HellermannTyton – Manchester

Noise Survey

Background

The factory manufactures nylon cable ties using hot high pressure injection moulding machines. The machines have additional equipment, called granulators, to deal with waste moulding parts and equipment to move the finished product, such as conveyors. The nylon feedstock is provided to the machines pneumatically through pipe-work.

The factory has two main manufacturing areas, the first part known as Automated/Automated Bay 1 and the second part Bay 1 and 2.

The nylon pellets are delivered pneumatically by road transport and fed into storage silos on the Materials area.

The finished products are removed in tote boxes to the packing area and then on to logistics before leaving site by road transport on pallets.

There is a tool room area were the injection moulds are repaired and prepared for use.

Access to the manufacturing area is by a corridor, which extends round three sides of the area. The logistics and packing area is on the fourth side.

The survey was conducted by taking noise measurements at various agreed areas inside and outside the factory. The information on each measurement, along with a photograph of the measurement point is included in the main report.

Eight operators wore the dosimeters for up to eight hours whilst going about their normal duties. The information gathered by this equipment is included in the main report.

A noise map was created showing 'spot' noise levels in various areas of the factory and this is shown inside the rear cover of this report.

Test Equipment and Criterion

Castle Pro-DX Vocis GA131 - Formal Calibration Date 5/5/2010. Local calibration at each period of use to Castle G607 Calibrator – Formal Calibration Date 5/5/2010.

Cirrus Research CR:110A Personal Noise Dosimeter system and RC:110A Reader unit – Formal Calibration 28/10/2010. Eight personal dosimeters.

The test criterion for the survey was **80 dbA** and dose projections for the static tests are based on a **twelve hour** shift. The static tests were run for five minutes to allow

the equipment to project the daily dose and LEPd measurements. Concurrent Channel A dBA and Channel B dBC measurements were taken in every case.

The noise dose badges were worn for approximately eight hours.

The standard period for action levels under the Control of Noise at Work Regulations 2005 is eight hours.

The dates of the survey were 12th and 13th January 2011.

Executive Summary

The survey consisted of two main methods of capturing the noise in the factory and associated operating areas.

The first method was to use a noise meter at agreed locations around the site and take readings that would give projected noise dose data over a chosen period.

The second method was to use noise dose badges on selected members of staff to give an accurate measurement of the noise levels each person was subjected to. It would be usual to back this information with a diary of the measurement day but as everyone is highly mobile within their area it was not practicable.

The static tests show noise levels in the manufacturing area to be above the 85dBA action level and above the 87dBA exposure limit value for lengthy periods during the survey. Averaging the exposure over seven days still leaves exposure levels requiring action. The use of hearing protection in the factory would reduce the noise exposure to acceptable levels. This is indicated on the Hearing Protection Comparison graph included with each section in the main report.

As the noise levels in some areas are consistently above 85dBA then the requirement is to attempt to attenuate the noise levels by some method other than hearing protection. It is suggested that an acoustics engineer be engaged to give advice on the best methods of attenuation.

The dose badge results show higher levels of exposure than the static tests due to the closeness of the operators to the machines during their normal work pattern.

Non manufacturing personnel visiting the manufacturing area during their working day are also exposed to levels requiring action.

The tool-room, pre-packing and logistics areas do not have significant noise levels. However, the noise dose badge reading for one operator who works in that and other areas indicates action is required.

Recommendations

Engage a consultant acoustics engineer to give advice on the best noise attenuation methods. We have talked to several acoustics engineers and have identified one linked to a university research department who would have the experience needed to give the necessary recommendations.

Attenuate as much operator noise as is reasonably practicable based on the acoustic engineer's advice.

Consult with employees regarding the noise survey findings and the plan for attenuating the noise.

Identify the problem noise areas with signs and demarcation lines.

Provide and enforce the wearing of hearing protection

Keep any roller shutter access doors closed whenever possible as they act as attenuators.

Limit the exposure to only those who need to be in the area.

Consider the possibility of shift pattern changes

Main Survey Report

Factory Corridor

This corridor extends round the North, West and South sides of the factory between the manufacturing area and the administration, amenities and tool-room areas.



Corridor South Side

The noise levels measured in the corridor do not present any issues to people walking through the area or working there temporarily on maintenance or cleaning. The LEPd for a twelve hour period was 69.9. The corridor design provides a noise transmission gap and, therefore, significantly reduces noise levels in the administration area and outside the factory. A detailed noise survey analysis is included in Section 3 of this report and headed 'Corridor'.

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Materials

The material area is on the West side of the factory, separated from the manufacturing area by a corridor and accessed from the inside and outside by roller shutter doors.



General View

The area houses silos for the raw manufacturing materials and the pneumatic conveying equipment used to transport the materials to the machines in the manufaturing bays.

Noise reduction imprvements have been carried out in this area by fitting silencers to equipment to reduce the overall levels.

At this time no-one works in the area on a full time basis. Operators visit the area to check equipment and make adjustments to the operation of the equipment on a ad-hoc basis. Maintenance personnel and contractors also work in the area from time to time.

The exit from the area to the West side corridor has a flexible roller shutter door but this is not kept closed on a regular basis.



General View



Materials Test Point One

The first material test point was in the area indicated in the photpgraph 'Materials Test Point One'. It is an area that operators visit and work in when adjusting the equipment. The maximum levels on the Channel A measurement in this area were 87 dBA with the peak levels being 101.4.

It should be remembered for this measurement and all subsequent measurements that the maximum levels are controlled by the response level settings in the test equipment, in this case 'fast', wheras the peak levels are not under the same measurement control and are, therefore, actual levels. It is common for peak levels to be higher than maximum levels.

The Channel B maximum was 87.9 dBC with the peak again being 101.4.

The projected noise dose calculation was 83.6 LEPd, which gives a 227% dose.

A detailed noise survey analysis is included in this report in Section 4 and headed Materials One.

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Materials Test Point Two

A similar test was carried out at the opposite end of the materials area indicated on the photograph Materials Test Point Two above. In addition to the pneumatic equipment the conveyor shown in the right hand side of the photograph had and influence on the overall noise levels and the peak levels due to the arrangement of the flaps on the conveyor belt.

The Channel A maximum was 89.2 dBA with a peak level of 111.9.

The Channel B maximum was 91.5 dBC with a peak level of 111.9.

The projected dose calculation was 86.1 LEPd with a 405.1% dose.

A detailed noise survey analysis is included in this report in Section 5 and headed Materials Two.

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Manufacturing Test Point One



Manufacturing Test Point One

The test pint was at the West end of the Automated Bay in the area indicated on the photogaph Manufacturing Test Point One above. The Materials area roller shutter door was open at the time of the test. Engineers were working on the Materials area door at the time of the test but didn't operate any equipment that would have an influence on the test result.

Operators in this area, and in other subsequently tested areas of the factory, move about regularly from machine to machine in theor allotted work area. They don't have any static operating positions. Their work includes adjusting the machines and responding to various alarm calls to each machine. A typical response activity would be to replenish cardboard boxes on a packing machine. There are clerical workstations, shown on the photograph, that are not protected from the machinery noise.

In addition to the constant operating noise of the machinery and the pneumatic delivery system additional levels are created by such activities as the discharge of compressed air, the operation of the alarms, the granulators on the machines and the dropping of the plastic tote boxes and pallets. The test point was immediately inside the manufacturing area and consequently the level of noise here would also be found in the adjacent corridor.

The Channel A measurement in this area was 90.3 dBA maximum with a peak level of 105.3 dBA.

The Channel B measurement in this area was 91.1 dBC with a 105.3 dBC peak.

The projected noise dose in this area was 83.7 LEPd with a 232.7% dose.

A detailed noise survey analysis is included in this report in Section 6 and headed Manufacturing One.

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Manufacturing Test Point Two



Manufacturing Test Point Two

This test point is in the machinery area indicated on the photograph 'Manufacturing Test Point Two' above and is at the East end of Automated Bay 1.

The working pattern for the operators here is similar to that described earlier. The area is frequented by the operators, maintenance personnel, quality assurance and safety personnel, maintenance contractors, administration and management staff.

There is one manufacturing machine and one packing machine immediately adjacent to the test point.

Higher levels of noise were created by alarms and the dropping of pallets and totoe boxes.

The Channel A measurement in this area was 96.5 dBA with a peak level of 110.1 dBA.

The Channel B measurement in this area was 95.8 dBC with a peak level of 110.1 dBC.

The projected noise dose in this area was 83.4 LEPd with a 217.1% dose.

A detailed noise survey analysis is included in Section 7 of this report and headed Manunfacturing Two.

Manufacturing Test Point Three



Manufacturing Test Point Three

The test point here is as indicated on the photograph 'Manufacturing Test Point Three' above. The area is between two manufacturing machines at the North West corner of Automated Bay.

The working pattern of operators here is as described earlier and the area has the same visitors as described earlier. Peak levels of noise are caused by compressed air discharge, operation of granulators, alarms and the handling of pallets and totoe boxes.

The Channel A maximum level was 96 dBA with a peak of 108.6 dBA.

The Channel B measurement was 95.2 dBC with a peak level of 108.6 dBC.

The projected noise dose for the area was 88.6 dBA with a 721.8% dose.

A detailed noise survey analysis is included in Section 8 of this report and is headed Manufacturing Test Point Three.

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Manufacturing Test Point Four



Manufacturing Test Point Four

The test point is indicated on the photograph Manufacturing Test Point Four above and was taken with the test equipment microphone pointing towards the two machines in the photograph.

The operators and visitors to this area, and their working patterns, are as described earlier in this report.

The Channel A maximum level was 89.7 dBA with a peak of 109 dBA.

The Channel B maximum level was 89.8 dBC with a peak level of 109 dBC.

The projected noise dose in this area was 82.2 LEPd with a 164.5% dose.

It is noted that, although these machines are new, there isn't any noise attenuation panels or equipment fitted to them.

A detailed noise survey analysis is included in Section 9 of this report.

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Manufacturing Test Point Five



Manufacturing Test Point Five

This test point is as indicated on the photograph Manufacturing Test Point Five above. The area is in Aoutomated Bay 1 centre aisle and was taken with the test equipment microphone pointing East to West in the direction shown.

The operators and visitors to this area, and their working patterns, are as described earlier in this report.

The Channel A maximum in this area was 88.2 dBA with a peak level of 100.6 dBA.

The Channel B maximum level in this area was 90.9 with a peak level of 100.6 dBC.

The projected noise dose in the area was 83 LEPd with a 197.9% dose.

In the personal noise dose section later in this report, the nearest operator to this area used Badge No. CA124

A detailed noise survey analysis is included in Section 10 of this report.

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Manufacturing Test Point Six



Manufacturing Test Point Six

The test point for this area is indicated in the photograph Manufacturing Test Point Six. The area is in the North West Corner of Manufacturing Bay 1.

The area is used by static operators sorting products in addition to the transient manufacturing operators.

The manufacturing operators and visitors to the area have similar work patterns to those described earlier in this report.

The Channel A maximum in this area was 85.2 dBA and the peak measurement was 96.9 dBA.

The Channel B maximum was 87.6 dBC and the peak level was 96.9 dBC.

Although the projected LEPd was 80dBA, the projected dose calculation was 81.8LEPd, which gives a 150% dose over a 12 hour shift.

A detailed noise survey analysis is included in Section 11 of this report.

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Manufacturing Test Point Seven



Manufacturing Test Point Seven

The area for this test is indicated in the photgraph Manufacturing Test Point Seven above. The area is in Bay 1 adjacent to machine 5090.

The manufacturing operators in this area are transient and have duties similar to those described earlier in this report. The area is visited periodically by mangement, maintenance, QA, safety and office staff.

The Channel A maximum in this area was 86.6 dBA with a peak of 103.8 dBA.

The Channel B maximum in this area was 92.1 dBC with a peak of 103.8 dBC.

The projected noise dose was an 82.8 LEPd of with a dose of 189%.

A detailed noise survey analysis is included in Section 12 of this report.

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Manufacturing Test Point Eight



Manufacturing Test Point Eight

The area for this test is indicated in the photograph Manufacturing Test Point Eight above. The area is in between Bay 1 and Bay 2 with the test equipment micrphone pointing towards Automated Bays.

This area is a transit area for all staff. The Channel A maximum for this area was 85.8 dBA with a peak level of 98.1dBA.

The Channel C maximum for this area was 89.5 dBC with a peak of 98.1 dBC.

The peaks in this area were contributed to by operators dropping the plastic tote boxes during handling.

The projected noise dose in this area was LEPd with a 193.4% dose.

A detailed noise survey analysis is included in Section 13 of this report.

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Manufacturing Test Point Nine



Manufacturing Test Point Nine

The test point for this area is indicated in the photograph Manufacturing Test Point Nine above. The area is in the centre aisle of Bay 2 with the measuring equipment micrpohone pointing East towards the corridor leading from Pre-pack to Logistics.

The operators and visitors to this area work in a similar manner to that indicated earlier in this report.

The Channel A maximum was 91.5 dBA with a peak level of 105.9 dBA.

The Channel B maximum was 93.9 dBC with a peak level of 105.9 dBC.

The projected dose was 82.9 LEPd with a dose of 193.4%

A detailed noise survey analysis is included in Section 14 of this report.

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Manufacturing Test Point Ten



Manufacturing Test Point Ten

The test point for this area is indicated in the photograph Manufacturing Test Point Ten above. The area is between machines on the South side of Bay 2.

The Channel A maximum in this area was 87.9 dBA with a peak of 100.3 dBA.

The Channel B maximum in this area was 92.6 dBC with a peak of 100.3 dBC

The noise in this area is contributed to by the manufacturing machines including the granulators and hydraulics.

The workers and visitors to the area are transient similar to those described earlier in this report.

The projected noise dose was 84.1 LEPd with a dose of 255.2%.

A detailed noise survey analysis is included in Section 15 of this report.

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Toolroom Test Point Eleven



Toolroom Test Point Eleven

The test Pont for this area is indicated in the photograph Toolroom Test Point Eleven above. The test was conducted at the West end of the toolroom with the measuring equipment microphone ponting East.

This area is used by toolmakers and maintenance staff preparing and repairing dies for the manufacturing machines. The work consisites of dismantling, cleaning, machining and assempbling dies. Portable and fixed electrical equipment is used along with compressed air for some work.

Visitors are managers, and other transient staff such as QA, designers and safety personnel.

The Channel A maximum level was 87.9 dBA with a peak of 113.7 dBA.

The Channel B maximum was 87 dBC with peak of 113.7 dBC.

The workshop is generally quiet in operation and the peak figures were achieved by tools occasionally being dropped on the steel topped benches or by intermittent hammering.

The projected noise dose was 71.9 LEPd with a dose of 15.2%

A detailed noise survey analysis is included in the is report in Section 16.

Packing Test Point Twelve



Packing Test Point Twelve

The test point for this area is indicated in the photograph Packing Test Point Twelve above.

The operators in this area are all involved in the sorting and packing of product ready for despatch.

The Channel A maximum was 89.5 dBA with a peak level of 105.3 dBA.

The Channel B maximum was 97.7 dBC with a peak level of 105.3 dBC.

This is a relatively quiet area with the maximum and peak levels all created by operators dropping pallets and tote boxes during the process.

The projected dose was 73.9 LEPd with a 24.2% dose.

A detailed noise survey analysis is included in this report in Section 17.

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Environmental Noise Test Points

As requested, a number of noise measurements were taken outside the factory to enable judgements to be made on the noise influence the factory has on commercial and residential properties in the neighbourhood. Each test was run for five minutes to allow the measuring equipment to gather data that can be calculated and projected

Edgecote Close



Edgecote Close Test Point

A noise survey was carried out in Edgecote Close at the point indicated in the photograph Edgecote Close Test Point above.

The Channel A maximum was 65.7 dBA with a peak level of 95.1 dBA.

The Channel C maximum was 80.8 dBC with a peak level of 95.1 dBC.

The peak levels were caused by passing traffic on the main road and aircraft approaching Manchester Airport.

During the test a heavy goods vehicle with pneumatic discharge equipment was operating near the silo area indicated on the photograph. The noise from this vehicle will have contributed to the maximum levels and, whilst the levels are low, the frequency of the noise from the vehicle could be annoying to residents.

A detailed noise survey analysis is included in this report in Section 18.

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Truck Discharge Test Point



Truck Discharge Test Point

The truck test point was as indicated in the photograph Truck Discharge Test point above, and was on the perimeter of the company premises.

The Channel A maximum was 87.6 dBA with a peak level of 99 dBA.

The Channel B maximum was 89.2 dBC with a peak level of 99 dBC.

The peak levels were influence by the adjacent motorway and by aircraft approaching Manchester Airport but the predominant noise is from the pneumatic discharge equipment on the vehicle.

The driver of the vehicle was not wearing hearing protection and it is recommended that HellermanTyton advise delivery drivers that this is necessary. Similarly any maintenance staff working in the area should also wear hearing protection during the discharge process.

The projected noise dose, based on **one hour** was and LEPd of 77.3, which is 53.6% of the daily dose. It should be noted that the test point is approximately eight metres from the vehicle.

A detailed noise survey analysis is included in this report in Section 19.

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Silo Test Points

The area adjacent to the external silo was tested previously during the planning process. The three tests below were taken at the same points as the previous tests after the addition of a second silo.

Silo Test Point One



Silo Test Point One

The test point is indicated on the photograph Silo Test Point One above.

The Channel A maximum was 83 dBA with a peak level of 94.5 dBA.

The Channel B maximum was 88.5 dBC with a peak level of 94.5 dBC.

The factory was operating normally and the pneumatic discharge vehicle was not present. The primary source of noise at this test point is the adjacent motorway.

A detailed noise survey analysis is included in this report in Section 20

Silo Test Point Two



Silo Test Point Two

The test point was as indicated in the photograph above Silo Test Point Two. The test point was at the perimeter of the company premises with the microphone of the test equipment pointing towards the silos.

The Channel A maximum level was 78.6 dBA with a peak level of 101.5 dBA.

The Channel B maximum level was 84.6 dBC with a peak level of 101.5 dBC.

It is worth noting that the maximum levels are reduced compared with Silo Test Point One and this is possibly due to the increased distance from the motorway and that the the silos are actually attenuating the noise in this area.

The peak levels are created by the motorway traffic, other local traffic on the access road adjacent to the test point and aircraft approaching Manchester Airport.

A detailed noise survey analysis is included in this report in Section 20.

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Silo Test Point Three



Silo Test Point Three

The test point is as indicated in the photograph Silo Test Point Three above. The test point was approximately two metres from the silos.

The Channel A maximum was 83.4 dBA with a peak level of 97.2 dBA.

The Channel B maximum was 85.5 dBC with a peak level of 97.2 dBC.

The projected noise dose was 55.6 LEPd with a 0.4% daily dose, based on **one** hour duration.

Maximum and peak levels were influenced by traffic on the adjacent motorway and the local access road and by aircraft approaching Manchester Airport.

A detailed noise survey analysis is included in this report in Section 20.

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Car Park Test Point



Car Park Test Point

The car Park test point was as indicated in the photograph Car Park Test Point above.

The Channel A maximum was 80.9 dBA with a peak level of 92.9 dBA.

The Channel B maximum was 83.7 dBC with a peak level of 92.9 dBC.

The standard 8 hour LEP,d for the area was 41.5.

A detailed noise survey analysis is included in this report in Section 21.

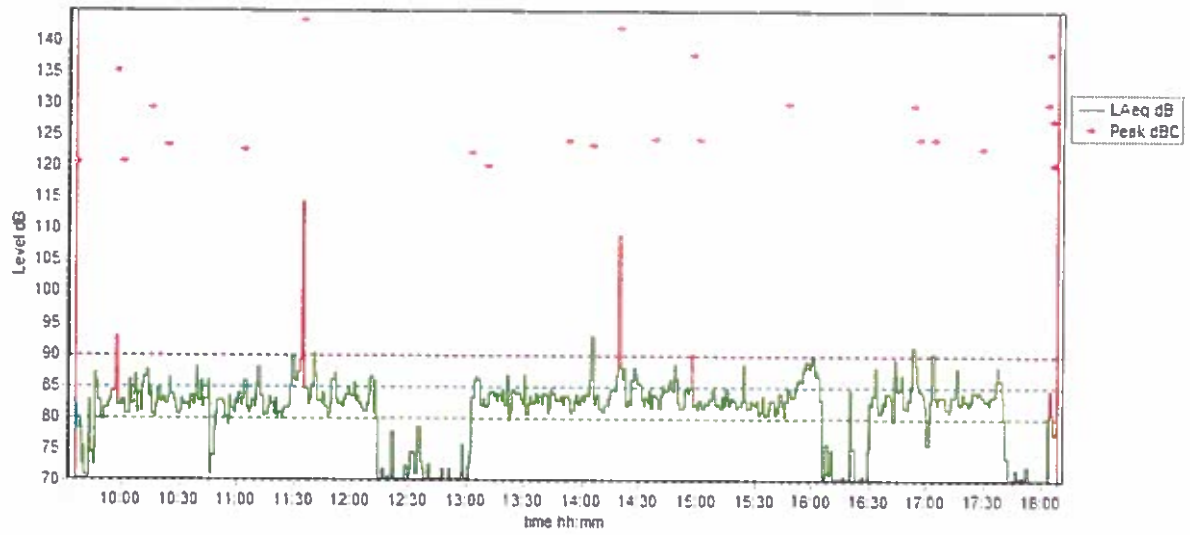
Noise Dose Badges

The noise dose badges were run on operators in various areas and personnel perfoming a variety of tasks.

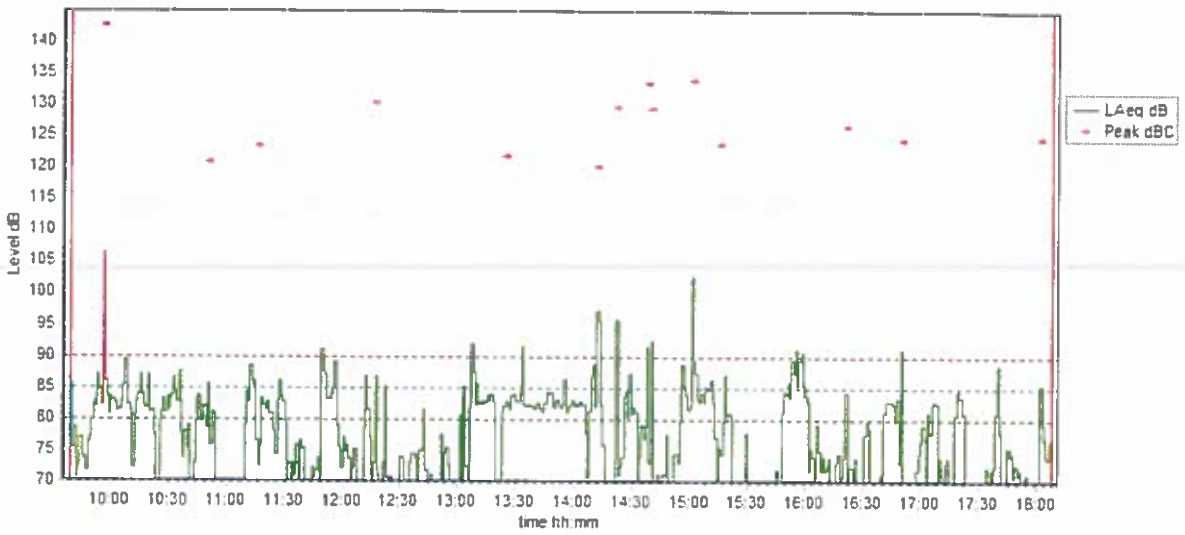
The badges were run for approximately eight hours, with the exception of the machine operator 'Billy', who ran a four hour test.

A summary readout of each report is included here with the detailed reports being included in Section 22.

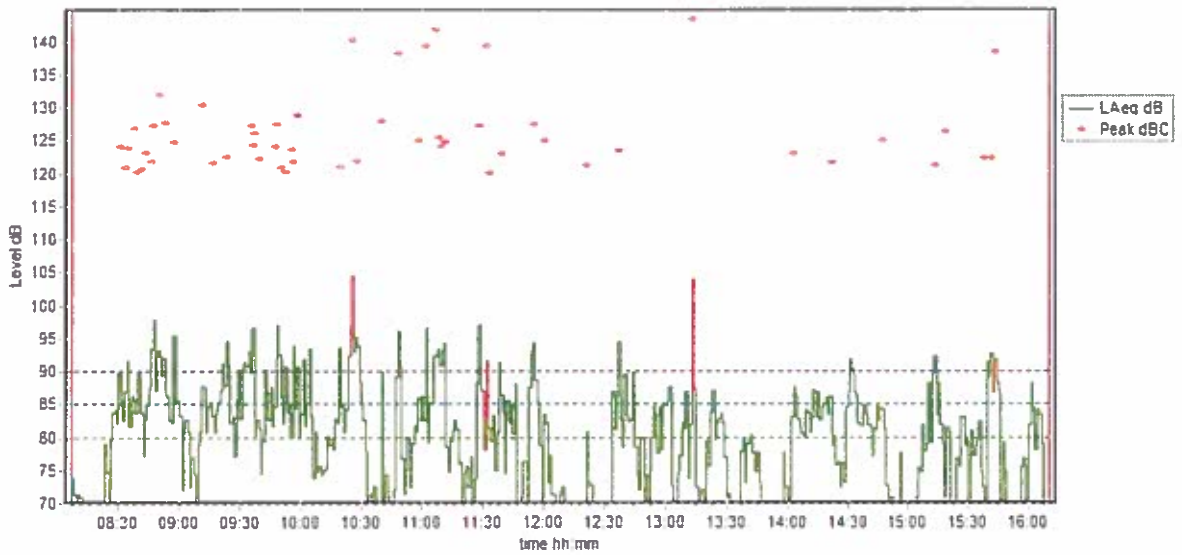
Noise Badge CA124 – Lorraine



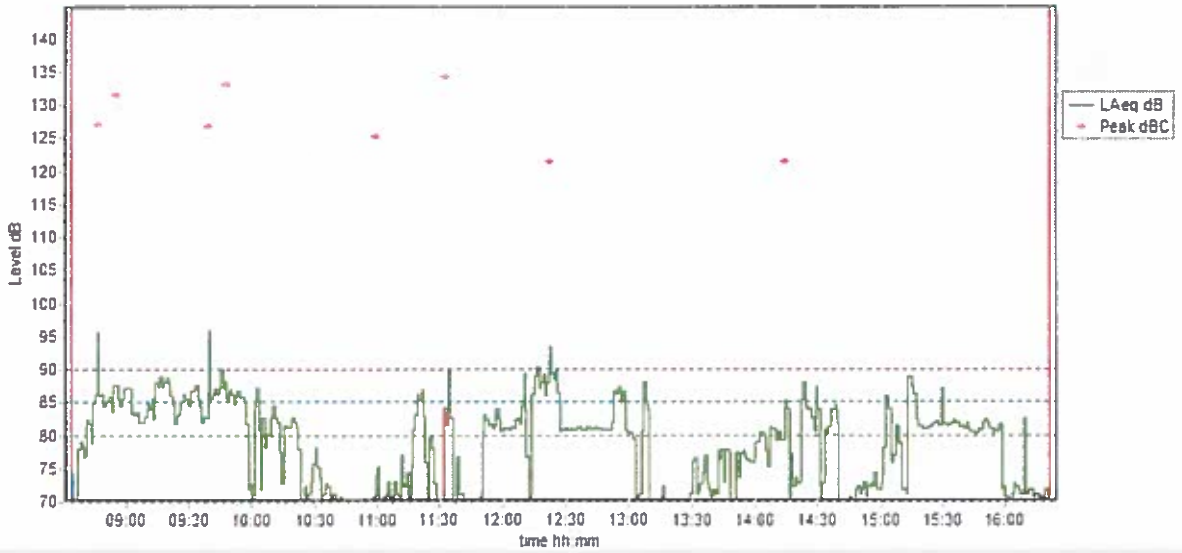
Noise Badge CA4119 – Ruth



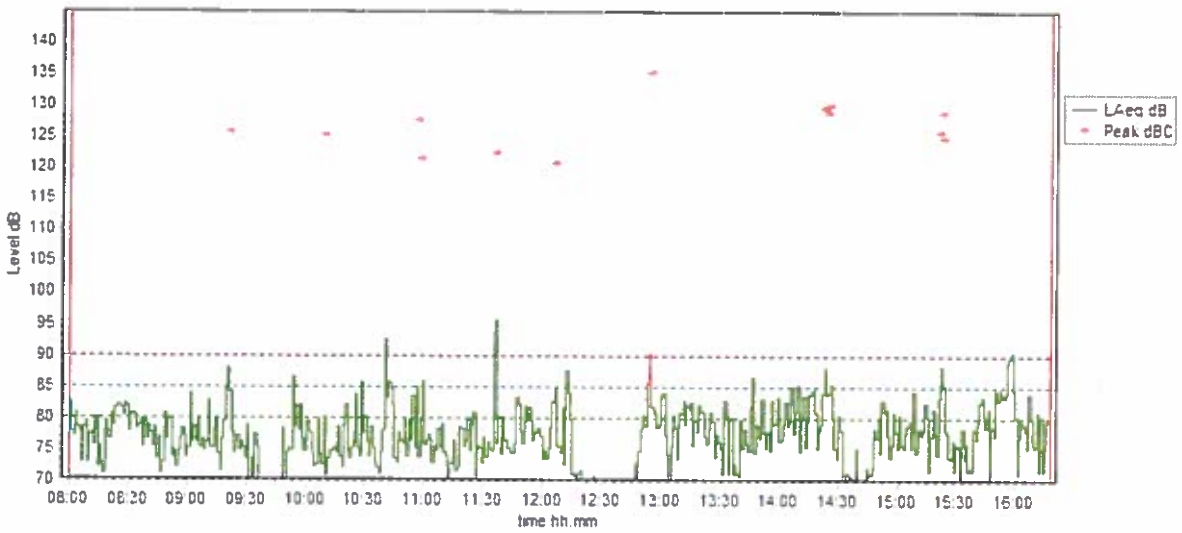
Noise Badge CA658 – Bob HSE



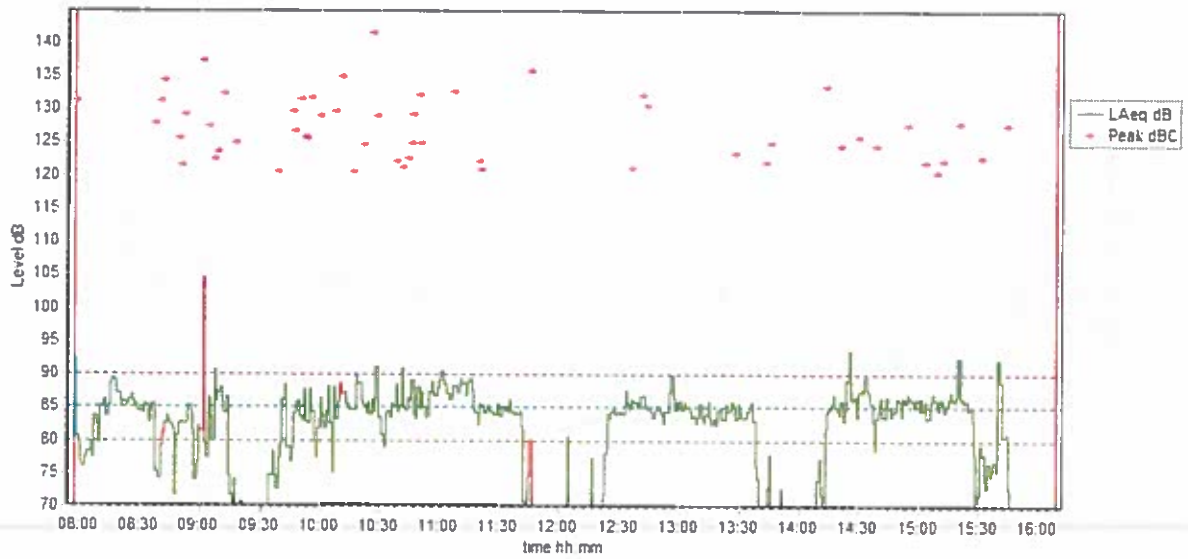
Noise Badge CA 657 – Julie



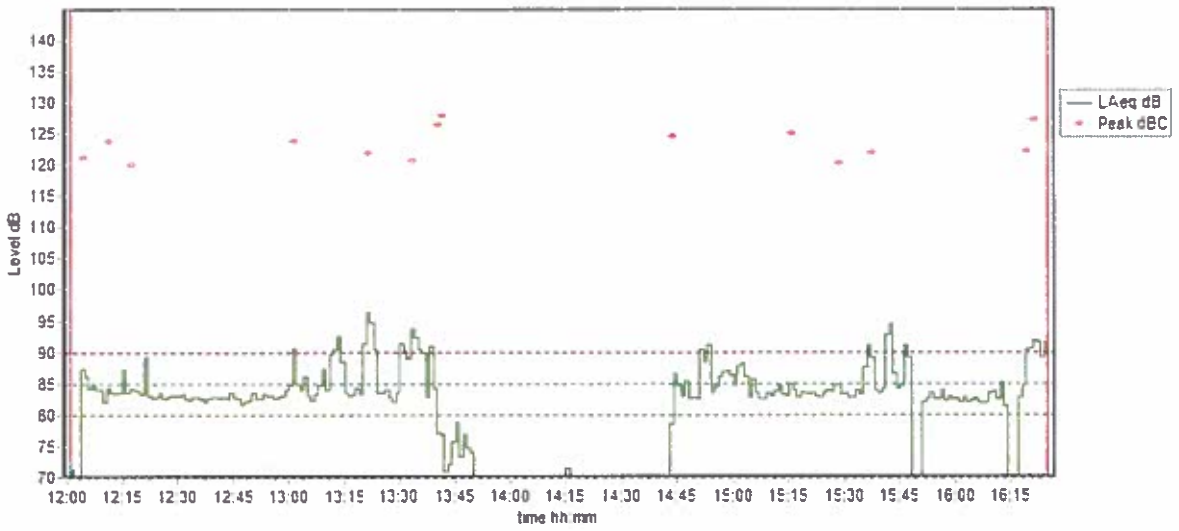
Noise Badge CA3005 – Steve (Toolroom)



Noise Badge CA659 – Brian (Cleaner)



Noise Badge CA4119 – Billy



Noise Badge CA660 – Phil

