Category(ies) of vehicle M, N & L

(CH) LOW-NOISE ROAD SURFACES IN SWITZERLAND

ROAD SURFACE « ITSELF"

MAIN MESSAGES FROM THE PRESENTATION(S)

- Road traffic is the most important source of noise and is caused mainly by the rolling sound.
- Means used to control the propagation path of noise (e.g. barriers) only have an impact in a limited area, especially in urban areas.
- As reminder, +/-3 dB can just be perceived by human ear, while +/-10dB are perceived by humans as a doubling / halving of the noise level.
- -3 dB corresponds to halving of the traffic volume
- A low-noise road surface has an immediate impact on noise emissions up to 6dB and that for any vehicles (type, age, tyres, …)
  → road maintenance has also to be considered to keep benefits brought by a low-noise road surface. With low-noise road surfaces, an initial noise reduction of -3 dB can be achieved. Nevertheless, a shortened service life on average -10 years must be accepted.
- Work on road surfaces brings a win-win deal with the community and promote the acceptance by citizens. In the future, the aim is to increase the initial noise reduction linked to the new layer.

SUMMARY

From the study in Switzerland led by FEDRO (FEDeral Roads Office) related to the low-noise road surfaces, have been considered:

- Current noise situation in Switzerland
- Basic approaches to noise abatement: oppose the noise at the source (reduce the noise emissions, control the propagation path and the immission point)
- Traffic noise and noise perception
- Low-noise Road surfaces challenges

➔ Research & development on low-noise road surfaces in urban areas (2009-2017) through 3 subprojects (research, test tracks and monitoring test tracks)

  - 8 research projects including test methods, operation & maintenance of roads, variability of surface production, innovations
  - 15 test sections with innovative asphalt mixtures
  - Long-term monitoring

  Knowledge gained and initiated developments
    - Origin of rolling sound (vibrations, contact points, surface structure, cavities)
    - Semi-dense Road surface (SDA) for noise reduction on urban roads
    - Symposium in September 2017 → see document TFVS-04-04

- Low-noise surface 2021
    - Principles and service life of roads
    - International evaluation of StL86 surface in the Netherlands, Germany, France, USA, Japan, Sweden, Denmark
    - Practices & experiences through application of SDA surfaces with initial noise reduction -3dB(A) – up to -6dB(A) for SDA 4 and its evolution during service life
      → Challenge: optimization of acoustic and surface durability
- Additional research needed regarding the low-noise road surfaces
- Summary: with low-noise road surfaces an initial noise reduction of -3 dB can be achieved
  - a shortened service life on average -10 years must be accepted

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ADDITIONAL POINTS FROM DISCUSSIONS IN THE TF-VS
This study shows a very holistic approach regarding what can be done through the roads vs. noise. - Cost for new low-noise road surfaces and their maintenance (durability of the surface vs. noise) has to be considered. - The cost can be reduced with a process to renew the road from the top layer and not fully from the ground. - Stl86/SMA 11 used according to Swiss calculation model (not a special surface) to compare roads worldwide with a gap up to 4dB(A) can be due to the potential different interpretations linked to the reference system definition of each country, - Low-noise mastic asphalt developed by FEDRO (dense pavement) has a good potential and started last year. Results from the Research project expected within 5-7 years. - For the time being, this project was looking for noise reduction in general, and not the type/source of noise.

REFERENCES
- TFVS-04-04 (Switzerland/FEDRO) : Lärmarme Strassenbeläge aus Asphalt / Revêtements bitumineux peu bruyants / *Low-noise bituminous surfacings* - TFVS-04-09 (Switzerland/FEDRO) : Low-noise road surfaces in Switzerland - Reports are available in German language (except EP1 in French) under the following link: RESEARCH+DATA-Shop - Mobilityplatform, or TFVS-04-17: Research package – Low noise pavements in urban areas – Report analysis ▪ TFVS-04-18: EP1 No.1552 – Mix design of low noise asphalt ▪ TFVS-04-19: EP2 No.1559 – Laboratory assessment of the durability of low noise pavements ▪ TFVS-04-20: EP3 No.1423 – Operations and maintenance of low noise pavements ▪ TFVS-04-21: EP4 No.1564 – Laboratory methods for acoustical characteristics of low noise pavements ▪ TFVS-04-22: EP5 No.1566 – Optimisation of the accuracy of acoustic measurements ▪ TFVS-04-23: EP7 No.1561 – Applicability of low noise asphalt in Switzerland ▪ TFVS-04-24: EP8 No.1560- Acoustic effectiveness of cleaning measures on low noise pavements ▪ TFVS-04-25: EP10 No.1616 – Sensitivity of acoustic properties of low noise pavements related to mixing plant production variability