

# INTELLEGIBILITY OF PUBLIC ADDRESS SYSTEMS IN TRAINS

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**Introduction** In order to know the intellegibility of Public adress systems in trains, research has been carried out for NS Reizigers, the Dutch Railway Company. NS Reizigers has started a Pilot Comfort, in which train PA systems are monitored on functionality. The previous technical study of electronic components is now followed by study of the intellegibility.

Noise turns out to play an important role in train PA systems. Complication of the measurements, and complication of the intellegibility are result of the fast fluctuating background noise.

By measuring the background noise in not-running and running trains, the difficulties of measuring were overcome. With the knowledge of the background levels, calculation of the intellegibility is possible for running trains.

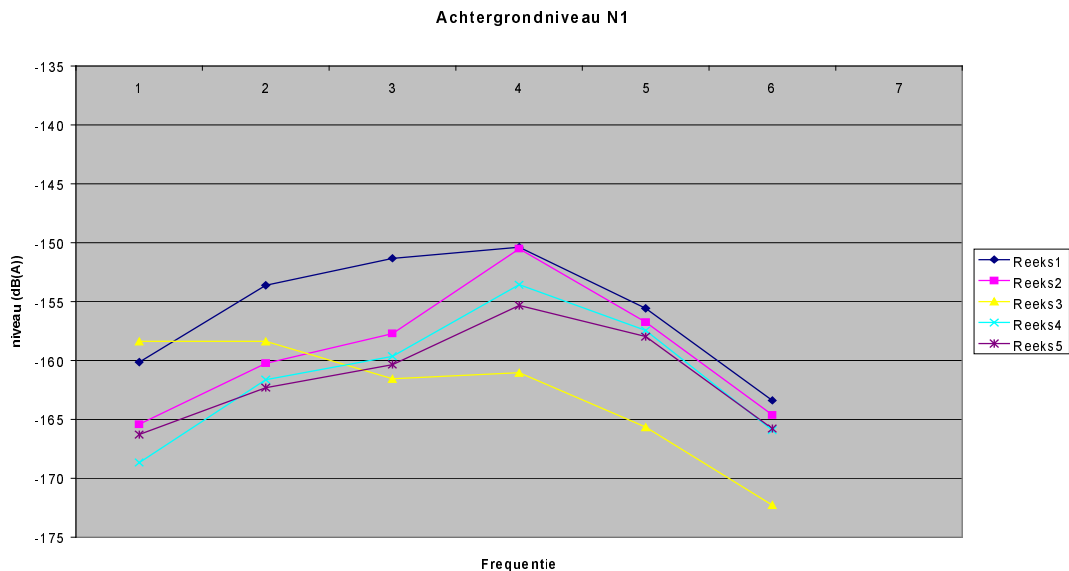


Besides, the fluctuation of the background levels is studied, and its influence on the intellegibility is determined.

STI values have been determined in several types of trains. Comparison with a subjective CVC test with nonsense words was carried out. Results showed that the intellegibility grows with the stability of the PA system components. Suggestions for improvement of the intellegibility are discussed.

Measurements in running trains showed that background noise in trains is whimsically fluctuating. As a result, it was found difficult to find reliable STI results with the software used. A solution to this problem was found by determination of STI values in stationary trains, followed by calculation of the STI values in running trains. The consecutive steps are:

- measurement STI values and signal level in not-running trains. Results show the differences in STI values for different train types. The output signal turned out to vary, sometimes resulting in high sound pressure levels.



Some pictures will be shown about the signal transmission of the system, and the influence of noise. Results of the disturbing circumstances on the intelligibility like bridges, switches, open windows will be shown.

- measurement of background noise in running trains. Background noise with relation to the speed, and as a result of varying circumstances, like bridges, switches, curves, etc. Background values at the microphone position,  $N_1$ , (mostly the balcony), and at the listener position,  $N_2$  (mostly the passenger compartment) are distinguished.

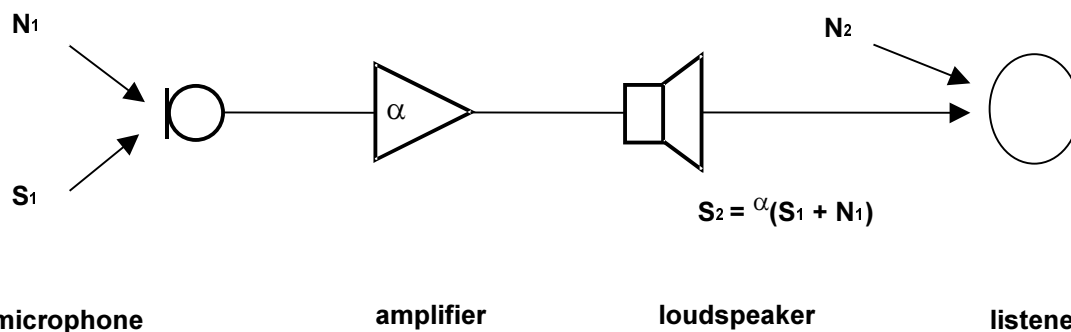


Figure: signal process in trains, with background noise at microphone and listener position.

- calculation of the STI values in running trains.

## References

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