

## Workplace Health and Safety Queensland

# Controlling dust exposures in the Queensland foundry industry 2009

*Workplace Health and Safety Queensland Occupational Health Strategy 2007 – 2010*

## Introduction

The priorities of the *National Occupational Health and Safety Strategy 2002–2012* are to:

- reduce the high incidence and severity of occupational disease in the workplace
- develop the capacity of workplaces to manage occupational health and safety (OHS) more effectively.

Workplace Health and Safety Queensland has recognised this strategy by adopting all of its priorities through development of the *Occupational Disease Strategy 2007–2010*. As was identified, there have been continuing silica exposures to workers in several different sectors as a contributor to respiratory disease.

It is important, in terms of reducing the incidence and severity of silica-related disease, to know the extent of this exposure and to help develop the capacity of workplaces to manage OHS more effectively.

## The purpose of the intervention

This intervention targets the foundry industry and its workers exposed to the industry's major causative agents of respiratory disease.

The purpose of the intervention is to:

- see if dust levels have been reduced over the last two to three decades
- see if the risk is being controlled more competently
- suggest where attention needs to be paid to further reduce the risk of disease from

dust and respirable crystalline silica (RCS) exposures.

The study used historical records to compare the past and present performance of the foundry industry.

## The targets of the intervention

### 2009 survey

This intervention involved reviewing respirable dust and RCS exposures in 12 of about 18 foundries in Queensland, i.e.:

- three small foundries (< 10 workers)
- two medium-sized ones (10 to 29 workers)
- seven large foundries (≥ 30 workers).

The major part of the program's focus was a targeted assessment of worker exposure to respirable dust and RCS of workers who worked in similar foundry work groups, such as moulders and fettlers (these are referred to as similarly exposed groups (SEGs)). Day shifts were monitored in all 12 workplaces, with one part evening shift in one foundry.

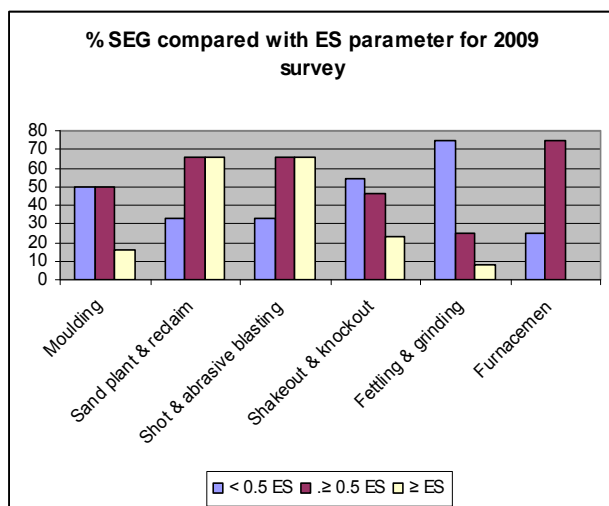
By comparing the results with permissible exposures under the WHS Regulation, the industry's performance and control capability were assessed.

## Trends (i.e. compliance and controls)

### Compliance

Foundries surveyed reported working eight and up to nine and three-quarter hour shifts. Consequently the exposure standard (ES) is adjusted slightly down-ward to allow for a more simple interpretation where different and longer shift length results are collectively grouped under one SEG.

Figure 1 (below) gives an indication of the proportion of each SEG in which the measured (unprotected) RCS exposures exceeded the adjusted ES in the 2009 survey. Real compliance is slightly better than indicated, since some, but not all, of those potentially overexposed wore respiratory protective equipment (RPE).



**Figure 1:** Performance of each SEG compared to half the adjusted ES and the full adjusted ES.

### Dust and RCS concentration trends

As is evidenced in Tables 1 and 2, there are downward trends in respirable dust concentrations (Table 1) and RCS concentrations (Table 2) for three SEGs between the surveys in 2009 and the earlier surveys. However, no significant change was seen for moulders and furnace men. The abrasive blasting SEG position worsened slightly.

SEG	<2002 mean BMRC dust conc. mg/m <sup>3</sup>	<2002 mean ISO dust conc. mg/m <sup>3</sup>	2009 mean ISO dust conc. mg/m <sup>3</sup>
Moulders	0.43	0.31	0.32
Sand plant, mix and reclaim	1.64	1.17	0.46
Shot and abrasive blast	1.67	1.19	5.55*
Shakeout and knockout	0.92	0.66	0.35
Fetting and grinding	2.60	1.86	0.97
Furnace men	0.74	0.53	0.70

**Table 1:** Mean respirable dust concentrations for the different SEGs in each survey period.

- biased by an individual high result

SEG	<2002 mean RCS conc. mg/m <sup>3</sup>	2009 mean RCS conc. mg/m <sup>3</sup>	Relative average compliance performance
Moulders	0.03	0.03	No change
Sand plant, mix and reclaim	0.18	0.08	Much better
Shot and abrasive blast	0.06	0.16	Worse
Shakeout and knockout	0.09	0.03	Much better
Fetting and grinding	0.13	0.02	Much better
Furnace men	0.05	0.05	No change

**Table 2:** Mean RCS concentrations for the different SEGs in each survey period.

### RCS concentration trends – compliance indicator

A detailed analysis of the Table 2 (above) compliance performance has shown the proportion of RCS measurements exceeding the ES has fallen from 28 per cent in the early survey period to 21 per cent in 2009. With the greater use of RPE, non-compliance is now around 15 per cent.

## Controls

It was found the use of RPE has increased markedly between the two survey periods from a recorded uptake of 8 per cent to 26 per cent of all workers. However, not all of the highest exposed were properly protected. Of the 21 per cent of workers with the highest personal exposures ( $\geq$ ES), two-thirds wore no RPE in conditions ranging up to three times the exposure standard (the majority were moulders or shakeout operators). Eight per cent wore RPE for part of their tasks, had beards, or used only one strap. Greater reliance is now placed on RPE to achieve exposure compliance.

In the 2009 survey, 48 per cent of all workers, some protected by RPE of differing effectiveness, worked in dust concentrations  $\geq$ 0.5 the adjusted RCS exposure standard.

## Recommendations

Foundries need to place much greater emphasis on:

- more precise identification through monitoring tasks where control is needed (i.e. a more frequent assessment of dust conditions and RCS exposures)
- greater use of good quality RPE
- improved engineering solutions for dust control
- attention to major dust leaks in some abrasive blasting chambers and sand plants.

Because a number of workers remain overexposed, health surveillance must remain a consideration for this industry.

## More information

Further information is available from [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au) or by calling the WHS Infoline on 1300 369 915.

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