NEWSLETTER 8

September 2009

Demonstration Event in Dublin – Mitigating noise annoyance in ports

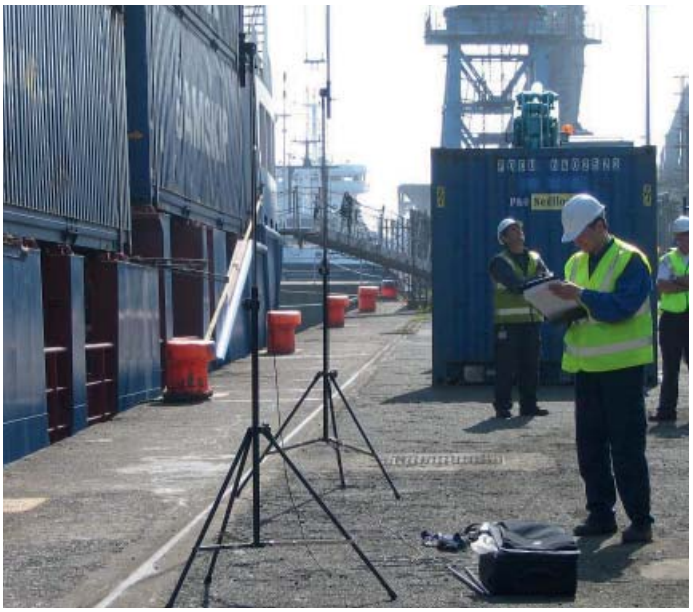

Fig.1: *Sound power measurements and recordings in the Port of Dublin*

Highly mechanised operations like modern port work cause noise. If people live close to the operations areas, they frequently get annoyed by this noise, in particular, as ports frequently work on a 24/7 operations schedule.

The EFFORTS project's work package on noise annoyance in ports has investigated this matter and came up with some novel realisations. The team's findings were then validated in the ports of Turku and Dublin. During the EFFORTS Demonstrator in Dublin, the team will introduce their findings, give additional background information and explain novel possibilities to tackle noise annoyance mitigation in ports.

Existing noise assessment procedures consider the noise annoyance evaluation by using yearly average noise levels weighted by frequency and time of day. The methods are well established and apply fairly well to continuous broadband noise such as road and rail traffic. But port noise includes components of low frequency and impulsive nature; therefore it must be evaluated in a novel way, taking the frequency and temporal content into account.

The team started with the usual procedure and conducted extensive studies on noise sources common to ports. Several sources were measured; sound sample recordings were taken for each source and elaborate sound maps prepared. The sound samples were captured from machinery operations as well as from cargo handling events, too.

But then the team left the trodden path.

The team took a look at the effect of weather on sound propagation. It found out that weather can have a significant effect on sound propagation from the source to the receivers. Therefore, weather-effected sounds can reach considerably higher levels than the estimated yearly averages and the annoyance perceived by the residents can be completely different in different weather conditions.

But that was not the end. Next, the team investigated how sound and noise is actually perceived by individuals and found that psycho-acoustic descriptors can better indicate potential annoyance than the commonly used sound pressure levels.

Psychoacoustic descriptors describe sound properties in relation to human observations. The most significant correlations related to annoyance are sound loudness, sharpness, fluctuation strength and roughness, which can be calculated from sound signals. Additional factors are prominence of tonality and prominence of impulsiveness. The total effect on annoyance is a combination of several factors.

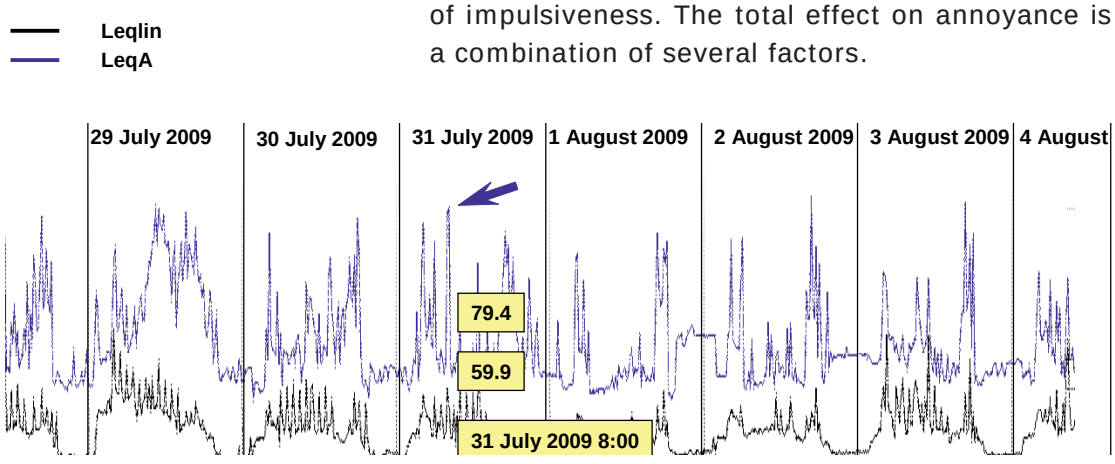

Fig. 2: *Sound levels over time recorded in the Port of Turku close to a passenger terminal*

Mitigating noise annoyance in ports

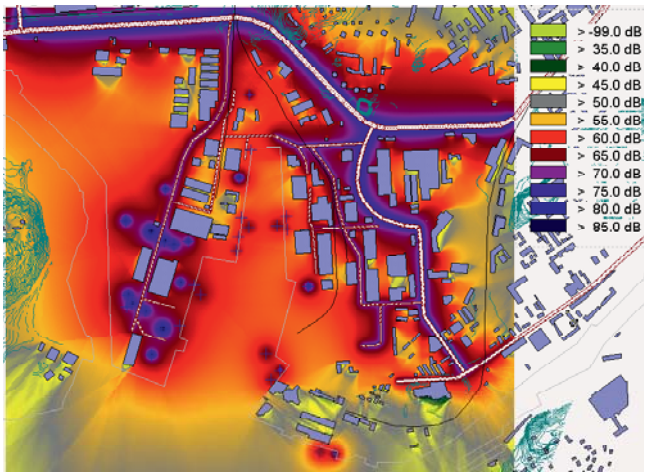

Fig. 3: *Distribution of sound close to the Port of Turku*

These factors are used to create higher order indicators such as unbiased annoyance or sensory pleasantness. Such annoyance indicators for port-related noise were developed in the EFFORTS project.

The development of these indicators required listening tests. The listening tests included processing of sound samples to be suitable for headphone testing, corrections due to distance or screening by buildings and organizing the tests for almost 100 persons from different professions, age groups and gender. The results have been obtained using statistical analysis.

Fig. 4: *Headphone calibration for listening tests by head simulator*

The results of these tests and investigations were used to develop a concept to support port authorities to deal with community response, such as complaints, concerning noise issues. Sound data from port operations is collected at selected locations in the port continuously around the year and stored on a data server. In case of a complaint, the time history of noise data is retrieved and studied at the time of occurrence. The selected data is listened to to identify the cause of noise. The cause may be noisy operations, but it could also be due to weather conditions favourable to noise propagation. After establishing the cause of the complaint, an explanation can be given to the community and actions to prevent further annoyance can be determined.

As a result of the EFFORTS project, a response form has been drawn up for ports to obtain all the vital information required to deal with the complaints in an efficient way.

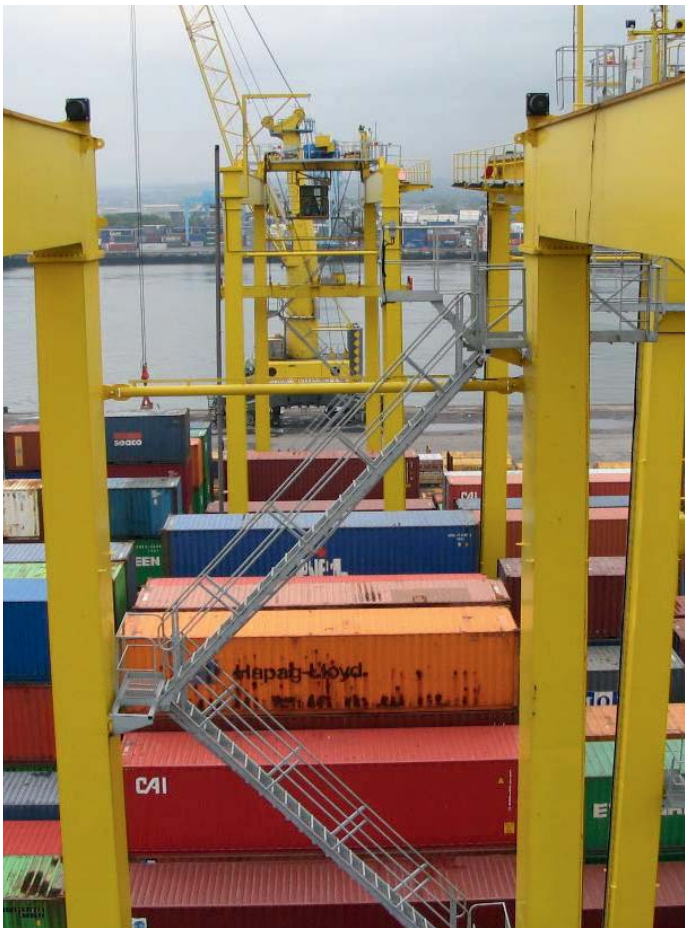

Fig. 5: *Equipment for container handling is a source of noise (Port of Dublin)*

Demonstration event on Noise annoyance of ports – Mitigating noise annoyance in ports

The demonstration event on noise annoyance will be organized in Dublin on Friday, the 2nd of October. In addition to the work carried out in WP 2.4 the event will present useful information on noise sources, propagation and perception in the form of sound samples and practical demonstrations. It will also provide a forum to discuss noise related topics.

Friday, 2 October 2009	
Noise annoyance of ports - Introduction	• Noise and acoustics • Methodology assessing noise • Port sound sources • Environmental noise mapping of ports • Environmental noise monitoring of ports • Port related noise annoyance research • Means to combat noise annoyance
Applications for ports and communities – Practical Demonstrations	• Sounds of ports • Effects of propagation on noise in ports • Annoyance • Complaint process tool demonstration
Venue: The Dublin Port Company, Port Centre, Alexandra RD, Dublin 1	

Advance Notice of EFFORTS events:

In October 2009 the following events will also take place

Education, Training and Human Development
8 October 2009, Dublin, Ireland
The detailed programme with definite times and places and registration details is published on the website of the project: www.efforts-project.org

EFFORTS Final Conference
28 October 2009, Hamburg, Germany
For detailed programme and registration please go to: www.seaport-innovation.org

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