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NOISE PROBLEMS ASSOCIATED WITH A NEW RAILWAY LINE IN JUGOSLAVIA

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1. INTRODUCTION

The oil crisis has forced my country to consider cheaper means of transportation. Therefore railways are, after a long decay, again increasing in importance.

As a result of this Jugoslav Rail (JZ) in conjunction with the Jugoslav Government, is studying new railway routes which are vital for our transportation system. One of them is the route which connects Middle Europe with the Adriatic Sea. The first section would connect Zagreb in the mainland with Rijelo on the Adriatic coast.

It is planned that the trains will operate at speeds of up to 200 km/hr. The line will be electrified. The introduction of a railway line with high speed trains into an environment which is not used to them may lead to serious complaints about noise and vibration.

To minimise the impact of noise and vibration on the nearby residents, J.Z. had asked for an analysis of the likely environmental impact. Also they sought suggestions for protection against excessive noise and an estimate of the cost for the proposed measures.

This paper relates only to noise produced by train pass-bys and does not include noise as it may affect the passengers.

2. CRITERIA

The noise index was chosen on the basis of a recent finding that: 'Of the various indices explained none is more closely related to annoyance than 24 hour Leq dB(A). The evidence does not support the use of a night time weighting or an ambient level correction.' (FIELDS, 1979). It was also felt that the maximum noise levels in dB(A) are an adequate predictor of disturbance of certain human activities. These together formed the criteria for an acceptable noise climate along the railway line.

At the present time in my country we do not have an official criterion for railway noise. In other countries recommended acceptable levels vary significantly.

Some reports suggest that on average the population is today exposed to noise levels of 70 dB(A) Leq (24 hour) and higher and that there is not much difference between workers and housewives in exposure to noise (Kono et al 1979).

The following criteria were adopted:

(i) Maximum noise level in dB(A) for a train pass-by:

residential areas	... 75 dB(A)
industrial and commercial areas	... 85 dB(A)

(ii) 24 hour equivalent sound level in dB(A)

residential areas	... 60 dB(A)
industrial and commercial areas	... 70 dB(A)

An EEC Report (Bastenier et al 1975) and some practical experience in Great Britain (Clegg, 1979) influenced the choice of the above criteria.

A 50 metres buffer zone was proposed for existing settlements and 80 metres for new ones to avoid complaints about vibration. The distance from the railway line seemed to be a more satisfactory variable than say other physical variables (including noise level) (Fields, 1979).

3. THE NOISE PREDICTION METHOD

The prediction method was based on (Kurzweil et al 1979) combined with results from (Rathe, 1977: Tubby, 1975: Glaretas, 1977). As there were no noise data on Jugoslavia rolling stock reference values at 30 metres were adopted from work at ISVR (Walker et al, 1974).

An Leq (24 hour) of 60 dB(A) was anticipated at a distance of between 320 and 340 metres from the line for 220 and 230 trains per day.

At the moment these and some other models for the prediction of railway noise are being tested and some noise data on Jugoslav rolling stock are being collected (Susic, 1980).

4. MEASURES TO REDUCE RAILWAY NOISE

It is know that the type of track influences the noise level produced. For this reason C.W.R. on wood tie and ballast was proposed on level ground as well as on reinforced concrete elevated structures and in tunnels.

At places where the predicted noise levels exceed the proposed criteria, barriers are planned. Two types of barrier are proposed: barrier walls and earth banks. Topographical and economical reasons will decide which should be used in any particular case.

Noise protection has been evaluated for an Leq (24 hour) of 60 dB(A) and 65 dB(A). Noise protection for Leq (24 hour) 60 dB(A) is approximately 60% more expensive than that for 65 dB(A).

5. CONCLUSIONS

The impact of noise and vibration from a proposed railway line on the nearby residents has been assessed and measures for protection against excessive noise suggested. This is an important step in avoiding potential noise annoyance situations.

Noise criteria have been established and railway noise levels alongside the line predicted.

Noise protection has been evaluated for Leq (24 hour) of 60 dB(A) and 65 dB(A). It is left for decision makers which criteria to choose.

This is, to the author's knowledge, the first time in Jugoslavia that transportation noise has been considered at the planning stage.

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