

**1\*** On a 20-km line, electrified with single-phase AC-current, 1600 t trains are hauled at 100 km/h by a *Class 185* from DB. We can find a 10 km ramp at 5 ‰. After an important incident on the substation, the power supply of the catenary is not available. The line has to be used provisory with Diesel locomotives. (Leaflets 8.5.13 & 8.10.23, fig. 4.229).

**A** How many *Class 285* from CBrail are necessary to haul the same trains?

**B** A question: repair or not repair? Explain choice arguments to the board office.

**5\*** It is planned change the voltage on Uetliberg from 1200V= to 1500V=, to have a standard value and reduce the power lost in the catenary. It is planned buy new trains.

**A** Explain the impacts on fixed installations: objects to modify, change on operations?

**B** Explain the impacts on actual rolling stock. Modifications? Scrap?