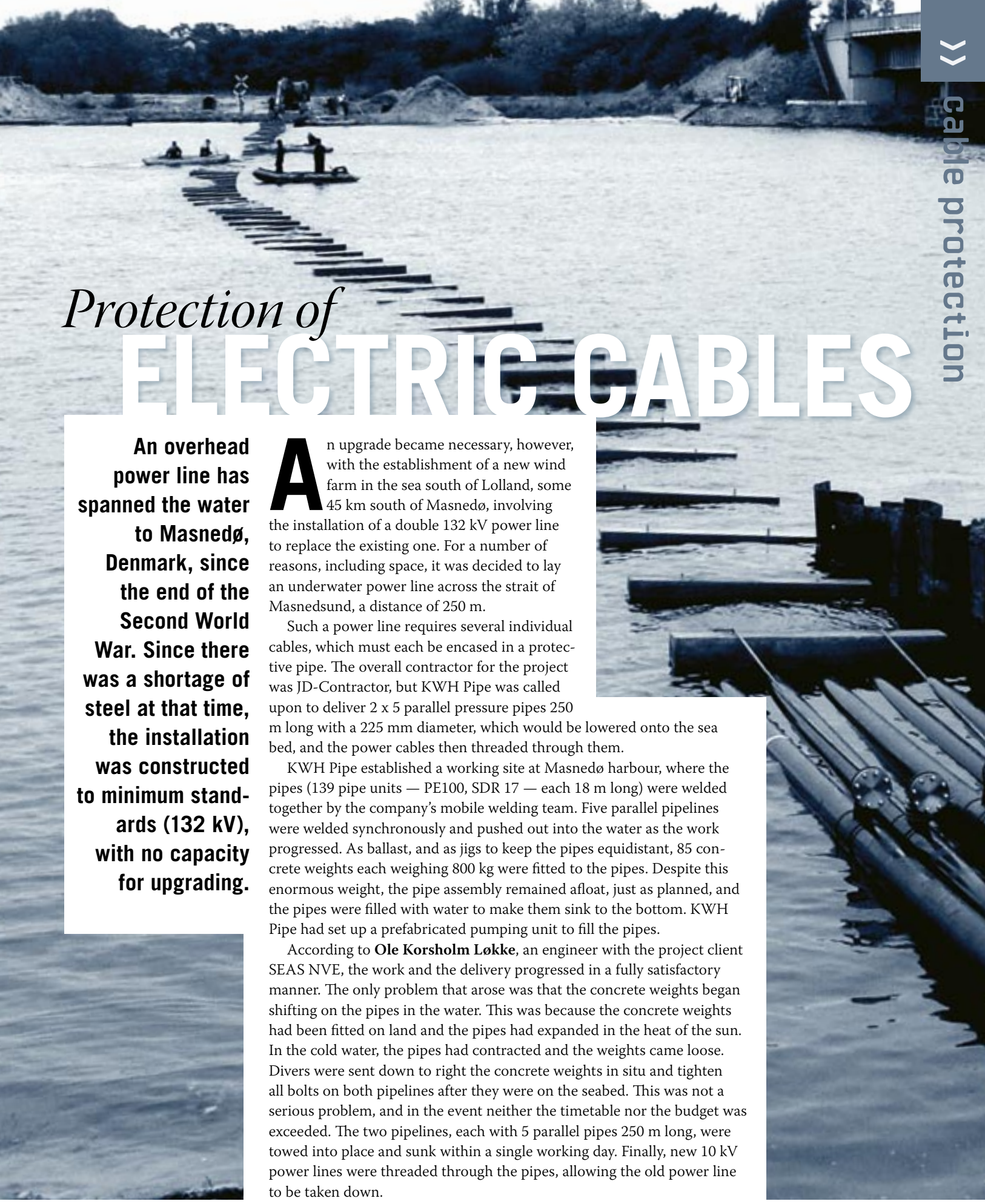

Protection of ELECTRIC CABLES

An overhead power line has spanned the water to Masnedø, Denmark, since the end of the Second World War. Since there was a shortage of steel at that time, the installation was constructed to minimum standards (132 kV), with no capacity for upgrading.

An upgrade became necessary, however, with the establishment of a new wind farm in the sea south of Lolland, some 45 km south of Masnedø, involving the installation of a double 132 kV power line to replace the existing one. For a number of reasons, including space, it was decided to lay an underwater power line across the strait of Masnedsund, a distance of 250 m.

Such a power line requires several individual cables, which must each be encased in a protective pipe. The overall contractor for the project was JD-Contractor, but KWH Pipe was called upon to deliver 2 x 5 parallel pressure pipes 250 m long with a 225 mm diameter, which would be lowered onto the sea bed, and the power cables then threaded through them.

KWH Pipe established a working site at Masnedø harbour, where the pipes (139 pipe units — PE100, SDR 17 — each 18 m long) were welded together by the company's mobile welding team. Five parallel pipelines were welded synchronously and pushed out into the water as the work progressed. As ballast, and as jigs to keep the pipes equidistant, 85 concrete weights each weighing 800 kg were fitted to the pipes. Despite this enormous weight, the pipe assembly remained afloat, just as planned, and the pipes were filled with water to make them sink to the bottom. KWH Pipe had set up a prefabricated pumping unit to fill the pipes.

According to **Ole Korsholm Løkke**, an engineer with the project client SEAS NVE, the work and the delivery progressed in a fully satisfactory manner. The only problem that arose was that the concrete weights began shifting on the pipes in the water. This was because the concrete weights had been fitted on land and the pipes had expanded in the heat of the sun. In the cold water, the pipes had contracted and the weights came loose. Divers were sent down to right the concrete weights in situ and tighten all bolts on both pipelines after they were on the seabed. This was not a serious problem, and in the event neither the timetable nor the budget was exceeded. The two pipelines, each with 5 parallel pipes 250 m long, were towed into place and sunk within a single working day. Finally, new 10 kV power lines were threaded through the pipes, allowing the old power line to be taken down.