

12th International Road Weather Conference

Bingen (on Rhine), Germany

**Pierre-Alain Brodard**  
Boschung Mecatronic SA - Switzerland

**TMS 3000 high pressure spray system**  
A new concept for stationary prevention of  
winter-induced dangers on roads and highways

## **1 Foreword**

The BOSCHUNG products for winter service are in use world-wide with great success. Fixed and mobile equipments for both surface condition assessment (on-board sensors or Ice early warning systems) and surface treatment (snow plows, salt spreaders or fixed automated spray technology), as well as state-of-the-art data display and management software are all part of the unique product range of the Boschung group of companies. With nearly 50 years of experience in the machinery and over 30 years of experience in the electronics, Boschung clearly paves the way of winter maintenance equipment.

## **2 Fixed automated spray technology (FAST)**

Boschung pioneered the Fixed Automated Spray Technology with a first system installed back in 1979 on the bridge of Flamatt, Switzerland. The TMS 1000 and TMS 2000 generations have lead this unequalled technology to world-wide recognition.

In its constant effort to improve and refine its products, Boschung has now set a new milestone in the Fixed Automated Spray Technology : the patented TMS 3000 high pressure spray system.

## **3 Special features of the TMS 3000**

Compared to the previous generations, this new system has the following features :

- The spraying process is almost invisible, thanks to the high degree of pulverisation
- The spreading pattern is improved, thanks to closer distance between nozzles (typically 5 meters)
- Bigger surfaces are treated faster (typically 100 meters in one shot)
- Less components in overall system concept, hence lower installation and maintenance costs
- Almost maintenance-free
- Installation depth in the pavement is not greater than 40 mm

The other standard characteristics of the previous generations remain :

- Works independently of the type of thawing agent
- One spray operation provides the equivalent of 2 grams of salt per square meter

## 4 Technology

The key element of the high pressure fine-spray installation is a longitudinal profile (pressure tube) with built-in jet-sticks every 5 meters (see fig. 1)



Fig. 1

The jet-sticks are equipped with two micro-nozzles, which dispense the thawing agent onto the road surface almost invisibly, thanks to the high degree of pulverisation. The thawing agent is then equally distributed on the carriageway surface by the traffic, achieving a coverage close to 100% on the surface. The longitudinal profile is installed in sections of 100 meters. Different sections of a system can be supplied in parallel with thawing agent, in order to achieve a faster treatment of the surface.

The jet-sticks are fixed by means of a sealing compound in the upper layer of the carriageway or runway, and are designed to sustain the load generated by traffic or airplanes.

A working pressure of 16 bars and a spray duration of 30 seconds ensure the proper coverage of the surface with the equivalent of 2 grams of salt per square meter. As stated in paragraph 3 above, this new technology provides an improved spray pattern. Fig. 2 shows the typical image of a spray profile installed in the center of a two lane road.



Fig. 2

The system can execute various spray programs, which differ by the spray time and/or the number of sprayings, adjusting the quantity of dispensed thawing agent to the road and meteorological conditions, thus optimising the thawing agent consumption while ensuring the traffic safety.

With pump-stations and tanks for thawing agent, connected in series, any surface can be covered, regardless of the size. The capacity of a single pump-station is enough to feed two spray profiles in parallel, that is, to treat 200 meters of two-lane carriageway simultaneously. The nozzles are equipped with cone-check valves to prevent the penetration of dirt, keeping the system maintenance-free. Filters ensure the cleanliness of the thawing agent.

Fig. 3 below shows a schematic representation of the jet-stick.

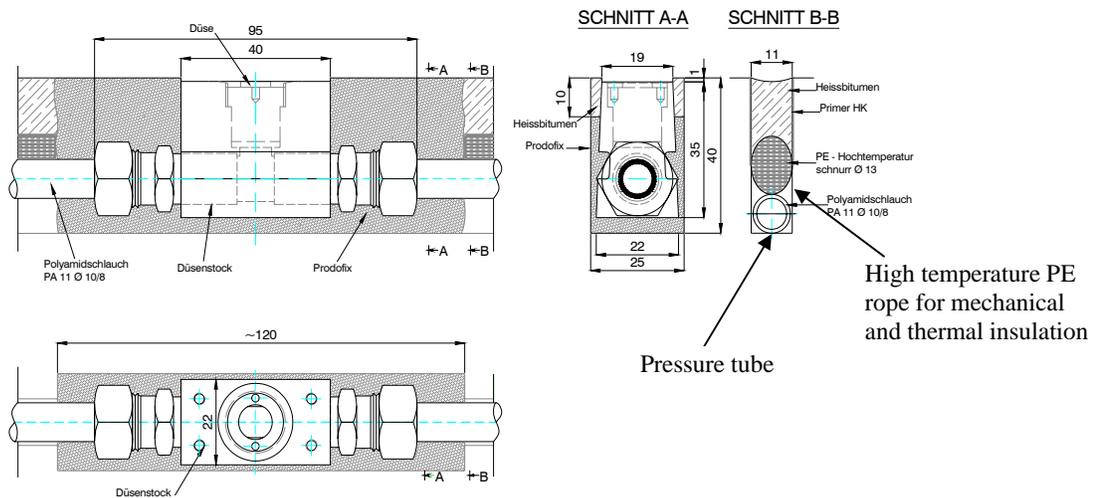


Fig. 3

## 5 Installation of the system



**One single, narrow slot is executed in the middle of the carriageway, between the lanes.**



**The jet-nozzles are held in the upper layer of the asphalt cover with a well-proven, two-component sealing compound.**



**The slot is then filled with hot bitume, on the special PE rope (see fig. 3 above).**

The system is installed in the middle of the carriageway, between two traffic lanes and is resistant to vehicle loads and to the wearing induced by snow ploughs and tires.

Thanks to the small installation depth of 40mm, the spray-profile can also be installed on bridge plates or concrete decks with reinforcement.

Fig. 4 below shows a typical installation in a 4 lanes highway.



Fig. 4

## 6 Summary

This new and revolutionary spray system marks another Boschung milestone in the field of winter maintenance : bigger surfaces can now be protected, effectively and economically, against wintry dangers. Furthermore, the addition of an ice early-warning- station with active pavement sensors to automatically control the system allows to take care immediately of dangerous situations without human intervention.



**Weather-induced dangers, for example freezing rain, are immediately defused thanks to the active probes and the micro high-pressure spray system**

This new system, which has been patented worldwide, has been tested for more than 3 winter seasons on airports and highways with high traffic volumes, meeting and even exceeding all design objectives. It is the result of the combination of modern technology and over 30 years of experience collected by Boschung worldwide.

08.12.2003/PD