Open Government status: Fully Open	**Paper Number:** ACTS/05/2004
	Meeting Date: 25 March 2004
	Type of Paper: Above the line
Exempt material:	**Paper File Reference:**

HEALTH AND SAFETY COMMISSION
ADVISORY COMMITTEE ON TOXIC SUBSTANCES

REVIEW OF FLOUR DUST MAXIMUM EXPOSURE LIMIT (MEL)

Issue

1 To review the effectiveness of the Maximum Exposure Limits (MEL) (10 $mg.m^{-3}$ 8 hour TWA; 30 $mg.m^{-3}$ 15 min ref period) for flour dust in driving down exposures levels. ACTS requested a 3 year review after its implementation in May 2001.

Timing

2 Routine.

Recommendation

3 That ACTS agrees to the setting up of a small ACTS/industry working group to develop a strategy for implementing compliance with the existing MELs and consider and to review the numerical values. The emphasis needs to be on communicating key messages to industry and gaining their cooperation to improve control.

Background

4 In January 2001, on ACTS' recommendation, the Commission:

i agreed a MEL of 10 $mg.m^{-3}$ 8 hour TWA for flour dust;
ii agreed a 'Sen' notation for flour dust;
iii endorsed ACTS' decision to review the MEL in 3 years; and
iv considered whether the level of the STEL (short term exposure level) should be set at 20 $mg.m^{-3}$, or 30 $mg.m^{-3}$. HSC subsequently agreed a MEL of 10 $mg.m^{-3}$ and STEL of 30 $mg.m^{-3}$. These figures were incorporated into EH40/2001.

5 Flour dust is defined as finely ground particles of cereals or pulses (including contaminants) which results from any grinding process and from any subsequent handling and use of that 'flour'. Any additives (eg flour improvers) are included in the definition only after they have been added to the final product mix. Flour is used in

bread making, cakes, pastry, biscuits and other confectionery in a wide range of baking premises, large plants to small craft bakers. Overall the total number of people exposed to flour dust, including associated industries, is in excess of 68,000. In 1999 HSE estimated that there were 95,000 employees in the UK baking industries of whom about 24,000 worked in occupations where there was potential for exposure to flour dust. About 4 million tonnes of flour are milled annually. Some 4,000 people (5,000 including contractors) were employed in 73 flourmills.

6 Further background information is available in ACTS/32/2000 and HSC/01/13. Prior to the implementation of the MELs in May 2001, flour dust had no occupational exposure limit. ACTS also agreed that HSE should do a separate review of alpha amylase with a view to setting a MEL. However, the review team found that many different enzymes were used in the baking industries and it was impractical to set a single MEL for these.

Argument

7 Following implementation of the flour dust MEL and STEL, HSE launched a cross HSE/local authority initiative to evaluate their impact, produce guidance on dust control and health surveillance, gather information on typical exposure levels and raise awareness of the need to reduce exposure to flour dust. HSE published 'A Baker's Dozen' in August 2003 with guidance on occupational asthma for management in bakeries and free COSHH essentials guidance sheets on the Internet for craft bakers in October 2003 (Withdrawn February 2012).
HSE undertook two linked studies as part of the review initiative, focusing mainly on small to medium sized businesses:

- a survey in Scotland (summary of the findings is at Annex 2); and
- a wider study by HSL and field hygienists (summary of the findings is at Annex 3)

The full reports will be available from HSL in the summer.

8 It is very clear that, based on the data in these two studies, the impact of the flour dust MEL is minimal. In summary, few of the bakeries were aware that a MEL existed. Poor work practices were being undertaken, such as flour dusting by hand and cleaning by dry brushing. As a group, bakers in the medium to large size category of companies were generally exposed to higher flour dust concentrations than bakers in smaller companies, although other factors influenced exposure, such as job task, bakery location (England/Wales or Scotland) and appointment of a safety representative. Limited training had been done. Where RPE was provided, most companies had not attempted to match appropriate types to the level of exposure. Most bakeries didn't have LEV. Less than a third of bakers seen had any element of training on flour dust.

9 HSL will provide a short interim report of the second part of the survey, which investigates respiratory symptoms in bakers and inhalable enzyme concentrations in bakeries.

10 On enforcement, as part of the Scottish initiative FOD inspectors served a total of 32 Improvement Notices, all relating to COSHH and flour dust. In addition, and outside this initiative, FOD inspectors in Scotland issued a further 13 Improvement Notices to bakeries. The local authorities in Scotland took a more advisory role, preferring not to take enforcement action in the first instance. In England and Wales, FOD has served 28 Improvement Notices since the introduction of the MEL. We are still collecting data on LA enforcement.

11 On a positive note the incidence of occupational asthma from all causes appears to have reduced slightly from an average of 1,000 estimated cases a year under the Self-reported Work-related Illness (SWORD) survey scheme to around 700. However, the cases from flour dust do not appear to have achieved the same reduction.

12 An estimated 670 cases of occupational asthma from all causes were seen for the first time by occupational and chest physicians who reported to the SWORD/ OPRA (Occupational Physicians Reporting Activity) surveillance schemes in 2002, bringing the average incidence over the three years 2000-2002 to 701, or around 3 cases per 100,000 workers per year.

13 One of the occupations with the highest incidence rate of occupational asthma as reported to chest physicians was bakers, where the estimated rate was over 20 times the overall rate for all occupations.

14 For the period 1993-97, the average number of cases of occupational asthma from flour dust was 58. This average is consistent with 2000-2002 average figures of 59 cases, making it still the second highest cause of occupational asthma. Claims for disablement benefit under the Industrial Injuries Scheme have generally reduced from pre-1999 levels but still tend to vary: 1999 – there were 23 cases assessed as over 14% disability; in 2000 - 13; 2001 - 18 but in 2002 – 29.

15 The MEL has not achieved significant reduction in exposure and compliance. Therefore the first priority is to improve collaboration with industry, trade associations and trade unions to cascade simple messages such as the importance of vacuuming instead of dry brushing. Until this has been achieved there is no merit in considering revising the MEL. To take this forward, HSE proposes that ACTS agrees to the setting up of a small working group with the Health and Safety in Bakeries Liaison Committee (HSBLC) and industry representation to develop and cascade messages on the importance of controlling flour dust. It is envisaged that the working group will consist of 10 members, 6 from ACTS and 4 from HSBLC. It will be chaired by HSE, who will also provide the secretariat. ACTS would have two representatives each from CBI and TUC and one each for local authority LA and other interests.

16 This approach is in line with HSE's Chemicals Strategy and the current HSC Strategy Communication Plan which:

- focuses resources on poor performance to get best results;
- promotes greater involvement of workers;

- makes information readily accessible and provides for clearer and simpler advice; and

- involves all stakeholders and forging close working relationships

Communication Plan

17 This will be a priority issue for the proposed working group as part of identifying and cascading key messages to industry.

Evaluation Plan

19 This paper is an evaluation of ACTS earlier request. The working group will evaluate the impact of its work.

Relevant Control Systems

20 Not applicable.

Consultation

21 Relevant HSE Divisions have been consulted over the proposal in this paper. Alastair Hay reported back to the HSBLC and floated the idea of a working group, which they supported. The proposed working group will consult with relevant interested parties such as other government departments, trade associations, trade unions, local authorities and industry representatives. The Asthma Project Board will also be informed of ACTS' decision over the proposal.

Presentation

22 The proposal involves setting up a small ACTS working group to seek effective cooperation over implementation of the flour dust MELs. It is not a permanent sub-group, but has a proposed life of only two years.

23 The proposals for a new OEL framework will result in existing long-term and short-term MELs for flour dust to become Workplace Exposure Limits (WEL) of the same values.

Costs and Benefits

24 Setting up and running the working group can be met from within existing resources. There is a clear benefit of ACTS working with industry and stakeholder groups to improve compliance. This is in line with HSC's communication strategy.

Environmental implications

25 Not applicable.

European implications

26 None unless the European Union proposes a binding limit. This is not in their work programme. The findings of the working group might be of interest across Europe.

Devolution

27 Not applicable.

Other implications

28 In keeping with other ACTS working groups, a short annual update will be provided.

Action

29 ACTS is requested to:

- agree in principle to set up a small working group as described in paragraph 15;
- agree the terms of reference and issues for their workplan at Annex 1;
- nominate members – 2 CBI, 2 TUC, 1 LA and 1 other;
- note that to date implementation of the flour dust MELs in the areas sampled has generally been poor and overall incidence of bakers' asthma remains static; and
- focus efforts on communicating key messages to industry and gaining their cooperation in reducing exposure to substances with exposure limits. There seems to be little to be gained merely from reviewing the value of the limit.

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Annex 1

REMIT AND TERMS OF REFERENCE FOR THE ACTS FLOUR DUST WORKING GROUP

It is suggested that the working group should:

1. Identify and cascade key messages on the control of flour dust.
2. Agree a strategy to minimise airborne exposure to enzymes used in baking.
3. Develop continuing evaluation plans
4. Re-assess the current numerical values of the MEL and STEL

Issues for the workplan:

- Engage with others, particularly key partners
- Address the concerns of trade associations
- Identify good case studies
- Agree simple changes to work practices
- Explore the issues of using liquid/granular substitutes for powdered enzymes

Annex 2

Compliance with the COSHH Regulations in selected Scottish Bakeries

This survey was a follow-up from the one done 12 years ago, which highlighted poor working practices and high levels of flour dust.

Main Findings

- Seventeen baking establishments were sampled between October 2002 and July 2003 in Scotland, and information was provided by the bakery owner/manager.

- A total of 65 personal 8-hour time weighted dust samples were collected and 25% exceeded the MEL (10mg/m^3)

- A total of 44 short-term task specific (15 minute) samples were collected, and 27% exceeded the STEL (30mg/m^3)

- Only one bakery (6%) had assessed the hazards and risk in the workplace and completed a written COSHH assessment.

- Only one bakery (6%) was aware of the MEL and STEL.

- Approximately half (53%) of the bakeries surveyed used a dredger or sprinkler, however most of the bakeries (82%) undertook some flour dusting by hand.

- In 41% of the bakeries, some or all of the cleaning was carried out using a vacuum, however most (94%) still used dry brushing.

- 35% of the bakeries provided the employees with respiratory protective equipment (RPE). None of these bakeries had attempted to match

appropriate types of RPE to the level of exposure and/or the nature of the work.

- Only one bakery (6%) had some form of training on flour dust for employees joining the company.

- 94% of the bakeries surveyed added bread improvers separately to the bread mixes, and half of these companies reported that they would consider changing to a liquid or paste formulation.

- 57 of the 65 individuals who took part in the airborne sampling completed a general health surveillance questionnaire. A total of 24 blood samples were collected from individuals with general respiratory symptoms. 54% (13 individuals) were found to have specific IgE to common environmental allergens, 38% (9 individuals) had specific IgE to wheat flour. 29% (7 workers) had specific IgE to a mixture of Rye, Barley and Oat, 13% (3 workers) had specific IgE to a mixture of Hemicellulase, Cellulase, Fungal Xylanase and Bacterial xylanase and 4% (1 individual) had specific IgE to fungal alpha amylase or a mixture of bacterial alpha amylase, Glucose oxidase and amyloglucosidase. No positive results were observed for the mixture of egg, milk and soya. The health data from the Scottish survey are not comparable to the data from England and Wales as different criteria were used.

Annex 3

THE STUDY BY HSL ON THE EXPOSURE TO FLOUR DUST IN UK BAKERIES AND CURRENT USE OF CONTROL MEASURES

Background

Under the Control of Substances Hazardous to Health (COSHH) Regulations, flour dust is treated as a hazardous substance. One of the actions for employers is to control exposure in the workplace. In May 2001 a Maximum Exposure Limit (MEL) was set for flour dust at 10 mg/m^3 (8hr TWA) with a Short Term Exposure Limit (STEL) of 30 mg/m^3 (15 minute reference period).

Objectives

The aim of this study was to investigate the effectiveness of existing control measures in reducing exposures to well below the 8-hour MEL and 15 minute STEL, following the implementation of the exposure limits.

Main Findings

- Fifty-five baking establishments were sampled between October 2002 and December 2003 in the UK, and information was provided by the bakery owner/manager.
- A total of 208 personal 8-hour time weighted dust samples were collected.
- Only 26% of bakeries with five or more employees had assessed the hazards and risk in the workplace and completed a written COSHH assessment.
- 80% of the bakeries reported that they understood that flour dust is a respiratory sensitiser.
- Information about the MEL and STEL for flour dust has been available in the trade press and through bakery associations. However only 27% of bakeries were aware of these limits.
- Although there is strong evidence that undertaking good working practices will reduce dust exposure, most of the bakeries were still using inappropriate work practices, such as flour dusting by hand and cleaning by dry brushing.

- 42% of the bakeries provided the employees with respiratory protective equipment (RPE). Only 30% of these companies had attempted to match appropriate types of RPE to the level of exposure and/or the nature of the work.

- 40% of the companies had some form of training for new employees on dust control, good working practice, and/or the potential health effects associated with dust exposure.

- Bakeries who had an appointed Safety Representative were more likely to have some form of training on flour dust, knowledge of exposure limits and have completed a written COSHH assessment, than bakeries without a Safety Representative.

- Mixed model regression analysis suggested that determinants of higher exposure included the job category (particularly weighing/sieving or mixing), medium to large bakery size (50 or more employees) and bakeries being located in Scotland. However, having an appointed safety representative was associated with decreased exposure. The conclusions derived here are based upon the use of a statistical model, but clearly if bakeries and individuals employ good working practice, with correct use of local exhaust ventilation, they should be able to comply with the MEL.

- For approximately 1 in 5 people, their inhalable dust exposure exceeded the MEL, and for 1 in 3, levels were higher than 5 mg/m^3.

- 64% of companies who use powdered improvers reported that they would consider changing to a liquid or paste formulation. However, 59% of these envisaged a technical or cost problem with changing to liquid or paste. The substitution of powdered improvers with low-dust granules was not investigated.

Additional Work

- Information focusing on personal exposures to inhalable fungal and bacterial alpha-amylase and the respiratory health effects related to flour dust exposure will soon be available in supplementary reports.