

## Video 15: How To Solve Some of the Norwegian Traffic Problems

Norwegians have an interesting traffic problem. Fjords generally cut the land perpendicularly to the coast, and because the water depth in fjords can be up to 2000 meters, and hills around fjords can be at least several hundreds of meters high, local transport is based on a combination of lorries and cars, which is time-consuming.

To solve such problems, they invented several solutions. The first one, which is particularly spectacular, involves floating tunnels.

There are also other ideas, including a ship tunnel to cross the hill between two fjords.

But a single water tunnel would bring a car only over a single fjord, and a ship tunnel would bring a ship only to the next fjord through a single mountain, and since there are many fjords and many mountains, such projects don't make much sense.

The Deep Underground concept for traffic purposes proposes a system of shafts and tunnels which can be created at the same time by starting construction at multiple access points.

So, the general idea is to construct a system of tunnels and shafts along the hills, over the hills, and underwater to create a versatile transport system that can bring passengers quickly and safely from one location to another, including multiple fjords, islands, tops of mountains, and ports. Let's look at some examples.

There are different kinds of hills between fjords. If they are high and wide, like the figure on the left, we would need several horizontal tunnels and several shafts.

The middle figure shows a flat but wide hill. In this case, only four tunnels and shafts should be constructed, and the connection between them can be established via a surface or subsurface line at the top of the hill.

The example on the right is another more favourable option, with much height but a relatively short distance between two fjords. In this case, a tunnel is the best option.

To do the same underwater can be a bit tricky. The option to start excavation at several places simultaneously is not available in this case, so it would take a lot of time to excavate a tunnel under deep and wide sections. A much better option is shown on the right, where it is possible to pick a shallow and thin part of the fjord and construct tunnels and shafts there. So, a good idea is to design your new transport line along the fjords and try to find suitable places to bridge spaces over hills or underwater.

The map shows an idea of how the route can be designed. The land is connected with routes, generally constructed along a fjord, crossing them under the water and above the hills, using directional elevators' ability to go in every direction, including up and down.

For transport, the directional elevators moving through shafts and tunnels can be used, as we proposed in one of the previous videos, and those vehicles can use existing infrastructure too, like existing rail routes or road lanes.

It's obvious that current solutions trying to allow lorries to float through the hills or cars to pass under the water are very expensive and technically challenging solutions with considerable negative impacts on the environment.

If there is a place for such ideas, then it is not too strange to suggest another one which is probably as crazy and expensive as those two: using directional elevators for transport. And this idea has its own advantages:

- No cars, ships, or lorries would be needed.
- It's a very versatile solution that can connect cities and points of interest underground in all directions.
- Nature will stay mostly intact since most of the routes are underground.
- The capacity of such transport can be very high because the elevators can follow each other within close distances, and they can evade each other as well.