

NOISE AT WORK REGULATIONS IN NORTHERN IRELAND

[with special reference to the textiles industry.]

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1. INTRODUCTION

LIRA is the acronym for the Lambeg Industrial Research Association, formerly known as the Linen Industry Research Association, set up in 1919 as a trade funded organisation designed to improve the quality of Linen.

The Environmental Monitoring Unit unofficially came into being in the mid seventies when it became recognised that exposure to flax dust could lead to a respiratory disease known as byssinosis. Employers wished to quantify the problem and, as a scientific research establishment, they turned to us for help.

From dust monitoring it was a natural step for LIRA to become involved in noise monitoring, and this work was started even before the Noise at Work Regulations came into force, largely driven by the possibility of hearing loss claims.

Northern Ireland consists of six counties. The working population numbers 76 000 people and total population is 1.5 million. The main industry is Agriculture, with it's allied sub-industries and most farmers are self-employed. The range of industry is quite large, extending from electronics and electronic components to heavy engineering, aircraft manufacture, textiles, glass and pottery manufacture, printing and chemical products, whiskey distilling and textiles. Much of this range and 'new tech' development owes its existence to the efforts of the Government funded Industrial Development Board.

2. EC DIRECTIVES, INDUSTRIES AND NOISE

The Noise at Work Regulations (N.I.) were created in response to EC Directive 86/188/EEC and were introduced to the Northern Ireland statutes in 1990. This directive forms part of the larger EC strategy of improving standards throughout the Community in general. Pursuant to this we now have the Health and Safety Framework Directive and the 'daughter' directives.

The copious annex of draft EC Directive 89/656/EEC 'Personal Protective Equipment' lists certain industries as likely to require hearing defenders. Shipbuilding and textiles are specifically identified.

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Shipbuilding has been a feature of Belfast for more than a century now, and the 'Yard' as it is known has long dominated the city. Even today it is hard to ignore.

Before welding became common practice the traditional method of joining steel plates together was hot riveting. The process involved forming the head on the rivet with a hammer and dolly and had a high impulse noise level. The World record for this is held by a Belfast man, J. Moir, who in 1918 placed 11 209 rivets in nine hours [ref 2]. It was generally accepted that riveters went deaf, especially those who made boilers. These employees also had the hazard of asbestos fibres to breathe. In addition to this there were the general noise levels associated with the working of steel.

At their height Harland and Wolff employed over 10 000 men, although now the number is around 2 000. This industry was recognised as inducing deafness as long ago as the eighteenth century, long before mechanised processes became common. The employers now run a hearing conservation programme, but this was not always so. In fact so great did the number of claims for hearing loss become that at one time the insurers were paying out without the formality of an audiogram.

Aircraft manufacture, in association with the Royal Naval Aircraft Yard at Sydenham in Belfast has not been such a long-established industry as shipbuilding. This industry, in the form of Short Brothers and Harland, now rivals the shipyard in the number of employees in various locations around the city. In addition to the manufacture of aircraft such as the Short 360 they also produce guided missiles, for example the surface-to-air Blowpipe.

Aircraft tend to be made of aluminium which is an easier material to work than steel, but to offset this they are still rivetted together. Noise levels can exceed the 90 dB(A) on the shop floor and there are certain operations which levels of 110 dB(A) are found. The most common noise associated with aircraft, however, engine noise, is not a great problem as the dangers are well recognised. Furthermore, the close proximity of residential dwellings tends to inhibit engine testing.

Much of the work undertaken by this company is of a sensitive nature but suffice it to say that their Occupational Health policy is supported by a full-time medical officer and team. This company operates a hearing conservation program, a feature of which is pre-employment audiometric testing. At a seminar recently the medical officer was heard to say that this was revealing a large number of young people presenting symptoms of noise induced hearing loss. The likely causes for this were the use of personal stereos or loud disco music. This caused him an ethical dilemma. He now had reason to ask himself if he could justify employing such a person in an environment in which there was a possibility of further damage.

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3. TEXTILES

Textiles, the special reference of this paper, are different from the other major industries in that they are diverse in both function and location. Textiles, in some form or another, must have been manufactured even before ships. As far as the Noise at Work regulations are concerned this industry differs from the above in that it consists of a great variety of different occupations, operations and locations. Whilst the large firm may have adequate resources to implement and maintain a hearing conservation program some of the smaller companies simply do not. This problem is not, of course, unique to the textiles industry.

Northern Ireland has long been associated with linen. The original raw material however was cotton, imported from America and cheaply produced by slave labour. The American Civil war stopped supplies completely for a time and when production recommenced cotton was not as cheap as formerly. It was this situation which caused the manufacturers to find an alternative, locally produced if possible, and flax seemed to be the answer.

Although top quality damask linen is still produced in the Province, along with fine linen yarn, the textiles industry has a broad range of interests, including carpet manufacture or materials knitted from fibres such as Lycra. The industry currently employs 26 000 people, which represents 33% of the labour force [ref 3].

Traditionally in textiles, as in shipbuilding, occupational deafness was to be expected. I was recently informed that a man who operated a beetling mill would be deaf by the time he was 50 years old [ref 4]. There do not appear to be any operating beetling or scutch mills in Ulster at the moment.

When fibre is being prepared for spinning it is subjected to a combing process, known as 'hackling'. The noise level at a hackling machine is about 91 dB(A), mainly caused by the combs suddenly dropping away from the fibre, which gives it a high impulse component.

After this comes a process known as drawing, then the fibre is given a coarse twist, known as 'roving.' Whilst at 86 dB(A) the noise levels from a drawing frame are not excessive, these machines tend to be located with, or close to roving frames which produce levels of 92 dB(A). It is interesting to note that another make of drawing frame, doing the same job, gave a level of 93 dB(A).

Spinning, either wet or dry, involves putting a strong twist in the yarn. Noise levels associated with spinning frames are about 92 dB(A).

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In all of these operations processes known as winding take place. This involves the winding of yarn from one size or type of spool to another. Winding machines tend to produce 90 dB(A).

Weaving on a shuttle loom can produce levels of 100 dB(A), exacerbated by the fact that the machinery is old, slightly worn and often operated at high density. A rapier loom, however, will run at about 92 dB(A), lower, but still above the Second Action Level. The difference in noise output from these two types of loom is not purely a function of age or wear. In the shuttle loom the shuttle is struck by a spring-loaded hammer which impels it across the beam. The rapier loom employs a thin metal rod, like the blade of a rapier, which whips the shuttle across. Not only is the action of this type of machine intrinsically quieter but, being new, they tend to be located in modern, purpose-built weaving sheds which are spacious and airy.

The production of thread and braiding form another aspect of the textiles industry. Levels here exceeded 100dB(A). Octave band analysis showed a peak at 4 000 Hz.

Machine knitting produces noise levels of about 88 dB(A), and the knotting in carpet manufacture is about the same.

Bleaching, dyeing and finishing, although lumped together tend to be carried on at all stages of production. It is not uncommon to find a spinner who also has bleaching capacity. The main source of noise in these operations seems to be connected with the heating of water in "jigs" wherein the fabric is bathed in the hot dye.

The washing range is a series of tanks of decreasing temperature through which fabric is passed via a system of rollers. As the name suggests the purpose of this is to rinse out any pre-treatment conditioners or excess dye. The hottest tank in this series was recording a maximum level of 98 dB(A) and this resulted in a general level of 95 dB(A) for the area. Octave band analysis reveals a peak at 2 000 Hz.

Relating the noise from this operation to running time shows it rising to a peak and then dropping as the washing range reaches boiling point. This is akin to a singing kettle [see graph overleaf].

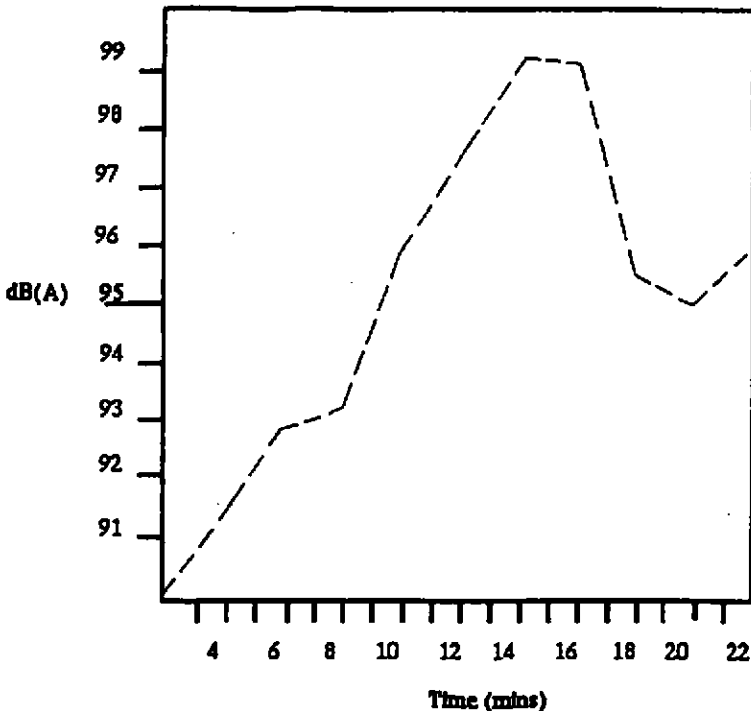
Mixing tanks and dye paddlers are universal in this branch of the textiles industry and can produce levels of around 95 dB(A). This is attributable to steam injection and is affected by steam pressure and nozzle type. They tend to be used for short periods several times per day, rather than continuously.

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Another machine widely associated with this type of work is the stenter the purpose of which is to dry fabric after treatment. Attributable noise levels range from 81 dB(A) to 89 dB(A), depending on location and type of machine. The source is mainly the air extraction system.

The two problems associated with noise reduction are expense and effectiveness. For a manufacturer, money spent on reduction will yield no profit, nor will it be of any apparent value if it does not reduce levels to below 90 dB(A). Thus one can take a machine with an SPL of 98 dB(A) measured at operator position, spend a great deal of money, cut the noise emitted by half and still be well into the Second Action Level. Retrofitting of noise reduction equipment is often difficult, sometimes impossible, and frequently ineffective. It is to be hoped that the requirement of the EC Machinery Directive [EC 89/392/EEC] to supply equipment with noise level ratings will help to produce a new generation of quiet machines.

TABLE: Washing range noise against time.



euro•noise '92

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Sometimes the problem of reducing noise can be easily solved. In the case of the washing range mentioned earlier decreasing the temperature of the first tank by several degrees reduces the "singing kettle" effect and also reduces fuel requirement. A very satisfying solution.

Mixing vats can be easily moved away from work areas but most textile machinery is less portable which leaves the alternative of reducing exposure. Unfortunately many of the noisiest machines, such as looms and spinning frames, require constant supervision, which means the "last resort" of relying on hearing defenders. Equally unfortunately many workers are disinclined to use them, claiming discomfort or that they have "got used" to the noise. This is a difficult position. According to the regulations the refusal to comply with the "Hearing Defender Zone" warning sign is a dismissable offence. However, as one personnel manager put it:- "Am I supposed to fire my best weavers?." High quality, trained, skilled and experienced employees are always hard to find their leaving can be very disruptive in terms of production and hearing loss does not really lead to time off work in the same way as, say, dermatitis.

Another problem is the use of radios and personal stereos. Noise levels of 88 dB(A) with the radio switched off have been recorded, with it on the level rose to 91 dB(A), entering the Second Action Level. It is apparent that in order to be heard the volume must be increased above the background level. This is unacceptable in a noisy environment.

The personal stereo is far more of a problem. If a radio is being operated it is possible to measure the noise level, but there is no easy way of assessing noise dose from a personal stereo set. Furthermore the headphones provide no hearing protection, prevent the effective wearing of muffs, and make it difficult to see if plugs are being worn.

Many employers now prohibit the use of both.

It is relatively easy to calculate the noise dose experienced by an operator who tends a machine eight or ten hours a day. Certain employees, however, do not remain at one workstation all day and may find themselves in a variety of locations, fitters are a good example of this. Calculating noise dose for such an employee can be difficult. The personal noise dosimeter was designed for this situation but employers seem reluctant to make use of it, relying instead on the obligation to wear hearing defenders in designated areas.

TEXTILE NOISE IN ULSTER**4. CONCLUSIONS**

Northern Ireland has several economic problems, some common and others unique. We are isolated by both water and distance from mainland Britain and Europe and, although our economy tends to react more slowly to fluctuations, there can be no doubt that we are experiencing a considerable recession. Naturally this has had a bad effect on our unemployment figures and has caused poor economic performance.

In addition to the common problems we also have one unique to ourselves, namely terrorism. The effect of this is to waste resources which could be better invested in new machinery, health and safety, or overseas marketing.

Whilst the Noise at Work regulations are not, in themselves, causing machines to be less noisy, people are being forced to become aware of the unnecessary nature of occupational deafness. To most people, once they realise the nature of their disability money is no compensation, they would rather have their hearing back.

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 KELLS
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