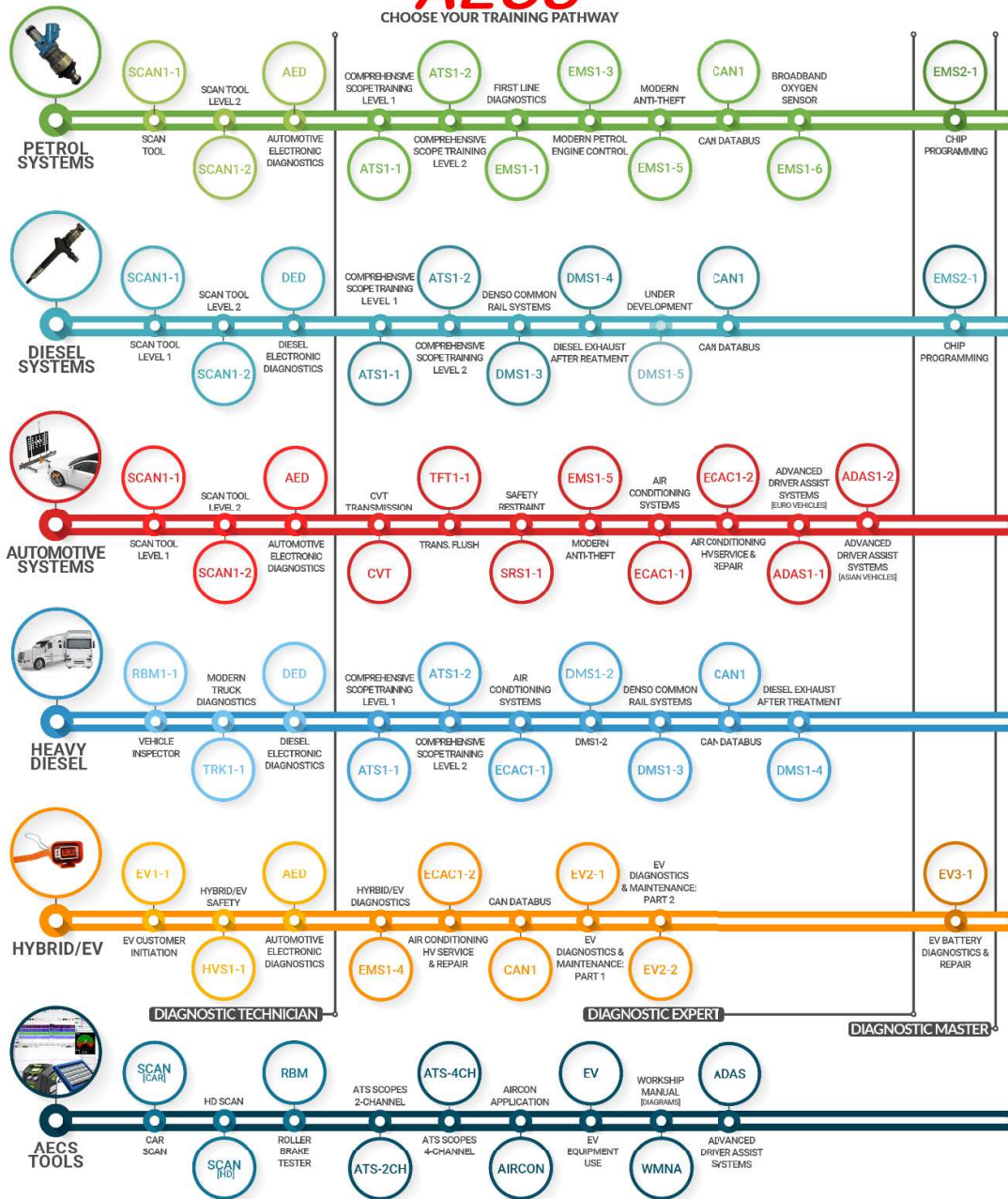
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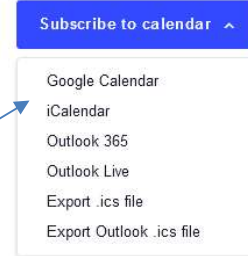


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