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Occupational Cancer – priorities for future intervention

Purpose of the paper

1. This paper presents proposals for HSE's future approach to occupational cancer. It takes account of the work of Dr Lesley Rushton et al on the burden of occupational cancer which was presented to the Board by Dr Rushton in December 2011. The paper provides an update on current activity, including interventions on asbestos and other carcinogens, and an overview of research commissioned to address evidence gaps. The Board is invited to consider proposals for HSE's future direction and approach to occupational cancer.

Background

2. Dr Lesley Rushton gave an update on the Burden of Cancer Study at the December 2011 Board meeting. An overview of the study findings can be found at Annex I.
3. The Board asked for a further discussion of the implications of Dr Rushton's work for HSE's current and future activity on occupational cancer. This paper explains how HSE has prioritised areas for intervention, and presents an overview of work HSE is currently undertaking and activities already planned in the short/medium term to reduce occupational exposure to carcinogens. It also draws on the findings from the Burden of Cancer Study to suggest areas where in the future HSE should consider targeting resource.

Argument

Determining priorities for HSE action

4. Annex I includes a table ranking the top 10 carcinogenic agents/occupations based upon 2005 data. HSE has analysed this to identify and prioritise those agents/occupations on which to consider focusing its activity. This prioritisation has been informed by evidence from the occupational cancer burden work, HSE's current understanding of the relevant industry sectors, and by applying the following criteria:
 - The strength of evidence that there is a current causative link between exposure to a particular agent/occupation and cancer.
 - The level of future burden estimated for each agent/occupation.
 - The numbers of workers likely to be exposed/at risk.

- Consideration of the likelihood of an intervention being successful.

This prioritisation is kept under continuous review so that any emerging new evidence is taken into account. Using this approach, the table below presents HSE's current prioritised for action list of the top ten agents/occupations attributed to causing occupational cancer. It should be noted that we currently have research underway that may change this picture when the results become available.

HSE's prioritised list of the top ten agents/occupations attributed to causing occupational cancer		
Agent/Occupation	Cancer Site	Ranking Criteria
Asbestos	Mesothelioma, Lung, Larynx, Stomach	<ul style="list-style-type: none"> • High numbers of deaths based upon 2005 figures (3,909) • High number of Trade's people are still at risk – 1.8 million • Strong evidence of a causal link • Evidence that interventions can be successful in raising awareness
Respirable Crystalline Silica (RCS)	Lung	<ul style="list-style-type: none"> • High numbers of deaths based upon 2005 figures (789) • High numbers of workers >1,000,000 at risk particularly in the construction sector • Evidence of causal link • Partnership activity already underway • Significant research activity already underway
Shift work *	Breast	<ul style="list-style-type: none"> • High numbers of deaths based upon 2005 figures (552) • High numbers of workers (5-20% of UK working population is engaged in shift work that involves night work 3-6 million workers) • Weak evidence of causal link/links not confirmed • Waiting for results of evidence gathering research
Welding	Lung	<ul style="list-style-type: none"> • Numbers of deaths based upon 2005 figures (152) • Numbers of workers exposed > 75,000 • HSE is already engaged in partnership activity with the welding sector • Causal agents – likely to be fumes & gases containing a mixture of salts of metals such as chromium and nickel and other compounds
Painting	Lung, Bladder,	<ul style="list-style-type: none"> • Numbers of deaths based upon 2005 figures (334) • Potentially large numbers of workers exposed many within SMEs and some linked to construction • Causal agents not identified but likely to be ingredients in paint solvents, additives

HSE's prioritised list of the top ten agents/occupations attributed to causing occupational cancer		
Agent/Occupation	Cancer Site	Ranking Criteria
		and pigments • Exposure pattern not understood
Diesel Engine Exhaust Emissions (DEEEs)	Lung, Bladder	<ul style="list-style-type: none"> • High numbers of deaths based upon 2005 figures (652) • Estimated >100,000 workers exposed • Environmental exposure is a contribution to the exposure burden • Professional drivers are estimated to be the biggest worker group at risk from exposure to DEEEs • Any future activity with respect to controlling exposures to professional drivers would need to consider innovations in vehicle technology when considering control options
Solar radiation	NMSC**	<ul style="list-style-type: none"> • Very low numbers of deaths based upon 2005 figures (12) • High numbers of people develop NMSC, however this cancer is more amenable to treatment • Not primarily an occupational issue
PAH - Coal Tars & Pitches	NMSC	<ul style="list-style-type: none"> • Very low numbers of cancer deaths based upon 2005 figures (11) • No evidence of significant exposure • Alternatives are available
Tetrachloro-ethylene	Cervix, NHL***, Oesophagus	<ul style="list-style-type: none"> • Low number of cancer deaths based upon 2005 figures (140)
Radon	Lung	<ul style="list-style-type: none"> • Number of cancer deaths based upon 2005 figures (184) • Not primarily an occupational issue • Other Government Department lead

* Shift work - animal evidence suggests that the disruption of circadian rhythms can increase the risk of cancer by a variety of mechanisms and a number of epidemiological studies have provided supporting, but not conclusive, evidence of a risk of breast cancer in shift workers.

NMSC – Non Melanoma Skin Cancer, *NHL – Non Hodgkin Lymphoma

Current and future HSE activity on these issues

Asbestos

5. Asbestos is the biggest contributor to the current cancer burden. Whilst many of the deaths arise from exposure in industries and activities that no longer exist, around a quarter of all deaths are amongst trades people. This group is the one most at risk today from accidental exposure during their everyday work and therefore HSE continues to focus its interventions on carpenters, electricians, plumbers etc. HSE's action is aimed at raising awareness of the risks and the simple steps trades people can take to protect themselves. The 'Hidden Killer' campaigns run in previous years

have been very successful and HSE is looking at further work to build on these campaigns subject to resources being available.

6. Since the introduction of the Control of Asbestos Regulations 2006, HSE has issued over 1,500 enforcement notices and since 2009/10 over 300 notices have been issued year on year. HSE has also taken a number of prosecution cases which have resulted in guilty verdicts for breaches of The Control of Asbestos Regulations 2006, most recently HSE is taking around 20 successful prosecutions per year.
7. In 2011 HSE has worked closely with key stakeholders to increase access to appropriate training and improve the management of asbestos. This has resulted in:
 - The launch of a vocational learning package and supporting FOD activity to raise awareness of asbestos risks amongst young apprentices.
 - The Asbestos 'Training Pledge' - HSE engaged with asbestos training organisations to encourage them to offer free basic training sessions for tradesmen. This ran in September (2011), during which 7987 hours of free classroom-based, and 5570 hours of free online training was pledged. Thus the original target of 4000 hours (to tie in with the approx 4,000 cancer deaths per year) was easily exceeded. This represented a commitment to deliver free asbestos awareness training for around 4020 trades people. Feedback indicates that the take up rate for this training was around 70%.
 - Building on the publicity following a successful prosecution for poor management of risk from asbestos during major refurbishment work, interventions with retail companies are being carried out to raise the awareness of their duties for asbestos removal during refurbishment in trading stores. This is to ensure that arrangements are put in place by those retail companies to provide appropriate management controls including the use of adequate refurbishment surveys and sufficient time and resource for the work to be safely carried out.

Shift Work

8. The risk of breast cancer associated with shift work and in particular night work has not been established and HSE has commissioned the University of Oxford to undertake an extensive study on the relationship between shift work and chronic disease.
9. The Cancer Epidemiology Unit at the University of Oxford will use data from two existing studies, the 'Million Women Study' and 'EPIC-Oxford', to investigate the disruption of circadian rhythms, with a focus on shift working patterns and 'lifestyle' behaviours in relation to cancer and other chronic conditions in men and women. This is a complex and challenging piece of work and the research team currently estimates that they will complete the study in December 2015.

10. In the interim HSE has reviewed its current guidance: *HSG 256 Managing Shift Work: Health and Safety Guidance* and considers this remains appropriate at present to enable employers to meet their current legal obligations relating to hours of work and how they are scheduled. HSE will also continue to monitor international research work in this area.

Respirable Crystalline Silica (RCS)

11. Significant exposure to RCS can cause silicosis and lung cancer. The current burden estimated in the Cancer Burden report is almost 800 annual lung cancer deaths. HSE is putting a lot of resource into working towards understanding and reducing RCS exposure. See also *Annex II Further research to improve the evidence base on occupational cancer*.
12. HSE continues to focus interventions in industries where the risk of respiratory exposure to RCS is higher. Construction is the key sector, with over 600 lung cancer deaths from RCS exposure amongst construction workers. The Construction sector is working in partnership with the Construction Dust Forum to improve industry awareness of the risks associated with breathing in dust and of control standards for high risk tasks. This approach has built upon the success of the use of water suppression for the control of silica during kerb and block cutting and has developed standards and guidance on selection and use of on-tool extraction. It has also pioneered the use of HSL's 'ELVis' dust exposure video visualisation tool.
13. Other sectors, where exposed numbers are smaller but potential exposure levels high are also being addressed, e.g. stone working and quarrying:
- Development of a vocational learning package for stoneworkers, to explain to new entrants to this sector that the dust they routinely produce can cause serious and fatal diseases.
 - A quarries partnership team comprising key players from the sector has generated numerous industry-led initiatives to improve RCS dust exposures – e.g. safety days including presentations on control of RCS; improving web access to information on controlling RCS; development of a tool-box talk aimed at raising employee awareness of RCS and best practice to be delivered on site by quarry managers and/or H & S managers; a pilot control of RCS course and, further engagement with training providers to discuss opportunities to disseminate the 'key messages' on RCS via induction courses etc.

Welding

14. HSE is working with partners in the welding sector to encourage them to develop and deliver new ideas aimed at reducing potential exposure to welding fume. HSE has delivered a vocational learning package for welders and is developing a communications plan for using visual materials, which will then be offered to the partners.

Painting

15. The Cancer Burden study included painters and decorators in the construction sector, and vehicle spray painters and workers in paint manufacture. Painters are exposed to various substances including solvents, additives and pigments, as well as materials containing asbestos and silica through their work in and on buildings. There is insufficient information available to identify which particular agents are the cause of the reported excess lung or bladder cancers in painters. HSE has not recently targeted any intervention activity with this group, however HSE is:

- Considering undertaking some research specifically to look at what painters are currently exposed to.
- Looking into which hazardous substances in the construction industry are most prominent and the tasks/trades that give rise to the greatest exposures, early results indicate that certain types of paint and other relevant substances have been identified by this work.
- Working with the construction industry to raise awareness and to encourage better use of established published guidance, HSE is mindful of technical developments which have resulted in more widespread use of spray paint methods instead of traditional brush and roller.

Solar radiation

16. HSE has guidance on its website regarding sun protection for workers. Currently we are supporting the IOSH-funded SunSafe project, which is working to change construction workers group behaviour and reduce exposure to solar radiation. This project aims to launch a DVD based intervention delivering key sun protection messages to this high risk group during 2012. A research project to evaluate the success of this intervention in terms of changes in the workers' knowledge, attitudes, and behaviours is planned for 2012-13.

Diesel Engine Exhaust Emissions (DEEEs)

17. DEEEs are a complex mixture of particulates, gases and vapours which occur when diesel fuelled engines operate. The major source of workplace exposure to DEEEs is from emissions from heavy vehicles that use diesel fuel. Emissions are also generated from stationary power sources which may be used regularly in tunnelling, mining or on construction sites. An HSE survey in 1994/5 found that individual DEEE constituents with an occupational exposure limit were well below the limit and that this exposure risk could be considered as one of low priority. A further small survey was carried out in 2006 on bus garages, roll on roll off ferries and tollbooths. Personal exposures to respirable dust, carbon, aldehydes, carbon monoxide and carbon dioxide were measured – exposures were found to be significantly below the appropriate workplace exposure limits.

18. DEEEs are not classified as carcinogens under the EU Regulation on Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation). HSE provides guidance on DEEEs - *HSG187 Control of diesel engine exhaust emissions in the workplace* which provides examples of good working practice for controlling exposure in specific situations.
19. Professional drivers are estimated to be the biggest worker group at risk from exposure to DEEEs; however they will be subject to significant environmental exposure. HSE has therefore not targeted work on this group to date.

Polycyclic aromatic hydrocarbons (*PAH, Coal tars and pitches*)

20. Nowadays there are petroleum based alternatives to coal tars available and an HSE survey in 2006 of PAH exposure involving 25 site visits did not find evidence of significant exposure other than at sites undertaking timber impregnation with creosote (and this process has now ceased). This hazard has effectively disappeared.

Tetrachloro-ethylene (*trade name perchloroethylene/PERC*)

21. The main source of potential exposure to tetrachloro-ethylene is the dry-cleaning industry. It is also found in some manufacturing areas where it can sometimes be used as a degreasing agent. The design of modern and more efficient dry cleaning machinery and advances in both technology and garment care have contributed to reducing exposures. HSE provides guidance to dry-cleaners on monitoring levels of and controlling exposures to tetrachloro-ethylene. The majority of dry cleaners are enforced by HSE, but in some cases there is LA enforcement for local operational reasons. HSE has not recently targeted any intervention activity with this group.

Radon

22. Exposure to Radon is primarily delineated geographically rather than by particular occupation or industry. Government work on radon has focused mainly on considering the public health issues in areas where radon is found and may seep into peoples' homes. Interventions on this issue have therefore been delivered in the main by the Health Protection Agency (HPA).
23. Previously, HSE and local authorities have used a range of different interventions to deal with occupational exposures including providing advice during routine inspections, conducting targeted specialist inspections in high radon areas and working closely with other government departments. Current effort is focused on strengthening and complementing work with OGDs, raising awareness, improving

education and taking action where inappropriate management of radon risks in the workplace has been identified.

24. HSE is working with OGDs to deliver a coordinated UK Radon Action Plan for the revised EU Directive on Basic Safety Standards for Radiation Protection.

Targeted approach

25. In discussing HSE's occupational health agenda the Board has previously agreed (March 2010 (HSE/10/34) and December 2010 (HSE 10/94)) that HSE should focus its efforts and resources on targeted, pragmatic interventions in areas where the risks are higher and where there is a reasonable prospect of making an impact. The findings from the Cancer Burden research would appear to support this approach and offer further information to help target any new interventions on occupational cancer.

Increasing compliance

26. All of the agents/occupations listed in this paper are subject to legislative control. However, the Future Cancer Burden work suggests that for some of the agents/occupations changing exposure limits alone are unlikely to have a significant impact on reducing occupational cancer.
27. The Future Burdens scenario for RCS suggests that **increasing compliance** would have a greater overall impact on reducing the level of the future cancer burden than simply lowering exposure limit values. However, it is not appropriate to use the conclusions for silica to suggest that increasing compliance with the existing legal requirements is the only possible answer for all occupational carcinogens.
28. Where the evidence suggests that enforcement to secure compliance is the most appropriate approach, for example proactive inspection focusing on RCS dust controls, HSE will need to take this into account in deciding on its strategies for addressing specific carcinogens.

Sector Strategies/Intervention Plans (SIPs)

29. HSE is delivering the proactive elements of HSE's Strategy "Be Part of the Solution" on an industry basis. Sector intervention plans (SIPs) relating to the manufacturing, construction and chemicals sectors include a range of interventions relating to relevant occupational cancer risks and details of these activities have been presented in the relevant sections elsewhere in this paper.

Research

29. For 2011/2 HSE had a budget of £11m for applied research, the major part being devoted to occupational health. Precise figures for the occupational health spend are difficult to provide as some research involved both health and safety issues. However, figures from the programme, funding most of the health-based research, provide the following breakdown:

2008/09 - £8.5m
2009/10 - £6.5m
2010/11 - £6.7m
2011/12 - £5.8m

30. For projects related to cancer, the total expenditure between 2009/10 and 2011/12 has been around £5m. Included in this total is:

- The relationship between shift work and disease (the University of Oxford).
- The Burden of Occupational Cancer (Imperial College London).
- Epidemiological study at NSUK stage 2 - data collection, analysis and reporting of results (Institute of Occupational Medicine).
- Asbestos related cancers in Britain (jointly funded with Cancer Research UK).

This total also includes a long-running HSL support contract for the asbestos work - £450k.

31. HSE has also taken steps to commission further research to fill the knowledge gaps emerging from the Cancer Burden work and this is summarised in Annex II.

32. The views of HSE's Advisory Committee on Toxic Substances (ACTS) have been sought during the development of this paper and these are summarised in Annex III.

EU activity

33. HSE will continue to participate actively in Europe, by influencing the three European Institutions, the Commission, Council and Parliament that drive European legislation on chemicals. The European Commission is presently considering amendment of the Carcinogens and Mutagens Directive (CMD) to clarify duties and to possibly add new binding exposure limits. Potential candidate substances for binding limits include RCS, DEEEs, mineral oils and tetrachloro-ethylene. CMD is implemented by the Control of Substances Hazardous to Health Regulations (COSHH).

34. In addition, the EU Registration, Evaluation, Authorisation and restriction of Chemicals (REACH) Regulation establishes controls on both supply and use of specific substances including certain carcinogens, and more

generally aims to encourage the phase out of substances of very high concern including known carcinogens.

Action

35. The Board is invited:

- To agree that delivering effective interventions in relation to workplace health, and occupational cancer in particular, is challenging and that HSE has to prioritise its work in this area, even when faced with some of the most hazardous agents/occupations.
- To note that there is no single common approach to deal with all of the issues of concern and to have a positive impact HSE needs to work collaboratively with a range of stakeholders to implement and embed sustainable improvement.
- To agree that HSE that should continue to focus its interventions on:
 - increasing compliance with legal requirements that currently exist
 - achieving behavioural change in workplaces
- To agree that HSE should continue to resource targeted activity, including enforcement, on Asbestos, Silica and Welding following the principles of the sector prioritisation approach.
- To agree that for exposures to agents/occupations that are not solely work-related, HSE should seek to work with other relevant bodies and identify those best placed to take action to reduce exposures – e.g. in the cases of solar radiation and radon where the majority of the total cancer burden is not occupationally related and is best addressed as public health issues.
- To agree that HSE should not take any proactive action on shift work before the evidence from the GB and other international research is delivered.
- To consider whether HSE should gather more evidence in relation to painting and DEEEs, to inform future activity in these sectors?
- To note that any targeted intervention is unlikely to have any real and measurable impact before 2030 and that account has to be taken of an aging population living and working longer. However, unless action is initiated now, the burden of occupational cancer at that time will be little different from the estimates in Dr Rushton's future burden work.

Paper clearance

Cleared by SMT on 2nd April 2012

Annex I

Summary of occupational cancer burden work

In 2005, HSE commissioned Imperial College London to produce an updated estimate of the burden of occupational cancer in Great Britain. The research was broken down into two phases:

The **first phase**:

- estimated the **current** occupational cancer burden based on past exposures;
- identified important cancer sites;
- identified those industries and occupations with the highest incidence of occupational cancer.

The **second phase**:

- used the **current** burden estimates, to estimate the future occupational cancer burden;
- developed scenarios to demonstrate the potential effects of different measures to reduce the burden.

The **first phase** of this work provides for the first time the “big picture” of the magnitude of the current burden of occupational cancer created by particular agents/occupations and the scale of the overall burden. For instance, an estimated 56% of occupational current cancer registrations in men are attributed to work in the construction industry and an estimated 54% of current occupational cancer registrations in women are attributed to shift work.

It is recognised that there are several sources of uncertainty in the cancer burden estimates, including exclusion of other potential carcinogenic agents, inaccurate or approximate data and methodological issues. The estimates are likely to be conservative.

The **second phase** of the work - **the future burden element** built upon the estimates from the first phase to develop a methodology for HSE to make further **best estimates** of what the future occupational cancer burden might look like in a variety of scenarios.

Table 1 ranks the total **cancer deaths** based upon 2005 data for each carcinogenic agent/occupation:

Agent/Occupation	Cancer deaths (2005)	Cancer site	Ranking
Asbestos	3,909	Lung/mesothelioma/ stomach/ Larynx	1
Respirable Crystalline Silica (RCS)	789	Lung	2
Diesel Engine Exhaust Emissions (DEES)	652	Bladder/lung	3
Mineral Oil	566	Bladder/Lung/NMSC*/ Sinonasal	4
Shift Work	552	Breast cancer (female)	5
Painting	334	Lung/bladder	6
Environmental Tobacco Smoke (ETS)	249	Lung	7
TCDD (Dioxin)	231	Lung/NHL**/STS***	8
Radon	184	Lung	9
Welding	152	Lung	10

*NMSC – Non Melanoma Skin Cancer, **NHL – Non Hodgkin Lymphoma, ***Soft Tissue Sarcoma

Table 2 ranks the agents/occupations with a major contribution to the future occupational cancer burden, the numbers used for this ranking are based on estimated **cancer registrations*** for 2010.

The future projection work only dealt with **cancer registrations** not **cancer deaths**.

Agent/Occupation	Cancer Site	Ranking
Asbestos	Mesothelioma, Lung, Larynx, Stomach	1
Shift work	Breast	2
Solar radiation	NMSC*	3
Respirable Crystalline Silica (RCS)	Lung	4
Painting	Lung, Bladder,	5
Diesel Engine Exhaust Emissions (DEEEs)	Lung, Bladder	6

Agent/Occupation	Cancer Site	Ranking
PAH - Coal Tars & Pitches	NMSC	7
Tetrachloro-ethylene	Cervix, NHL**, Oesophagus	8
Radon	Lung	9
Welding	Lung	10

*NMSC – Non Melanoma Skin Cancer, **NHL – Non Hodgkin Lymphoma

Both tables demonstrate a similar ranking trend with asbestos, clearly at the top and both shift work and RCS both in the top 5 rankings.

Annex II

Further research to improve the evidence base on occupational cancer

HSE has commissioned research to address evidence gaps to help to refine understanding of the causes of occupational cancer:

Occupational CARcinogen Exposure data for Great Britain (Carex-GB)

The lack of comprehensive GB specific exposure data is a significant cause of uncertainty in the cancer burden estimates and our own knowledge of the overall prevalence of workplace exposure to carcinogens. The exposure data used in the cancer burden estimates came primarily from CAREX, a database that provides estimates of exposed populations in European countries based on exposure data from Finland and the US from 1990 -1993. HSE is in the process of commissioning work to develop an information system that can gather and evaluate the best available data on occupational exposure to known carcinogens in GB workplaces.

Occupational exposure data

HSE continues to commission work to address evidence gaps on exposure to occupational carcinogens, currently this includes:

- An evaluation of historical and current exposure to hazardous substances and their control in the British construction industry. This evaluation will include the current exposure information available for asbestos, silica, DEEE, coal tars wood dust and painters.
- Exposure surveys to gather data on RCS exposure for particular high silica generating tasks and high risk groups.
- Occupational hygiene surveys at foundries for RCS and other carcinogens to improve substance control and set benchmarks for control.

The Cost of Occupational Cancer

HSE is currently working on two strands of research to develop a robust cost estimate for occupational cancer.

Firstly, Newcastle University has been commissioned to undertake a pilot study to obtain evidence on whether individuals consider the human cost of cancer greater than other risks. By comparing cancer with road related risk, the pilot study is investigating how dread and latency associated with cancer affects people's concern about it, relative to road risk. The study is hoped to provide a defensible empirical basis for establishing the human cost of fatal cancer.

Newcastle University expect to complete their pilot by late summer 2012, it is possible that they recommend a full study which could then take around a

year to deliver. However, it is also possible that the evidence from the pilot will be conclusive enough not to require additional study.

Secondly, HSE economists and statisticians are exploring how to adapt the 'Costs to Britain Model' to estimate a total cost for fatal and non-fatal cancers. The results of the Newcastle University work will enable us to select an appropriate value for the 'human costs' part of total costs of cancers. Total costs also include all the financial costs associated with cancer, including lost income, employer costs, Government costs (such as NHS treatment costs).

At this stage we can say that the current total cost of occupational cancer is expected to represent a cost to society in the order of 'double figure' billions.

The HARM index

HSE/HSL statisticians are currently developing an index of HARM for all occupational health diseases including cancer. This HARM index considers various work-related ill health and injury outcomes, which take into account factors such as severity, age at onset, and duration of the condition to estimate the burden or 'harm' of work-related ill health and injury in Great Britain based on current occupational exposure.

Transfer of technical knowledge to HSE project extension

A small project to transfer the technical knowledge of the cancer burdens method from Imperial College has been commissioned. This will allow HSE to revise estimates of occupational cancer in the light of new exposure and risk information and to assess the potential impact of intervention scenarios in-house in the future. The project is expected to deliver in October 2012.

RCS

HSE is putting a significant amount of resource into gathering more evidence about exposure relating to RCS:

- **Exposure data on RCS in Construction SMEs:** aims to assess the feasibility of collecting a representative sample of RCS exposure data for SME's in construction and to assess the feasibility of collecting survey data on the frequency of tasks generating high levels of RCS. A pilot study will subcontract recruitment of participants to a company experienced in working with construction SME's.
- **Cutting roof tiles** - to ensure a quality finish and in terms of injury prevention a safe approach 'valley roof tiles' are cut dry in-situ. There is a concern that this practise may result in high RCS exposures. Research work has been undertaken, and initial exposure measurements have varied, but have included some very high RCS exposures.
- **Hazardous substances review:** this will take an overview of what substances workers in construction are exposed to, the substances

and the effects that they have and the trades identified as being most at risk.

- **RCS surveys in brick manufacture and foundries:** this will include a baseline health visit conducted by HSL and the hygienists, with follow up visits after 4 years with, as far as possible, the same workers.
- **Strategic Research Project:** a five year programme of research to find out more about RCS and exposure levels and controls, and the relationship between ill health and exposure.
- **Exposome:** a number of pieces of work relating to silica are being undertaken as part of this, including, looking at the feasibility of biological monitoring and measuring RCS in exhaled breath collected from foundry workers during one of the RCS survey visits.

Asbestos

Asbestos lung burden in workers born after 1965: Current mesothelioma rates reflect asbestos exposure before 1980, this work aims to determine the range of asbestos levels in the lungs of construction and other workers born since 1965 and who started work after 1980.

The data gathered by the research will be used to:

- determine the extent of continuing asbestos exposure in Britain due to current working conditions;
- determine which occupational groups are suffering the highest exposures;
- provide an indication of whether the current UK and EU regulations on asbestos monitoring and control are appropriately focused to minimise the hazard.
- provide an estimate of future mesothelioma risks due to current occupational and environmental asbestos exposure levels.

The research project will be completed in Summer 2013.

Annex III

Comments received from members of the Advisory Committee on Toxic Substances (ACTS)

Three members submitted comments and these are summarised below:

General comments:

- Future burden forecasting needs to be an iterative process as workforce demography and exposure patterns are changing all the time. As an example, for diesel exhaust emissions, there is a lot of work at the US Health Effects Institute looking at the post-2007 low emissions diesel engines.
- The fact that the HSE board are to discuss this is an extremely important development. Similar estimates have been around for years, although the reports by Rushton et al, provides a useful opportunity to address these issues and particularly the focus on interventions.
- I would hope that the board reflect on the fact that nearly 40 years after Robens, we are still left with this burden of largely preventable occupational illness caused by working conditions. While we cannot change the past, many of us have been saying for years that health and safety in the UK needs to sharpen its focus on exposures in the work environment that can cause cancer (and indeed other occupational illnesses such as COPD, asthma, etc). Importantly, I would hope that the HSE board would wish to engage with ACTS in discussing options for the way forward which needs a greater emphasis on the principles of occupational hygiene and attention to the risk assessment and control of exposures.

Agent/Occupation Specific

Diesel: for drivers, the issue of exhaust emissions is covered under a new Euro 5/6 standards (2009/2014) and EU Regulation 692/2008 so I would agree that this is probably something that HSE need not necessarily target; the requirements focus on particulates and nitrogen oxides for the most part.

There are a number of technologies designed to control exposure including Diesel Oxidation Catalysts (DOCs), Diesel Particulate Filters (DPFs), Exhaust Gas Recirculation (EGR) and Selective Catalytic Reduction (SCR) and in-cab filtering, clearly they are all developing, but diesel emissions from new vehicles are significantly less than their older counterparts and are continually being reduced.

It is unclear whether increased road traffic and replacement of old vehicles was factored into the assessment.

Welding: welding is a very complex issue, in general I would agree that in terms of occupational cancer it is not the most significant, but in my experience welders concentrate more on the visual signs (smoke) and do not

tend to address the metal type/composition (e.g. Chrome VI content), composition of weld tips and welding through materials on metal surfaces (oils, sealants etc), amongst which can be many occupational carcinogens, I would hope these become part of a learning package.

Shift work: while it is understandable that more information about shift work might be necessary to accurately target interventions, it might be better for HSE to be seen to be doing something, if only a reference to participation in international research. The paper also mentions that “HSE should continue to focus (or resource) its interventions...” in several paragraphs, this seems rather weak in view of the nature of the problem. Something to indicate an increased focus of resources in this area might be more appropriate to the risk.