

Asfinag at the COB, April 2019

After weeks of intensive preparation, the time was finally there on the 17th and 18th of April: a delegation from Asfinag, the Austrian road and tunnel authority, came to visit the COB. The main purpose of this 2-day meeting was the exchange of knowledge and experiences, whereby the interest from the Netherlands was strongly focused on Austrian experiences with large-scale tunnel renovation projects.

No fewer than sixty people from the COB participants registered to attend the plenary and parallel sessions and exchange ideas with Austrian colleagues. This led to two intensive, but also fascinating and educational days with lively discussions in which a comparison could be made between the situation in Austria and in the Netherlands. Many similarities as well as clear differences became visible.

The Austrian Asfinag delegation consisted of the following specialists:

- René List, Head of Electrical and Mechanical Infrastructure
- Markus Gutjahr: Senior Project Manager for Electro technical and Mechanical Infrastructure
- Stefan Weiss: Regional Manager Styria, Electro technical operation and maintenance
- Franz Fegelin: Group leader region Styria for civil engineering

Below you can look back on plenary presentations and get an impression of the parallel sessions. For more details, see the sheets of the presentations on the COB site: www.cob.nl/asfinag

Presentation René List: Planning and Execution of Construction and Renovation Projects on Austrian Highways and Road Tunnels

- Asfinag stands for Autobahnen- und Schnellstrassen - Finanzierungs - Aktiengesellschaft. Asfinag plans, finances, builds and maintains the highways and expressways of Austria, a 2,200 kilometer motorway system. In addition, the company collects the toll from the Autobahn sticker, the truck toll via the GO-Box and the Sondermautstrecken, including maintaining these systems. The headquarters are located in Wien (Vienna). The company has 2,820 employees (2018) and a turnover of more than 2 billion euros (source: Wegenwiki). There is 1 national and there are 9 regional traffic centers.
- Asfinag is currently operating and managing 166 tunnels with a total length of approximately 450 km, 85 of these tunnels are longer than 500 meters
- Management and maintenance of the tunnels is laid down in a Strategic Asset Management plan based on safety, availability and life cycles. Increasingly important are the IT systems.
- The approach to tunnel renovation is based on a fixed pattern, one of the most important points which is kept into consideration is whether and how bi-directional traffic (counter traffic) is possible during the renovation.
- It is important to notice that with 20,000 to 50,000 vehicles (per day) the traffic intensity in the tunnels is on average much lower than in the Netherlands, where intensities can go up to 100,000.

Presentation Stefan Weiss: Tunnel Safety 2000 - 2019

- A detailed overview of the Austrian roads and tunnels managed by Asfinag, followed by an overview of accidents, injuries and deaths in the last 15 years. It is striking that the number of deaths in the last 10 years has remained about the same (around 5), while the total tunnel length has increased by 130%.
- An explanation of the development of tunnel safety over the past 20 years in a number of phases according to the Tuckman life cycle model (forming - norming - storming - performing).

Presentation Stefan Weiss: Risk Analysis

- In this presentation, Stefan indicates how the risk is calculated in Austria.
- In addition, which measures are possible to minimize risk and the effectiveness of each of these measures in practice.
- What stands out is that in Austria AKUT (acoustic tunnel monitoring) is used, a system that can recognize voices, blown-downs, accidents and other 'abnormal' sounds in a tunnel by using sound recognition and can react to this by for example switching the right camera.

Impression of the parallel sessions

In addition to the above-mentioned plenary presentations, there was also enough time during the two-day visit to have direct conversations and discussions with Austrian colleagues in smaller groups. This happened during parallel sessions that were grouped around the following four themes:

- Preparation and technical implementation
- Safety during the renovation
- Management and maintenance
- Governance and contracting

To illustrate the topics that have been discussed during the parallel sessions, a small 'anthology' below, with thanks to the reporters Hans Janssens, Johan Naber, Aris van Erkel, Arjan Neef, Leen van Gelder, Jacco Kroese and Ronald Grams.

It was noticed that there were relatively many fires in the Austrian tunnels, what caused them?

The main cause of the fires are poorly maintained vehicles, both for freight traffic as for holiday vehicles such as campervans and caravans. For example, overheating of the engine, jammed brakes or loose pipes can cause a fire. Particularly with regards to freight traffic, this is checked by using hotspot-detection.

What are the biggest challenges for Asfinag in the near future?

In the near future a large number of large-scale renovations of tunnels, but also bridges (around 5000) are on the program. This has a major impact, not only on our staff, but also on the available finances.

What are your experiences with planning maintenance on several tunnels at the same time in the same area, as is soon to be discussed in the Netherlands?

This experience exists in Austria, but there is no generic strategy for this. These are always customized solutions that are determined per situation on the specific conditions such as the nature of the renovation, the intensity of the traffic on the relevant part of the network and the impact of the various measures on traffic flow.

For example, recent experience has been gained with the renovation of 6 tunnels in and around a large city. Apart from the tunnels (a tunnel is a tunnel), it is much more about planning and traffic management. There is always a long-term preparation, in consultation with all stakeholders, and very precise planning. A lot of attention is also given to informing road users. Finally, holiday periods also play a major role. Where it is relatively quiet in the Netherlands, traffic in Austria is extra intensive.

Which contracting approach is used in Austria? One or more contractors? Clustered per tunnel, per technical component to be renovated? Or not clustered?

An example is the approach to the A2, an important route in the south to Italy, where 7 tunnels in the same route have been renovated. These renovations were put on the market as separate

contracts per tunnel, awarding was based on 50% price and 50% quality. What struck me was the high prices from foreign parties, especially from Switzerland.

Where is the responsibility for the design, at Asfinag or at the market parties?

This is different for electrical installations and for civil work. For installations, Asfinag makes a preliminary design based on its own design guidelines and basic configuration. This is followed by an inquiry for project preparation, design and planning, and finally an inquiry for the implementation itself. Types and brands are not prescribed, it is required that the design (the so-called basic definition) is elaborate. The design responsibility therefore lies with Asfinag and design and execution are not included in the same request.

Is the installation design the same for every tunnel?

No, the basis is the same, but is made specific for each tunnel on the basis of the specific characteristic such as length, traffic intensity and traffic composition and location in relation to the prevailing wind direction. The latter has a particular influence on the ventilation design.

In Austria water mist is used in tunnels, can you explain that further?

It is true that water mist systems have been used in a number of tunnels in Austria, but certainly not everywhere. The reason for applying water mist is not an increase in road safety but mainly as protection of the object. It is therefore used in tunnels where availability is an important issue, for example if the road connection is strategically important, if there is construction on top of the tunnel or if any rebuilding is extremely expensive or even impossible. Furthermore, tests carried out by Asfinag have shown that when the water mist system is used, visibility during the incident in the tunnel is greatly reduced and therefore presents an additional danger. Finally, it are very expensive systems, both for purchase and maintenance.

What exactly is 'acoustic tunnel monitoring'?

In Austria, the AKUT (Acoustic Tunnel Monitoring) system has been used for some time, the "ears of the tunnel". With this system, specially designed microphones are placed close by, or as part of, the cameras, and the sound in the tunnel is continuously recorded and analyzed. Special noises such as hard braking or a blowout are recognized and the connected camera is activated so that the traffic controller can immediately see what is going on. This allows the response time between accident and intervention to be shortened. The system is not applied everywhere but from a certain risk level.

How is Austria trying to minimize traffic disruption during renovation work as much as possible?

The options that are available in Austria, in addition to the approaches also known in the Netherlands such as partial closure and night and weekend work, is also allowing bi-directional traffic in one tunnel tube. This option exists because it is already taken into account when constructing tunnels such as two-sided ventilation, traffic detection and cameras. It should be noted that the traffic intensity in the Austrian tunnels is often much lower than in the Netherlands. Before bi-directional traffic is permitted, an additional safety analysis always takes place and there are almost always restrictions during this period, such as speed limits and restrictions on the transport of hazardous substances.