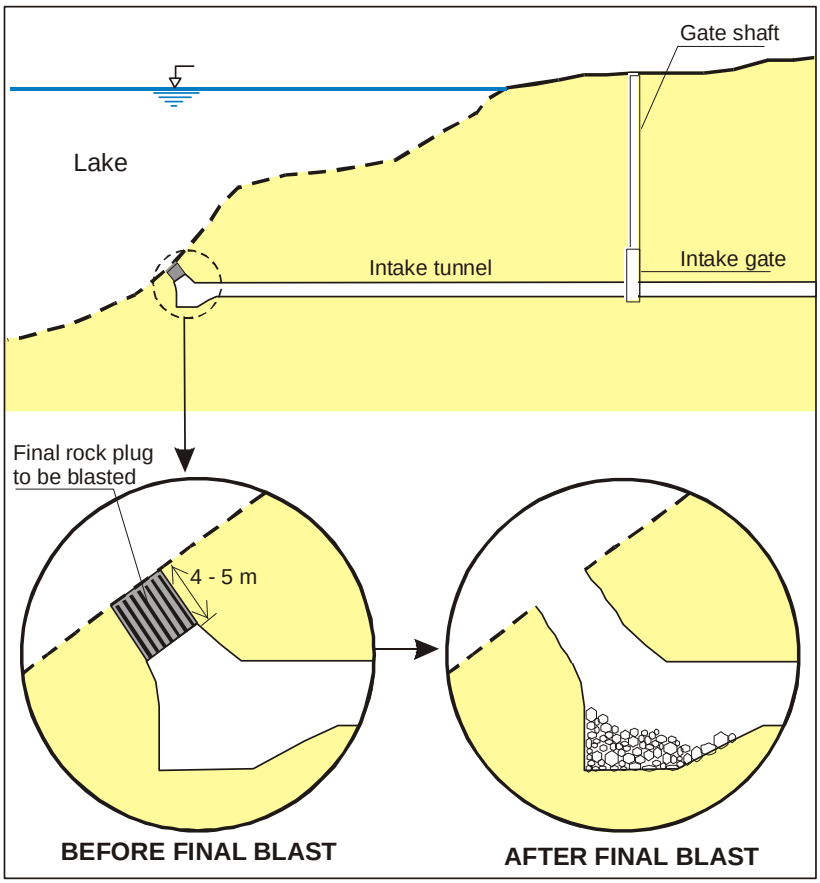
LAKE TAP
a well proven solution of a tunnel piercing the lake or sea bottom

The principal in lake tapping involves running a tunnel towards and under a lake, leaving a short rock plug to the lake floor beneath the tapping level (Figure 1). The final plug is then blasted, piercing the lake floor from below. The technology is an old practice and several hundred lake taps have been carried out in Norway alone.



Apart from establishing waterways for hydropower, drinking- and irrigation water purposes, the technique has also been utilised for landing of oil and gas pipes from offshore fields. Important requirements to a successful construction are suitable ground conditions, i.e. acceptable stability and permeability of the rock masses in the piercing area.

The successful construction of the great number lake taps is based on the fact that the piercing process has been headed by a highly trained specialist having practical experience in these challenging works. Due to the complexity and risk of damage to existing structures, a thorough and detailed design based on detailed geological data and experience from similar work is a prerequisite for a successful design.

FIGURE 1. PRINCIPLES IN THE LAKE TAP METHOD FOR A WATER TUNNEL

Careful planning and follow up are essential, involving the following important features:

- Control of the geological conditions in the rock mass and lake sediments, before any construction work commences.
- Design of the suitable method of final blast, whether to use so-called "open" or "closed" solution.
- Control of rock mass and permeability conditions while excavating towards the piercing area and during trimming and designing the final rock plug.
- Detailed design of all elements in the piercing area with verification of the pressures build up in the final blast, ensuring that no damage will occur.

Piercing of the sea or lake bottom has been made as deep as 120m below water level. Over the past 25 years Norwegian experts have been involved in lake taps in Norway, Asia, North America and South America.