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NOISE IN THE 90's AND THE RESPONSIBLE FIRM.

P J Hunnaball

Laboratory Manager, Woods of Colchester Ltd, Colchester, Essex.

1. Introduction

1.1 The object of this paper is to explain the experience of a responsible, medium size, manufacturing company in managing potential problems arising from noise levels at the operating plant. The method used is explained and the resultant actions detailed. A model solution for managing similar potential problems is outlined for general consideration.

1.2 This paper deals primarily with the attention to environmental noise with less emphasis on the noise monitoring work carried out for Health and Safety requirements.

2. Woods of Colchester Ltd, The company.

2.1 Woods of Colchester is a world leader in the provision of air moving equipment, the company produces fans as small 100mm in diameter to mighty 2800mm Tunnel ventilation units. The company has always been based in the Essex town of Colchester and has grown since its inception in the early 1900's to being the £45 million turnover company that it is today, Woods employ over 900 staff in the organisation. Woods has always been a major force in the local community as both an employer and supporter of community activity, this was a tradition started when the company was owned by the Woods family and has continued under the present management and ownership by the G.E.C group. Woods continues to recognise its responsibility to the community. The company moved to its present 7 Hectare acre site during the 1930's when the location could be called truly Green-Field. During the 1970's an executive housing development was created on the Northern boundary of the site, the Southern boundary is the main London to Norwich railway line, see Fig 1.

2.2 The operating environment of all Industrial and Commercial organisations can be seen to be in a constant state of change. One area of particular relevance is the impact of Environmental pressure, Noise is just one part of this envelope of factors. By Education, Legislation, media activity and growing personal awareness the issues surrounding noise are never far from the public eye, this fact influences the decision and policy makers of the day and legislation results.

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2.3 Woods through its long involvement with acoustics has a wide range of experience in both the discipline of acoustics through trained and experienced engineers and the provision of noise control equipment and problem solving capability related to noise problems.

2.4 The current Noise legislation of interest to Woods as a company are firstly the 'Noise at Work' regulations which introduce a mandatory responsibility on an organisation to produce meaningful records of the noise levels throughout the site using trained and competent personnel. Secondly the impact of boundary noise levels when measured in accordance with BS 4142.

3. Historic treatment of Noise at Woods of Colchester.

3.1 In common with most responsible companies Woods has always tried to develop a company policy of Environmental friendliness, quality and avoidance of nuisance to the community, this deals effectively with any problems that may arise both inside the factory buildings as well as any effects on the local population. To the authors knowledge very few medium to large size companies have an individual who has global responsibility for all acoustic matters relating to the activities of an organisation, until very recently Woods was no exception to this rule. Problems being dealt with by whichever department was thought to be best positioned at the time.

3.2 In the past control has been exerted over the factory operating pattern including measures such as specifying start-stop times for processes and applying restriction zones to noisy equipment. This has all helped the avoidance of complaints in the past.

4. Formation of a Noise Group

4.1 During the late 1980's the company was concerned that the regularity of complaints relating to noise of any sort, albeit very minimal, increased from less than 1 a year, to 2 or 3 complaints a year in the past 3 years. The increase in complaints partly reflected the change in the commercial and physical working environment. One being an increase in the demand for demonstrated performance capability of fans, often to complex and arduous specifications. Another reason was the rapid increase in major capital projects involving large high performance fans, High Volume and Pressure, High Power consumption and the inevitable Sound Power Levels. These projects included MTRC and Taites Cairn metro tunnels in Hong Kong, Barcelona Olympic Stadium Tunnels and Sydney Harbour Tunnel and Frejus 4 in Italy.

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4.2 Some testing of large fans has always been carried out externally to the Laboratory (see Fig 1) due to the technical difficulties of inside testing, certain tests when monitored at the boundary, while indicating compliance with current legislation, were felt by the company to be worthy of some further action, before any unnecessary legal difficulties or irritation of neighbours was encountered.

4.3 Senior management of the company renewed their commitment to the control of any perceived noise problems that existed at the site, the impact and spirit of legislation relating to noise was recognised and a group was set up with mandate to identify and control any problem, The Site Noise Group. In order to make this control group function correctly it was essential that all involved parties were aware of and involved in, the objectives of the group. Group selection was then fundamental. At Woods the group selection was from the following areas;

- a) Production, As the division responsible for all factory activity including routine test they would be most effected by any operating restrictions directly effecting output and therefore company income.
- b) Health & Safety, as the division responsible for the safety and protection of the workforce and compliance with legislation.
- c) Works Engineering, as the division responsible for the costing and implementation of any structural modifications needed to the site plant.
- d) Acoustics Division, as both technical experts and trained data acquisition engineers.
- e) R&D Laboratory, as a major source of noise during test, technical experts and principle holder of instrumentation.

This balanced structure gives a wide commitment to the objective of the group, this helps to eliminate the dictatorial element of the group over other involved divisions.

5. Activity of the Noise Group

5.1 The initial activity of the group involved identifying the real areas of concern to the company, this involves;

- a) Identifying all known sources of noise and locating on a Site Map
- b) Recording the pattern and amplitude of noise during 7 day, 24 hour periods.
- c) Determining the significance in, ranking terms, of the problems.
- d) Determine a monitoring programme.
- e) Allocate trained staff to the project.
- f) Select and organise suitable instrumentation.
- g) Instigate a record keeping system.
- h) Determine magnitude of problems.

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- i) Identify solutions, cost and implement.
- j) Develop and implement recording system for factory noise records.
- k) Determine future training strategy.

5.2 In the first 6 months of operation the group has instigated a number of projects to control noise at the Colchester site

- 1) £30k+ provision of a run-in test facility to suit large fans, complete with dedicated power supplies, instrumentation and silenced inlet and outlet.
- 2) Modification to the R&D Laboratory structure to allow testing of large fans partially inside, this directs sound away from sensitive areas.
- 3) £26K provision of test system silencers to reduce radiated noise from the Laboratory test systems.
- 4) Self imposed operating schedule for large fan test centred upon the 10am to 4pm envelope.

6. Results

6.1 As a result of the regime of the Noise Group an avoidance of complaints has been achieved at a time when factory and test activity has been at peak levels. Boundary levels during testing of large fans has been controlled to below 75dBA, in the worst case!, during the day and 55dBA during the controlled 6pm - 8pm period. Provision of a specialist test cell for endurance testing has meant that increase over the night ambient has been limited to 5dB or less, at present it is aimed to reduce this interference with further upgrade of the testcell. A number of items of potentially noisy plant have been identified and further acoustically treated to eliminate noise problems.

7. Problems

- 7.1 One area of concern that arose from the records made is that of 'creeping background'. Over the years records indicate that Woods has progressively reduced the average working day noise levels by some 2-3dBA, this leads to a penalty if site noise was evaluated to a code such as BS 4142 as it is intrusion above background that is penalised.
- 7.2 Silencing of test systems is not a simple addition of silencing media, the addition of additional friction in fluid flow measurement systems can modify the apparent measured performance of a unit. This means that variations can occur and significant investigation programmes may be required to understand deviations. This can result in considerable expense beyond any initial capital outlay.

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- 7.3 One difficult area is that of 'undue sensitivity' it is very difficult for a company to judge if complaints are a real concern or a case of criticism of an industrial neighbour, the absence of hard and fast numerical target levels does not help this matter.

8. Rules for success

- 8.1 It would appear that a few guideline rules need to be applied to a situation like the Woods example in order to try and make a system work effectively. The following guidelines act as an effective starting point;

- 1) The company must be committed to compliance with legislation itself, but also the spirit of the legislation, the avoidance of nuisance.
- 2) The Company must be committed at the very highest levels to examine problems realistically and be prepared for the likely capital outlay.
- 3) A site Noise team should be selected from the cross discipline of involved parties, they must be motivated to deal with the problems encountered.
- 4) The company must be prepared to provide trained staff and suitable hardware.
- 5) Workable record keeping and work control systems must be devised and adhered to.
- 6) The group must be selected to function as an objective problem solving unit.

These are of course, in reality, just a few of the factors to make such a control system work correctly and many of the items would apply equally to any problem solving unit.

9. Conclusions

- 9.1 The advantages of a set up such as the Woods Site Noise Group is that a clear method exists for the execution of problems relating to noise with the power to implement decisions, a pool of capable people gives depth to the cover available and level of service required. Unnecessary formality is eliminated and the group can function on an 'as and when' basis as problems arise.

- 9.2 The principle factor for the success of such a group is the support and commitment of senior management to deal with problems rather than ignore them, thereby dealing with the responsibility towards employees and neighbours effectively.

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9.3 The potential costs of such courses of action should not be underestimated, however the risk of enforced operating restrictions and ensuing unnecessary cost will be far greater, problems will not go away it is a far better policy to be aware of, understand and deal with the reality of operating in the nineties.

9.4 Even with the formation of a group to deal with noise problems there will always be situations when short term problems exist. As noise is adjudged on a nuisance basis interpretation by enforcement bodies is always a potential concern. The Woods policy towards the Environmental Health Department has always been one of openness this has resulted in constructive dialogue and mutual appreciation of the problem's involved.

9.5 Lastly it is worth considering the impact of legislation. We rightly protect individuals, should we not also protect companies. Any moves towards obstructive rather than constructive legislation should be considered carefully and a set of positive target environmental noise levels should form part of any useful legislation.

REFERENCES,

BS 4142 : 1990 Rating industrial noise affecting mixed residential and industrial areas.
Noise at Work Regulations, 1989.

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MONITORING POINTS



