



## CONSTRUCTION DUST PROJECT



## **Introduction**

The Health and Safety Executive (HSE) is committed to addressing those areas where there are high risks of future ill health or premature death as a result of exposure to substances or physical agents. As part of this there is particular focus on those activities and sectors where there is a significant risk of developing respiratory diseases that manifest themselves years after exposure to the associated harmful substance(s) has occurred – also known as long latency diseases.

Within the construction industry the most significant respiratory risk after asbestos is presented by exposure to Respirable Crystalline Silica (RCS). The HSE is therefore currently planning a Construction Dust Project targeted at the refurbishment, repair and maintenance sector of the industry. It aims to raise awareness of the long latency ill health risk associated with RCS together with encouraging the correct use of effective control measures. In addition the Project will also seek to realise benefits linked to these where favourable opportunities present themselves in relation to other dust hazards.

Over the last couple of years HSE's Construction Division has already undertaken specific work in this area in relation to the cutting of kerbs, paving and flags and more recently on the cutting of roofing tiles. Although this continues to produce good results, continued work is needed to ensure that a long term step change in the industry's perception of RCS risks and their control is embedded.

The project wants to achieve this by working in effective partnership with key industry stakeholders. Ultimately therefore the specific remit of the project will be decided upon in collaboration between all those involved. The following information has been compiled to provide a premise upon which collaborative discussions can take place. It contains detailed background information on the proposed reasons for the work and what it wants to achieve.

## **Q1 What does the Construction Dust Project want to achieve?**

The Construction Dust Project has two specific objectives:

- Objective A** To work with key partners to raise awareness amongst construction employers and employees of long latency respiratory disease risks associated with RCS through the appropriate delivery of key messages via targeted activities.
- Objective B** To promote good practice control measures for higher risk RCS tasks and work with key partners to deliver these in a targeted way that positively changes behaviour.

The construction industry is one of five areas identified by HSE where workers are exposed to significant risks from respiratory hazards and hence of developing long latency respiratory diseases (the other sectors are quarries, stonemasons, foundries and welding).

Within the construction industry the most significant respiratory risk after asbestos is presented by exposure to Respirable Crystalline Silica (RCS). Over the last couple of years HSE's Construction Division has undertaken work to promote the knowledge of risks associated with RCS together with the control measures expected for some specific tasks. Although this work has produced good results, continued work is needed to ensure that a long term step change in the industry's perception towards and control of RSC risks is embedded. HSE views that such a step change can be most effectively delivered by working in effective partnership with key industry stakeholders.

While RCS is the primary focus of this work there is considerable synergy between this issue and other construction respiratory risks and in particular dust risks. The project will therefore also seek to realise benefits linked to these where favourable opportunities present themselves and will look to work with industry partners concerning this.

## **Q2 Why is HSE looking at respiratory ill health?**

HSE is committed to addressing those areas where there are high risks of future ill health or premature death as a result of exposure to substances or physical agents. As part of this there is particular focus on those activities and sectors where there is a significant risk of developing respiratory diseases that manifest themselves years after exposure to the associated harmful substance(s) has occurred – also known as long latency diseases.

HSE estimates that there are currently approximately 12,000 deaths each year due to past exposures to respiratory agents. This number is estimated statistically rather than based on counts of individual cases largely because of the difficulty of attributing individual cases of disease to specific causes.

The occupational diseases which cause most deaths can have multiple causes, including non-occupational factors (with certain specific exceptions like mesotheliomas). Thus, although most chronic obstructive pulmonary


disease (COPD) deaths are due to smoking, we estimate that across industry as a whole, there are 4,000 deaths each year from COPD attributable to occupational exposures.

### Q3 Why does the project focus on the construction industry?

The construction industry has been chosen for a number of reasons:

- **Size**

Construction is the country's biggest industry. Sources put the total number it employs at around two and a quarter million with another quarter of a million working in associated professions such as architecture or engineering. However, precise quantification is difficult due to elements of the 'black' economy that are linked to it.

 <b>United Kingdom</b> Total employment and annual recruitment requirement (ARR) by occupation: 2009-2013			
	Employment		ARR
	2009	2013	2009-2013
Senior, executive, and business process managers	98,010	105,160	1,600
Construction managers	219,080	235,520	3,550
Non-construction professional, technical, IT, and other office-based staff	282,340	292,630	1,460
Wood trades and interior fit-out	281,150	285,750	4,370
Bricklayers	88,160	90,920	2,420
Building envelope specialists	92,590	95,870	1,050
Painters and decorators	135,660	133,090	2,820
Plasterers and dry liners	48,300	51,930	1,460
Roofers	46,520	46,740	480
Floorers	38,050	38,900	570
Glaziers	41,740	43,300	1,220
Specialist building operatives nec*	56,170	57,780	950
Scaffolders	24,260	25,780	880
Plant operatives	46,750	45,400	1,300
Plant mechanics/fitters	27,060	27,820	880
Steel erectors/structural	28,330	29,070	900
Labourers nec*	116,590	125,070	1,950
Electrical trades and installation	177,880	181,100	2,740
Plumbing and HVAC Trades	176,920	180,110	1,290
Logistics	32,280	34,300	660
Civil engineering operatives nec*	59,660	58,150	710
Non-construction operatives	123,930	125,540	
<b>Total (SIC 45)</b>	<b>2,241,430</b>	<b>2,309,930</b>	<b>33,260</b>
Civil engineers	52,300	52,620	1,170
Other construction professionals and technical staff	143,930	144,820	1,670
Architects	40,550	40,490	400
Surveyors	57,280	61,700	530
<b>Total (SIC 45 and 74.2)</b>	<b>2,535,490</b>	<b>2,609,560</b>	<b>37,030</b>

(See [http://www.cskills.org/uploads/Copy\\_of\\_UK\\_2009-13\\_tcm17-13718.pdf](http://www.cskills.org/uploads/Copy_of_UK_2009-13_tcm17-13718.pdf) for more details)

- **Fragmentation**

Individuals also work in a sector dominated by small employers with much of the workforce at site level hired on a casual basis undertaking work project by project through a high degree of subcontracting. This, together with the long supply chains and need for cost and efficiency savings, exacerbate any

general weaknesses in health management. In addition to this workers also need to move around the country in order to follow job opportunities. This means that they tend to under-use local GP services.

- **Health and Safety Record**

Although the record of the UK construction industry compares well with other countries, challenges still remain. For example, in 2008/09 there were 53 fatal injuries and the fatal accident rate remains over four times that for all industries. Furthermore the rate of major injury is the highest of any main industry group (254.1 per 100 000 employees in 2008/09p).

The industry also has a problematic record on health issues. Data from the Labour Force Survey (LFS) indicate that in 2008/09 the combined estimate of the number of days lost (full-day equivalent) due to workplace injury and work-related ill health attributed to the current or most recent job in the construction industry was 3.0 million. Of this figure, 80% is accounted for by work-related illness.

More detailed prevalence data by type of illness are not yet available from the 08/09 Self-reported Work-related Illness survey. However, earlier Self-reported Work-related Illness surveys indicate that the prevalence rate for musculoskeletal disorders in 2007/08 was statistically significantly higher than the corresponding all industry rate.

(See <http://www.hse.gov.uk/statistics/industry/construction/index.htm> for more information)

- **Respiratory Hazards**

Long latency respiratory diseases pose a particular challenge within the overall health and safety picture as construction workers are potentially exposed to a great variety of hazardous agents over their working life. There can be also great diversity in the extent and duration to which these individuals are exposed to these hazards. The most common forms of exposure can be combined within the following groupings:

**Inorganic Fibres:** This mainly consists of asbestos and Man-Made Mineral Fibres.

**Inorganic Dusts:** This includes dusts containing silica, metals, minerals and other contaminants.

**Organic Dusts:** This is primarily wood dust and MDF

**Gases & Irritants:** A variety of different hazards that includes epoxy resins, isocyanates and organic solvents

**Fumes:** For example diesel exhaust and metal fume.

#### **Q4 Which long latency respiratory health conditions are the focus?**

Long latency diseases are those that develop many years after first exposure to the causative agent, symptoms often not appearing until mid-life or later.

This Project focuses on those affecting the respiratory system and in particular:

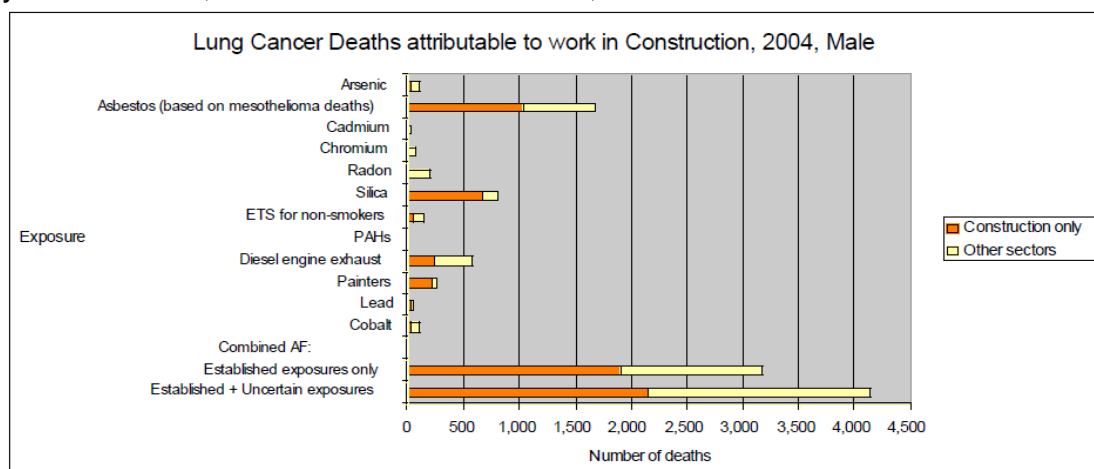
- **Lung Cancer:**

Lung cancer is a disease involving abnormal cell growth in the tissues of the lung; this growth may lead to invasion of adjacent tissue and spread beyond the lung. Cigarette smoking is responsible for 90% of lung cancers in GB. However, HSE estimates that approximately 5,000 deaths annually are due to occupational lung cancers, most of which are asbestos-related. These include lung cancer itself and mesothelioma.

Lung cancer which is attributable to occupation has the same characteristics as lung cancer due to other causes such as smoking. The most common symptoms are cough, shortness of breath, coughing up phlegm with blood, pain on breathing or coughing, loss of appetite and weight loss. Unfortunately it has a poor prognosis and only 7% of men with lung cancer live for five years after diagnosis.

***Lung Cancer in the Construction Sector***

The risk of lung cancer is increased in a number of industries and occupations of which the construction industry is one of the most notable. Recent HSE research has estimated that the construction sector accounts for over half of all occupational lung cancer deaths, in other words over 2,000 deaths per year. Of these, most are asbestos related, but over 500 are due to silica.



(See <http://www.hse.gov.uk/research/rrpdf/rr595ann6.pdf> for more details)

- **Chronic Obstructive Pulmonary Disease COPD**

COPD mainly involves two related diseases, chronic bronchitis and emphysema, both of which cause chronic obstruction of air flowing through the airways and in and out of the lungs. Unlike asthma, this obstruction is generally permanent and progresses over time. The disease doesn't usually become apparent until middle or old age with the main symptoms including breathlessness and cough with phlegm. While, the main cause is often smoking the HSE estimates that approximately 4,000 deaths annually, across industry, are due to COPD related to occupational exposures.

(For more information see <http://www.hse.gov.uk/statistics/causdis/copd/index.htm>)

### ***COPD in the Construction Sector***

The findings from numerous studies from different countries are reasonably consistent, indicating that construction workers show moderate increases (2 to 3-fold) in illness and mortality from COPD compared to age- and smoking-matched reference groups. In other words, working in construction is a risk factor for COPD, regardless of smoking habits. The few studies that have investigated causative agents have done so only at a very general level. These have found that dusts, including wood dust and silica, were associated with COPD.

(See <http://www.hse.gov.uk/aboutus/meetings/iacs/acts/watch/010206/paper3annex1.pdf> for more details)

#### **• Pneumoconiosis**

This is a condition in which dust accumulates in the lungs leading to damage which may include fibrosis (scarring) and abnormalities visible on chest X-Ray. There are various subgroups of pneumoconiosis depending on the type of dust exposure, the principal diseases being silicosis, asbestosis and coalminers' pneumoconiosis (black lung). Mixed dust pneumoconiosis is caused by exposure to mineral dusts containing a small amount of crystalline silica. All of the pneumoconioses are purely occupational in causation. The predominant symptoms are cough and breathlessness.

In contrast to COPD, there is a less substantive body of research evidence concerning silicosis/ mixed-dust pneumoconiosis. Often reports refer to only a very small number of deaths drawn from very large worker populations.

(See <http://www.hse.gov.uk/aboutus/meetings/iacs/acts/watch/010206/paper3annex1.pdf> for more details).

### ***Pneumoconiosis in the construction sector***

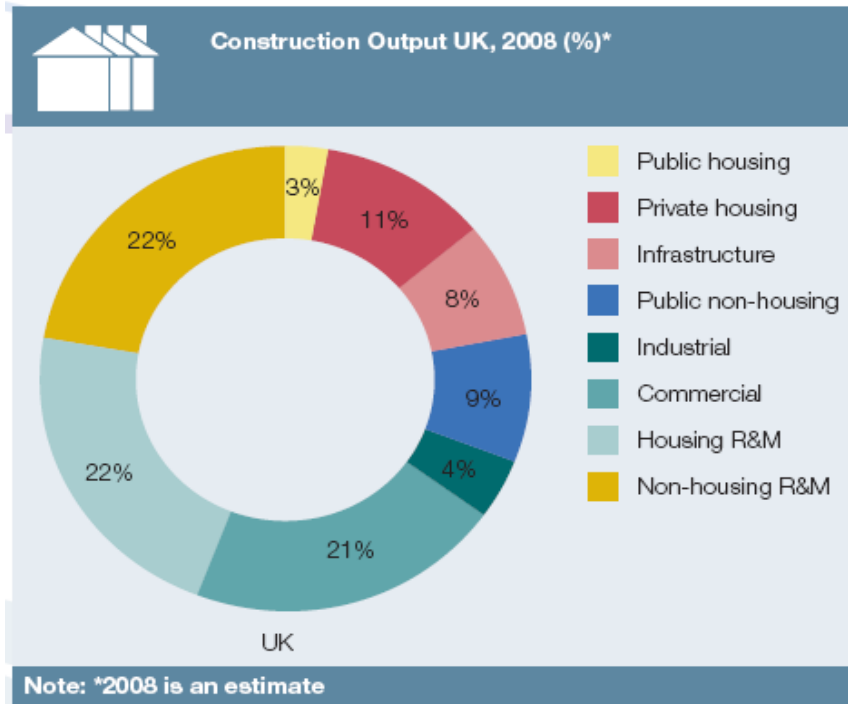
Silicosis may be necessary to cause silica-related lung cancer. Given that silica exposure in construction is thought to result in over 500 lung cancer deaths per year, the extent of the underestimation of silicosis could be very considerable. The risk estimate for silicosis for those with 15 years exposure to silica at the current Workplace Exposure Limit (reported in the table below from the Regulatory Risk Assessment), also implies a much higher figure than recorded in the available statistics.

<b>15 years exposure to respirable crystalline silica (8-hour TWA) mg.m<sup>-3</sup></b>	<b>Predicted risks of developing silicosis* within 15 years following exposure. (* This refers to a category of silicosis normally associated with some breathing impairment)</b>
0.02	0.25%
0.04	0.5%
0.1	2.5%
0.3	20%

(See <http://www.hse.gov.uk/statistics/causdis/pneumoconiosis/index.htm> and <http://www.hse.gov.uk/consult/condocs/cd203.pdf> for more details)

**Q5 Why are you focussing on the refurbishment, repair and maintenance sector and not the whole of the industry?**

The construction industry is itself subdivided into a number of sectors. A useful summary of the relevant importance of each sector to the economy in terms of output is provided in the table below. (Note: the commercial sector is used to include PFI/ PPP financed projects while publicly financed projects are included within the public non-housing sector).



(See [http://www.cskills.org/uploads/Copy\\_of\\_UK\\_2009-13\\_tcm17-13718.pdf](http://www.cskills.org/uploads/Copy_of_UK_2009-13_tcm17-13718.pdf) for more details)

HSE is committed to targeting those areas of the workplace that pose the greatest risks to people's health and safety. Within the subdivisions of the industry the refurbishment, maintenance and repair sector poses the greatest challenges to the effective management of respiratory risks because:

- It is a very significant proportion of the industry total in terms of output. Repair and maintenance work alone accounts for 44% of this total.
- There are significant and additional risks in this sector due to the presence of existing materials that need to be either removed or worked on. Some of these materials also contain hazardous substances that would not otherwise be present in new build construction projects.
- A significant majority of the work takes place in an indoor environment thereby increasing the concentration of respiratory hazards.
- Despite the increased risks, this sector generally manages risks poorly. Approximately 50% of all construction fatal accidents during the last ten year period have occurred during refurbishment and repair work. It also continues to demonstrate poorer standards of legal compliance. It is for



this reason that this sector is particularly targeted within Construction Division's plan of work.

While the refurbishment, repair and maintenance sector is the primary focus of this work there is also considerable synergy with other areas of the industry. The Project will therefore again also seek to realise benefits linked to these where favourable opportunities present themselves. The Project will look to work with industry partners concerning this.

**Q6 Why are you concentrating on silica dust and not other respiratory risks including asbestos?**

Construction workers are exposed to a significant number of different respiratory hazards during their work in a refurbishment and maintenance environment. Out of these, silica has been chosen as the main point of focus for the following reasons:

- Asbestos was extensively used as a building material in the UK from the 1950s through to the mid-1980s. Consequently those now working on the fabric of these buildings are at considerable risk of exposure and future respiratory disease. Given the significance of this risk HSE has chosen to tackle this area by devoting significant and specific attention to it as a topic in its own right (see <http://www.hse.gov.uk/asbestos/index.htm>). It therefore falls outside of the scope of this project.
- Airborne dusts are probably the most prevalent respiratory hazard on a construction site. The most significant sources of these are common activities involving the use of power tools for activities such as grinding and cutting. However, other processes such as sweeping, soft strip demolition and heavy machinery operations can also generate significant levels.
- Most construction trades (apart from certain ones such as carpentry) are likely to be working with products or materials containing a significant proportion of crystalline silica. Where any respirable dust is generated when using these materials there therefore exists an associated significant risk of RCS exposure.

**Examples of products and materials containing crystalline silica**

- Brick – up to 30%
- Concrete, "cement" mortar 25 to 70%
- Tile – 30 to 45%
- Sand, gravel, flint - more than 70%
- Sandstone, gritstone or quartzite – more than 70%
- Shale - 40 to 60%

(See <http://www.hse.gov.uk/research/rrpdf/rr689-annex2.pdf> for more information)

- Even tradesmen working exclusively with wood, metal or plastic may be subject to indirect RCS exposure if debris from other work migrates or is

re-suspended due to the failure to use good control practice at an earlier stage of the work.

- Silica accounts for the most significant proportion of construction related lung cancer deaths after asbestos is excluded and is considered to be responsible for in excess of 500 deaths per year. There are also significant links between silica and the levels of COPD and pneumoconiosis suffered by construction workers.
- While there is recognition that silica and dust in general is at least an issue of note, those working within the construction industry generally seem to have a poor appreciation of the associated risks. For example, research undertaken for the Silica Baseline Survey (See <http://www.hse.gov.uk/research/rrpdf/rr689-annex2.pdf>) found that those construction employers visited had underestimated the extent of exposures, and in many cases had not made exposure control a priority

*It should be noted that while the project is initially focussed on RCS risks, there is considerable synergy between this and other construction respiratory dust risks. There is therefore scope to realise benefits linked to these where favourable opportunities present themselves. The Project will look to work with industry partners concerning this.*

#### **Q7 Why do you mean by the term ‘high risk tasks’ and why are you concentrating on these?**

Workers in a number of construction trades are at particular risk of developing long latency respiratory diseases. These include painters, decorators, joiners, electricians, plumbers, demolition operatives and general labourers. However, estimating risk by trade is complicated because there can be great diversity in the extent and duration to which individuals are exposed because:

- As each construction worker moves about a site, the worker’s position in relation to exposure sources may change regularly. Thus two labourers on the same site may be exposed to different levels of risk.
- Exposure is experienced not only by the worker directly involved, but also by other workers within the vicinity (para-occupational exposure). A diversity of trades and activities may also coexist at a particular work site.
- Exposures to mixtures of agents can occur under a variety of outdoor, indoor and confined space settings. Each one will affect the level of risk.

Because of all this it is difficult to anticipate all the substances and degrees of exposure that individuals will encounter on a given day and during their working life. Consequently it is harder to establish risk profiles by trade. In order to ensure that the project is proportionate to the risks and appropriately targeted it has therefore been decided to focus upon high risk tasks instead.

High risk tasks are those construction activities that are capable of generating dust and RCS concentrations considerably above the WEL. In particular this means:

- High energy tasks such as grit blasting or those involving the use of power tools.
- Lower energy tasks that give rise to significant RCS concentrations due to their duration and/or location (such as pneumatic drilling or general cleaning activities in an enclosed environment).

Note that no definitive list of high risk tasks has identified as yet for the Project which will look to work with industry partners to identify these.

#### **Q8 Why is this Project planned now and how does it relate to the HSE strategy?**

One of the goals of the new HSE strategy is:

*‘To specifically target key health issues and to identify and work with those bodies best placed to bring about a reduction in the number of cases of work related ill health’.*

In order to achieve this, the strategy identifies the need for all stakeholders in the health and safety system to set priorities. The starting point for these priorities is the creation of a risk profile identifying which groups of workers are most at risk and the scale and incidence of cases of ill health (see <http://www.hse.gov.uk/strategy/> for more details).

HSE has for some time recognised the significant part that respiratory risks play in the overall incidence rates of occupational ill health. For example In particular considerable work has been undertaken in recent years on the risks regarding asbestos exposure (see <http://www.hse.gov.uk/asbestos/hiddenkiller/index.htm> for more details). However, while asbestos accounts for a major proportion of this, workers are also exposed to a number of other significant respiratory risks and the HSE has already undertaken other work to highlight these risks (for example see <http://www.hse.gov.uk/stonemasonry/index.htm>) and the associated control measures (for example see <http://www.hse.gov.uk/lev/index.htm>).

HSE has also undertaken targeted construction specific work on silica since 2008. In particular this has been related to kerb, paving and block cutting work (see <http://www.hse.gov.uk/foi/internalops/sectors/construction/020901.htm>) and more recently the controls associated with the cutting of roofing tiles (see <http://www.hse.gov.uk/foi/internalops/sectors/construction/021001.htm>). The industry and suppliers have picked up on this and reacted positively to it. A ready made platform has therefore been established which this Project is well placed to build upon.

Given this platform, continued work is needed to ensure that a long term step change towards long latency respiratory risks is embedded. HSE views that the time is now appropriate to initiate such a step change through industry

specific initiatives under a wider umbrella. In order to demonstrate its commitment to this, HSE has incorporated this work within HSE's Business Plan 2010/11 (see <http://www.hse.gov.uk/aboutus/strategiesandplans/businessplans/index.htm> for more information).

### **Q9 Why does the HSE want to work in partnership with the industry**

HSE believes that working in partnership with those from the industry has more of an impact on outcomes (for example see <http://www.wwt.uk.com/>) than working undertaken in isolation. It helps develop innovation, drive improvements and ensure consistency. Agreed priorities can also be targeted and the most effective use made of resources.

It is for these reasons that the principles of partnership working are contained within HSE's strategy document (see <http://www.hse.gov.uk/strategy/>) where one of the key goals is to:

*To specifically target key health issues and to identify and work with those bodies best placed to bring about a reduction in the number of cases of work related ill health*

However, true partnership working is about more than the odd meeting or joint event. For this project to succeed, HSE is keen to develop a mutual agenda and invest time in promoting a close working relationship with those industry representatives who are keen to play a part.

### **Q10 Is there any wider context to this project?**

The HSE strategy is clear that health and safety does not exist in a vacuum and that its priorities cannot be delivered in isolation from other issues that impact on or overlap with them. There are a number that are of importance in this instance:

- **Secretary of State Inquiry**

The Secretary of State for Work and Pensions commissioned an Inquiry into the underlying causes of construction fatal accidents in December 2008. The Inquiry arose from concern over the number of construction deaths and was tasked with examining what more could be done to tackle the underlying causes. Although primarily safety focused, the conclusions within the Inquiry report (see <http://www.dwp.gov.uk/publications/policy-publications/fatal-accidents-inquiry.shtml>) did recognise that far more workers die or develop long standing conditions as a result of the chronic effects of health risks within the industry and that therefore more needed to be done.

The Government response to this report was published on 30 March 2010 (see <http://www.dwp.gov.uk/docs/one-death-is-too-many-response.pdf>) and stated that:

*The Government agrees the need for renewed efforts to tackle health risks in construction and that the industry has a major challenge in managing health risks to workers. This recommendation provides a timely spur to reinvigorate and add to*

*past and on-going efforts involving HSE, the industry and trade unions; to further raise awareness of the importance of tackling health alongside safety; and, importantly, to continue efforts in convincing the industry why it needs to tackle health issues at least as seriously as safety matters.*

*To this end HSE's current programme of work has health at its core and work will continue on priorities that include asbestos, exposure to other respiratory risks and manual handling.*

- **Health Work Wellbeing**

On 17<sup>th</sup> March 2008 Dame Carol Black presented her report 'Working for a Healthier Tomorrow', to the Secretaries of State for Health and for Work and Pensions (see <http://www.workingforhealth.gov.uk/documents/working-for-a-healthier-tomorrow-tagged.pdf>). Her review sought to establish the foundations for a broad consensus around a new vision for health and work in Britain. At its heart were three principal objectives:

- The prevention of illness and the promotion of health and well-being;
- Early intervention for those who develop a health condition;
- An improvement in the health of those out of work – so that everyone with the potential to work has the support they need to do so.

The Government's response (see <http://www.workingforhealth.gov.uk/Government-response/>) set out a number of projects for government departments to take forward. In particular a commitment was given to:

- Spreading positive messages about health and work including the development of a communications strategy on COPD.
- HSE continuing to work with local authorities to target resources according to risk and to ensure that firm, targeted, consistent and proportionate enforcement on health and safety law is maintained.

- **Department of Health**

Building on the above the Department of Health undertook consultation on a strategy for services for COPD in England (see [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_113279.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_113279.pdf) for more details) during the early part of 2010. At its heart the consultation strategy recognised the need to change the current approach to COPD prevention, diagnosis and treatment. The stated aim was:

*... to advise how local communities can prevent people getting COPD, understand the risks of having poor lung health, secure improvements to the diagnosis of, and care of people with, the disease, and reduce health inequalities.*

The consultation is now awaiting a summary of responses and details of outcome. When completed, this information will be available at: [http://www.dh.gov.uk/en/Consultations/Closedconsultations/DH\\_111494](http://www.dh.gov.uk/en/Consultations/Closedconsultations/DH_111494).

- **Healthy Working Lives**

The Scottish Centre for Healthy Working Lives emerged from the Scottish Executive's strategy document 'Healthy Working Lives: a plan for action' published in August 2004 (see <http://www.scotland.gov.uk/Resource/Doc/924/0034156.pdf>). Historically, Scotland has had a poor health record, though in recent years much has been done to turn this around. The role of work and workplaces in contributing to this progress has been fundamental, and the vision of the strategy is to give people in Scotland the opportunity to work in ways that allow them not only to sustain, but also to improve, their health and well-being (see <http://www.healthyworkinglives.com/about/what.aspx>).

- **Business Benefits**

In addition to the above, regulation must be a benefit to those that it seeks to protect and not a disproportionate burden on those who have to comply with it. A key element of the partnership work will be to highlight not just the benefit to workers health but also the business benefits that can be gained by using appropriate workplace practices.