UMC Utrecht

Nederlands Kenniscentrum
Arbeid en Longaandoeningen

IMA Europe

Een Europese industriële database met blootstellingsmetingen van respirabel stof en kwarts

ervaringen met het IMA stof monitorings programma

NVvA symposium
13 april 2011

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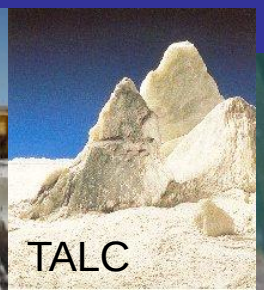
Goals and minerals covered

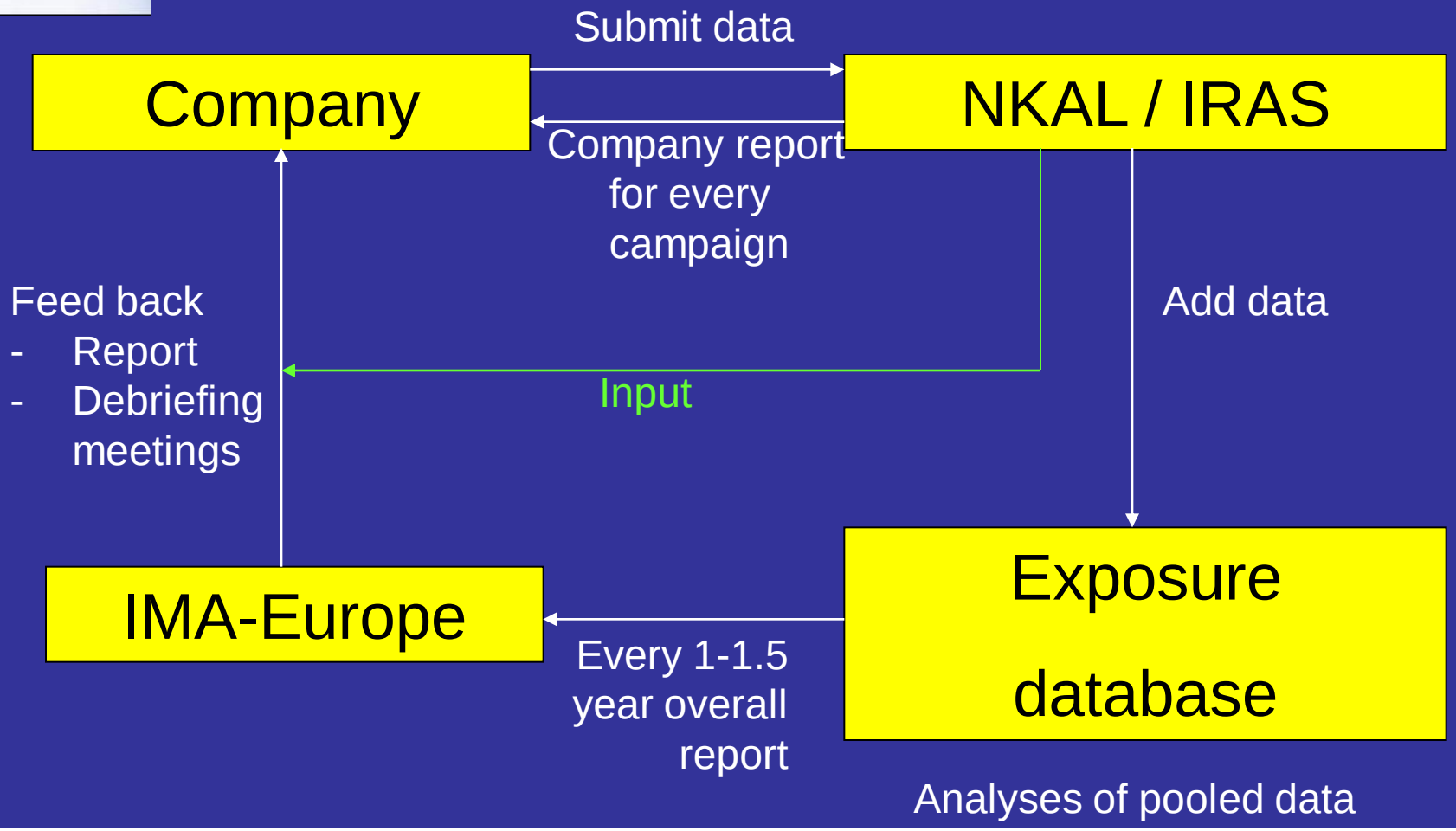
- To have (statistically) reliable exposure data
- To be able to discuss with authorities on new/future OEL's
- To develop prevention strategies to reduce exposure (develop prevention culture)
- To improve compliance with current OEL's
  - On industry level
  - On company level
- To be used as a resource for exposure assessment for future epidemiological studies
- To check the effectiveness of implemented control measures



High quality data requirements for comparable data

- Personal monitoring only
- Respirable dust fraction
- Full-shift sampling
- Assignment of unique worker codes
- Start with 2 campaigns/year (Summer & Winter)
- Collect field blanks
- Sampling of all high and low exposed jobs
- 13 pre-defined job functions
- Collect 6 samples per job function
- Quartz analyses: IR or XRD
- Laboratories: join an inter-laboratory round-robin exercise
- Record work activities, use ppe's etc during sampling
- Transmission of data in standardised MS Excel® collection sheet
- Extensive data checks & strict quality criteria for database

Lines of communication



Currently new report in progress with data until Summer 2010 (still confidential)

Last available report fall 2009 and used for this presentation

Available data until 2009

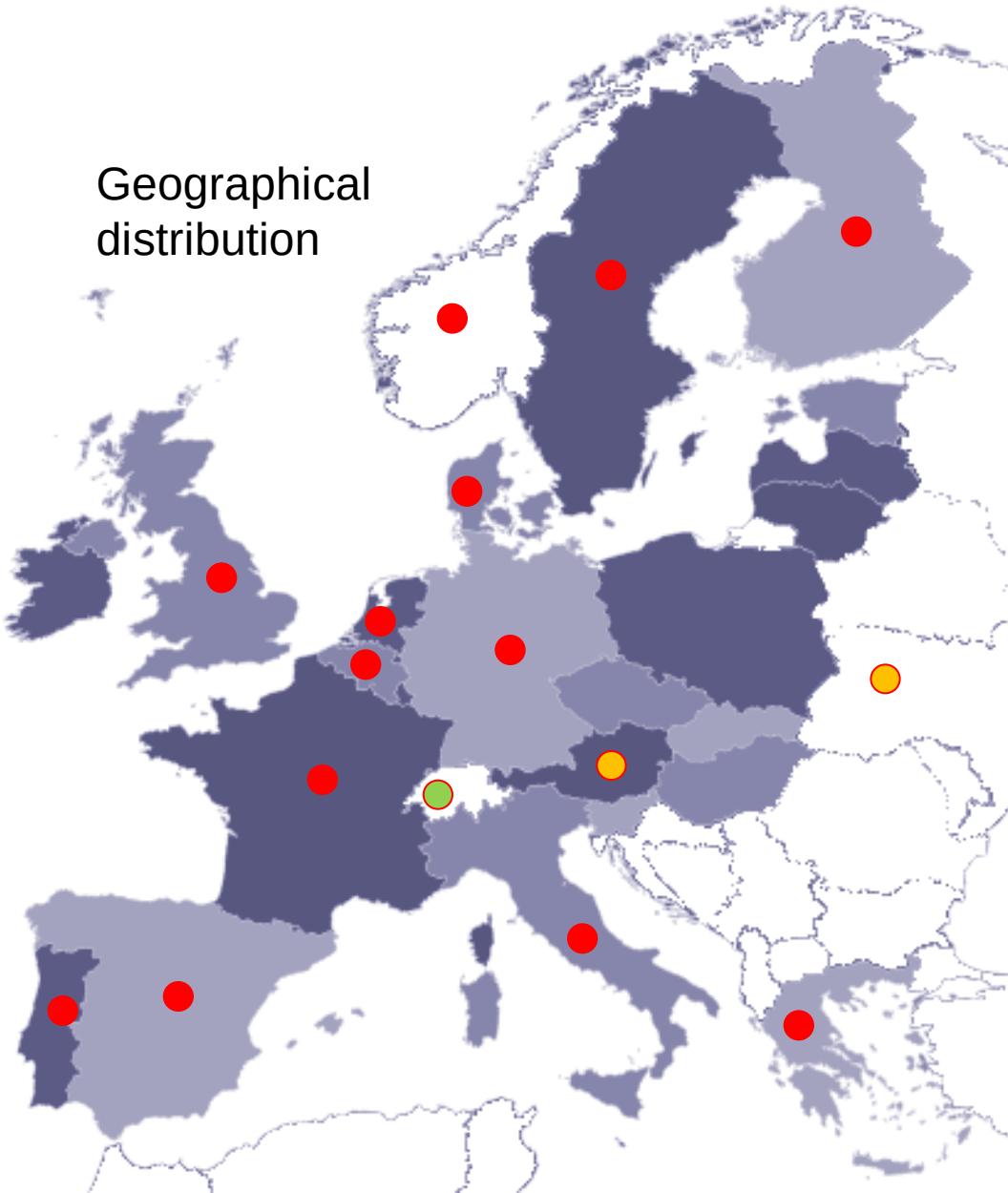
17 campaigns (2000-2009)
24 companies
93 work sites

Number of observations in IMA DMP database categorized per country

Country	Respirable dust	Respirable quartz
Belgium	945	711
Denmark	26	26
Finland	255	115
France	3,216	2,133
Germany	1,537	1,536
Greece	147	91
Italy	542	429
Netherlands	1,023	528
Norway	110	103
Portugal	153	153
Spain	1,170	839
Sweden	108	108
UK	3,408	3,303
All data	**12,640**	**10,075**

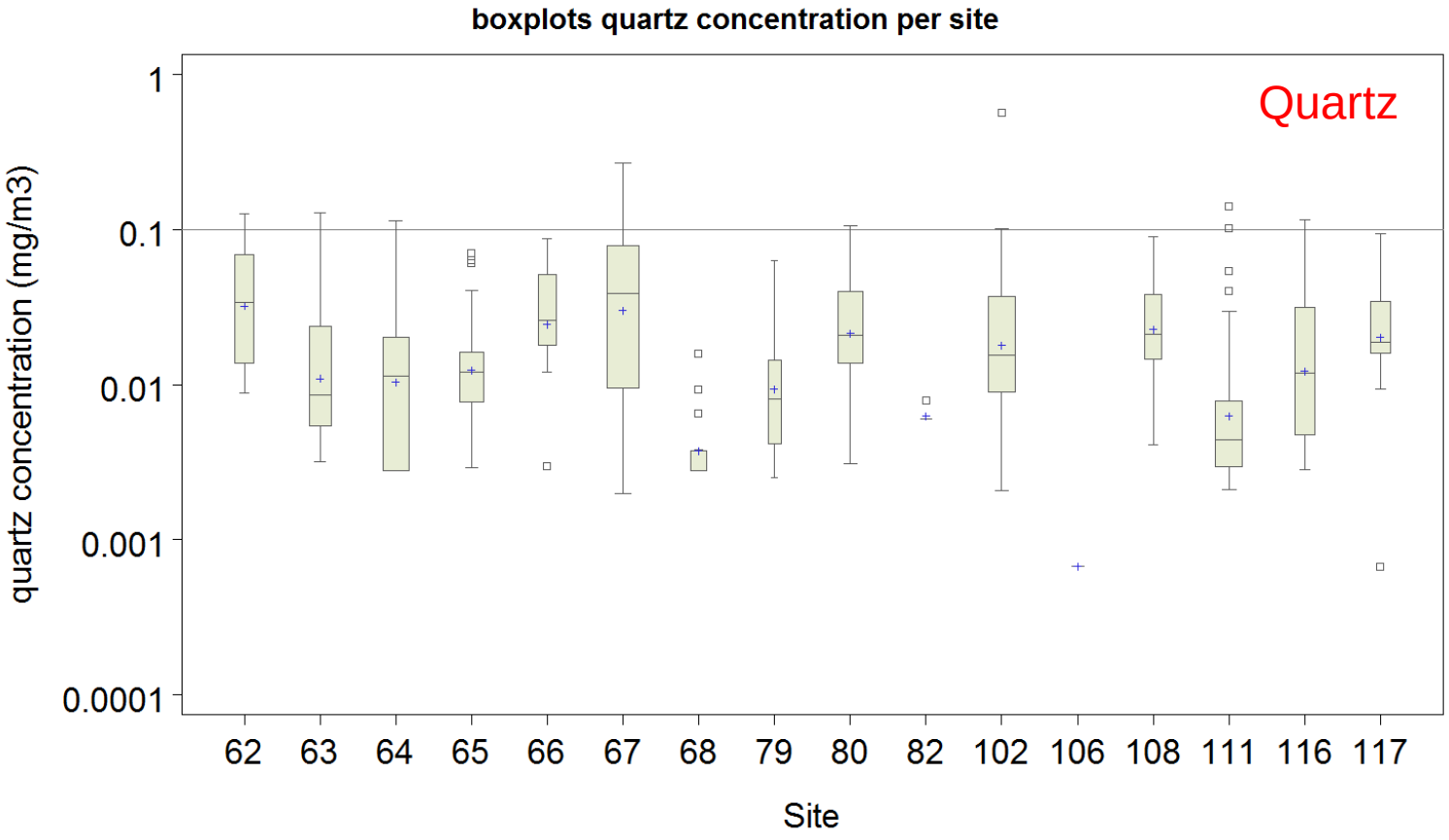
Currently: N= 15,808

Geographical distribution



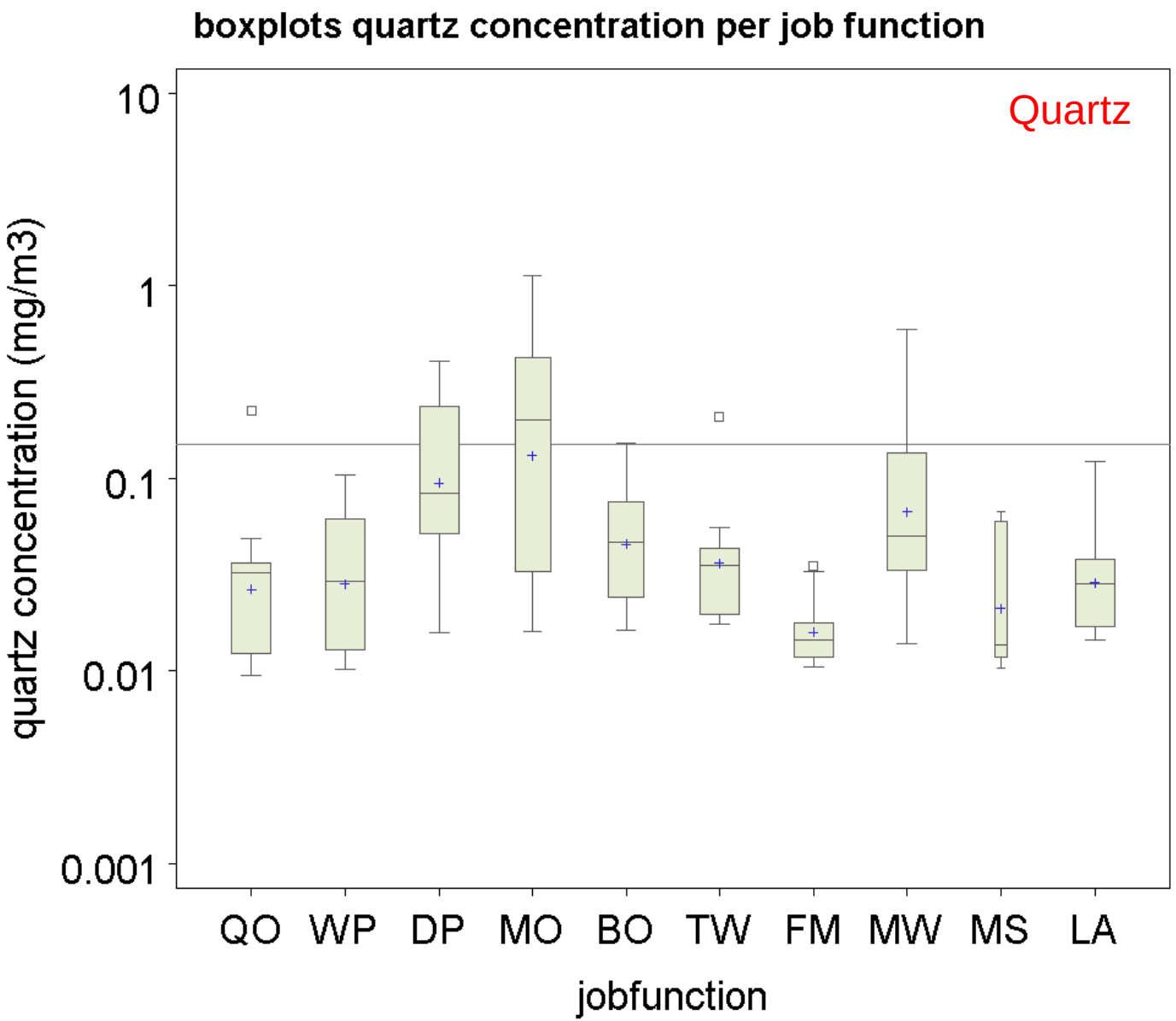
Example information in company report

Differences between sites within a company



Example information in company report

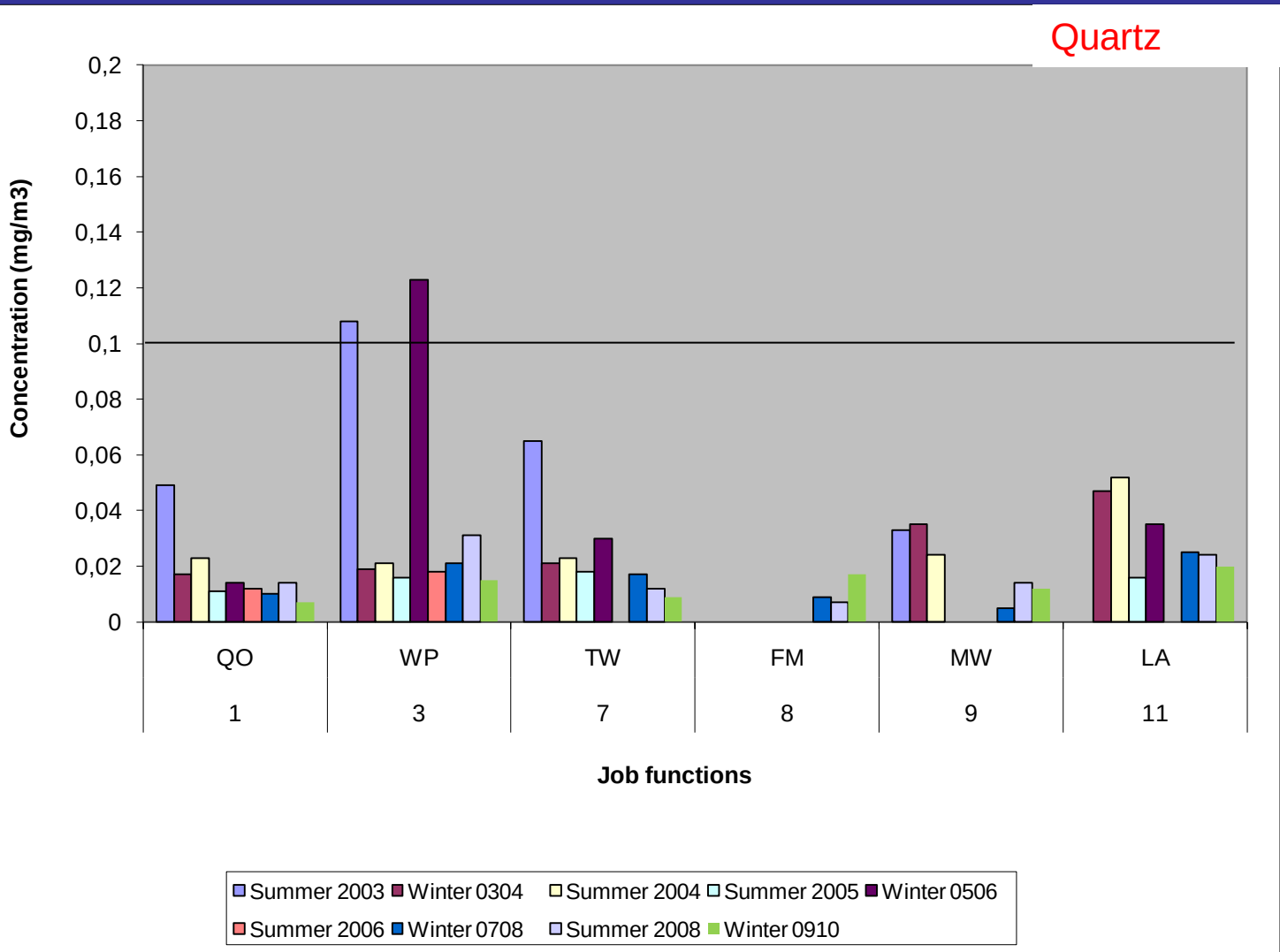
Differences between job titles within a site



Example information in company report

Time trends in GM quartz per job title within a site

No statistics!



Overall time trends in exposure

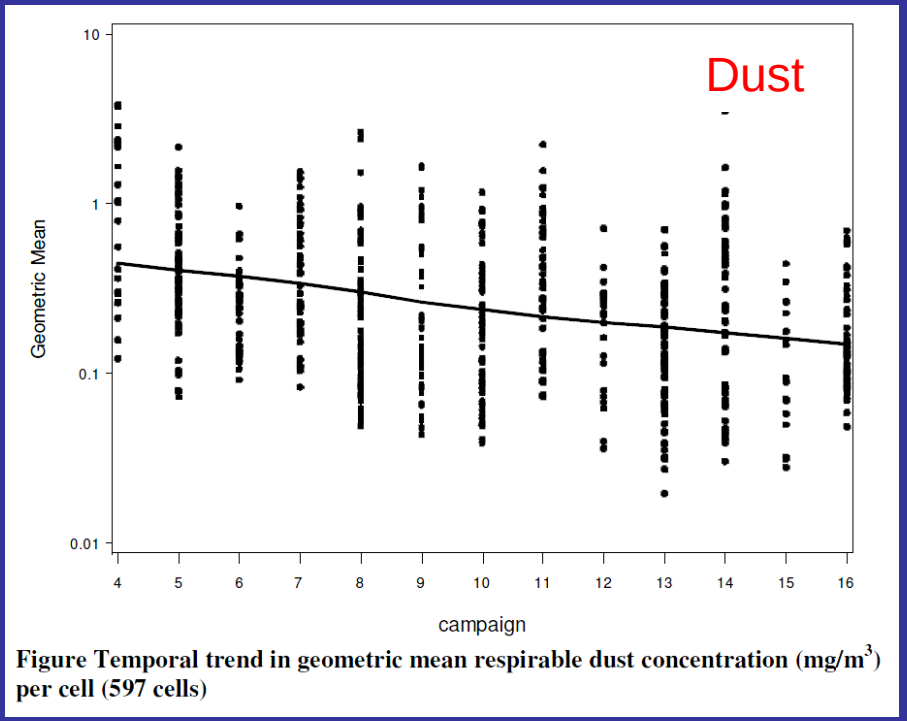


Figure Temporal trend in geometric mean respirable dust concentration (mg/m^3) per cell (597 cells)

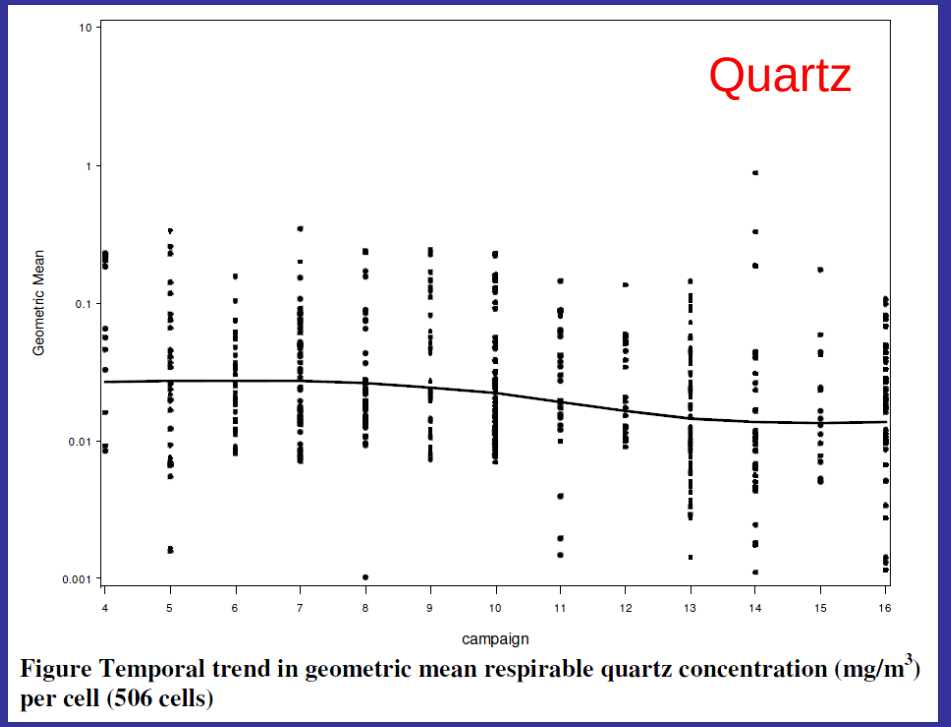


Figure Temporal trend in geometric mean respirable quartz concentration (mg/m^3) per cell (506 cells)

The trends in exposure levels were estimated based on a linear mixed effects model that takes into account the fixed effects of mineral, site and campaign and the random effect of each assessed individual on the average concentration per campaign.

Time trends in exposure by job title

Table Summary of estimated average trends in measured concentrations over time

Job Title	Number of sites	Number of observations (respirable dust)	Trend per campaign (respirable dust)	Number of sites	Number of observations (respirable quartz)	Trend per campaign (respirable quartz)
Bagging operator	30	803	-10%*	22	680	-9%*
Crusher operator	5	100	-8%*	2	47	-6%
Dry process operator	27	443	-13%*	22	394	-8%*
Foreman	24	389	-10%*	20	318	-8%*
Laboratory	18	244	-3%	14	201	-8%
Maintentance worker	28	542	-2%	21	377	-8%*
Miller operator	14	275	-12%*	10	231	-9%*
Multi-skilled	8	131	-19%*	6	96	-26%*
Plastification	2	42	-23%*	2	42	-24%*
Quarry operator	12	197	-10%*	10	172	-2%
Transport worker	32	866	-9%*	28	770	-6%*
Wet process operator	13	283	-6%*	12	266	-3%

* Trend is statistically significant for $p < 0.01$

Overall time trends in overexposure

Campaign 0: Winter 2000-2001
Campaign 17: Winter 2008-2009

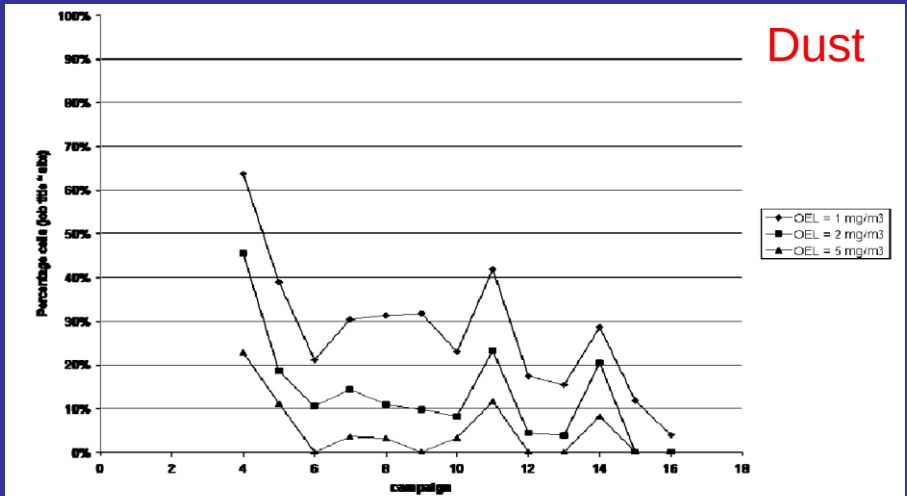


Figure Percentage of cells with a probability of overexposure > 5% (respirable dust)

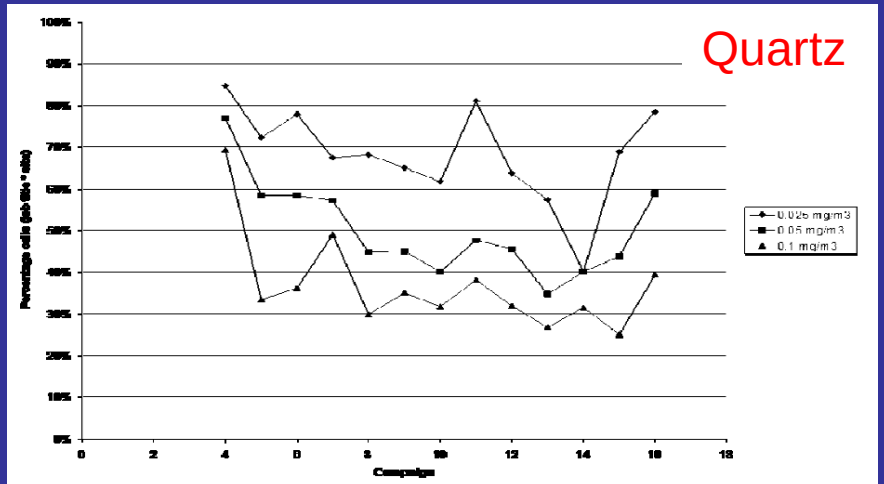
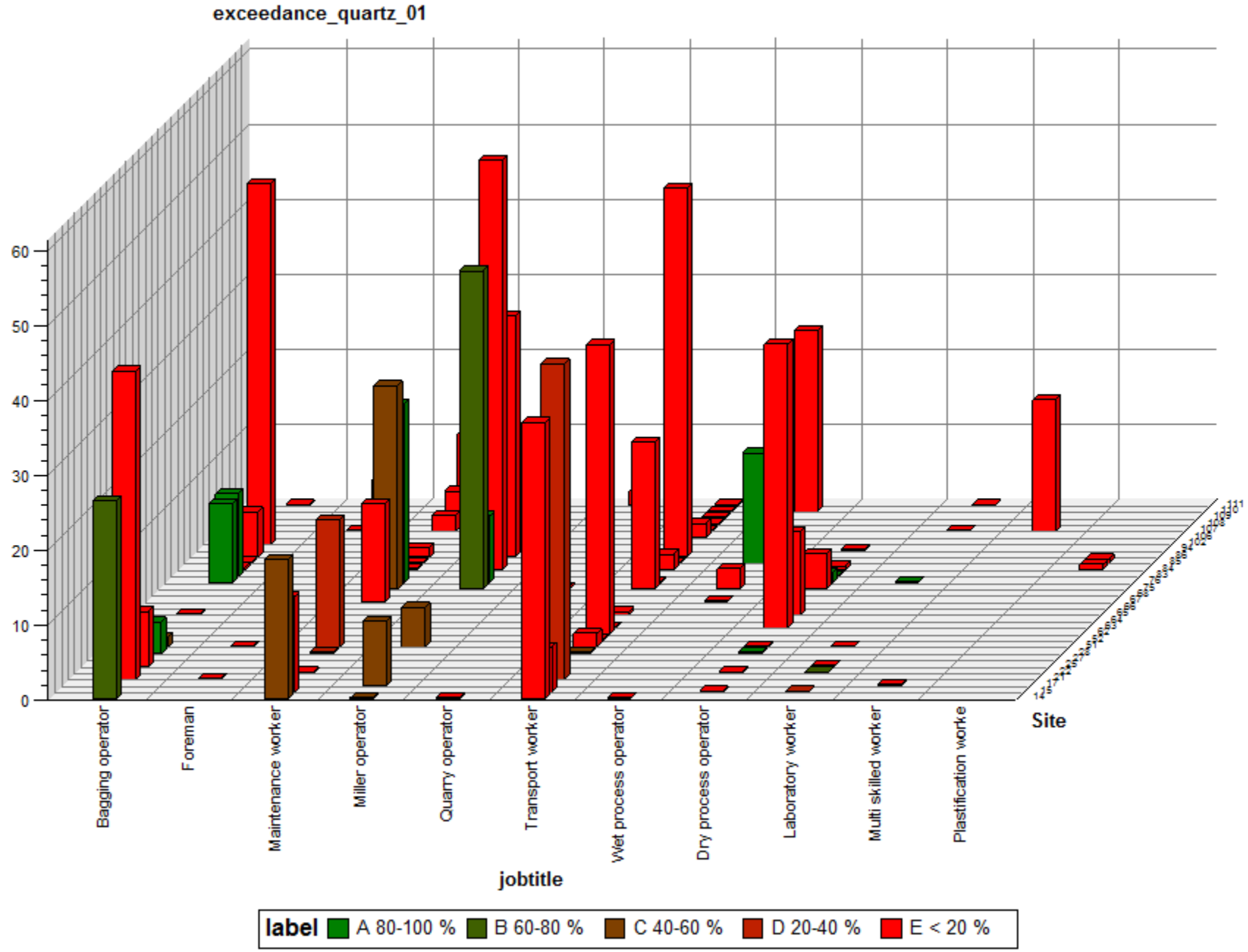


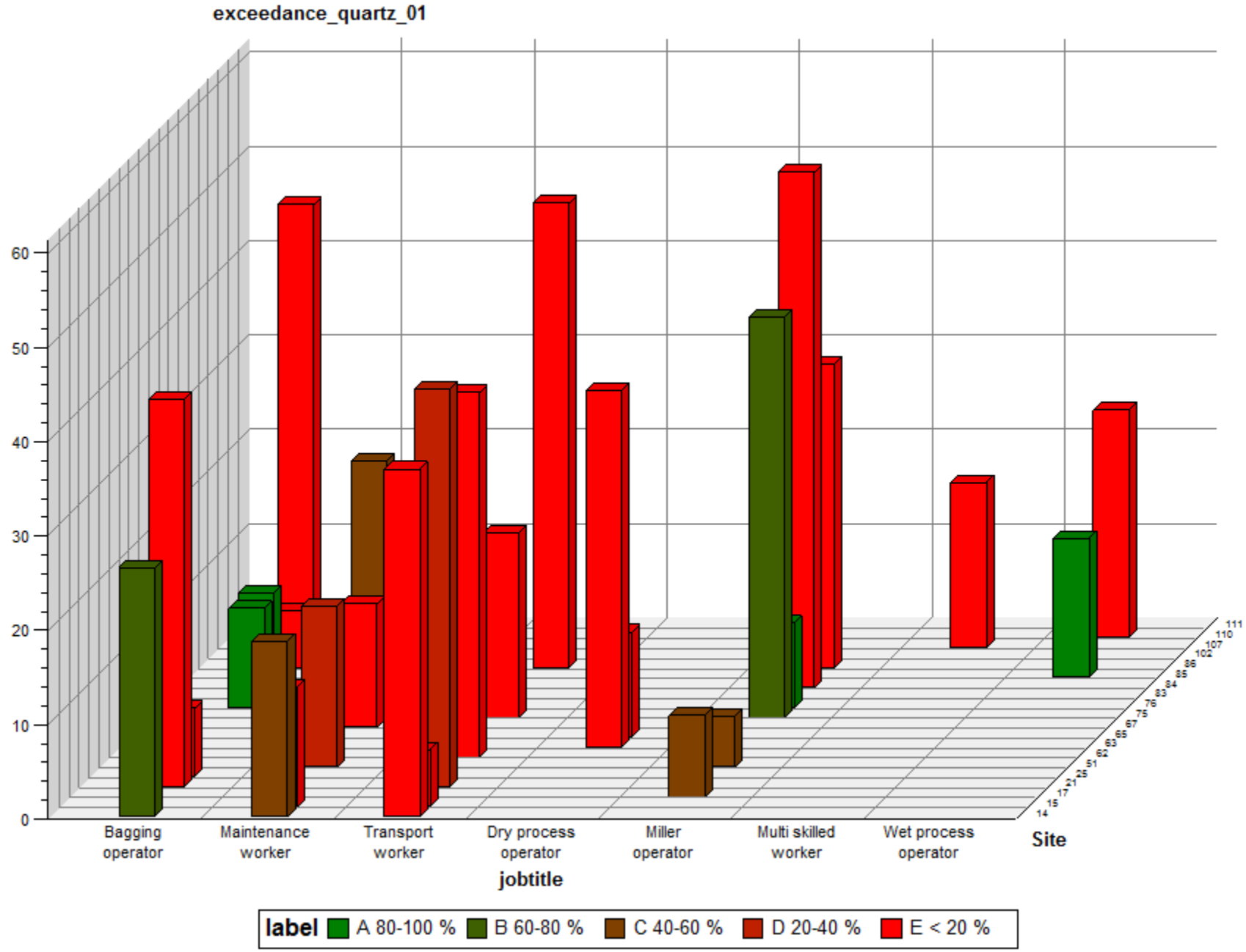
Figure Percentage of cells with a probability of overexposure > 5% (respirable quartz)

- Large differences between companies and sites
- Within the framework of the project hot spots are identified

- Company level: Hot spots need additional attention and exposure reduction activities
- On IMA level: number of hot spots decreasing in time?



All sites (with relevant information)



Sites with ≥1 job titles with exceedance >5%

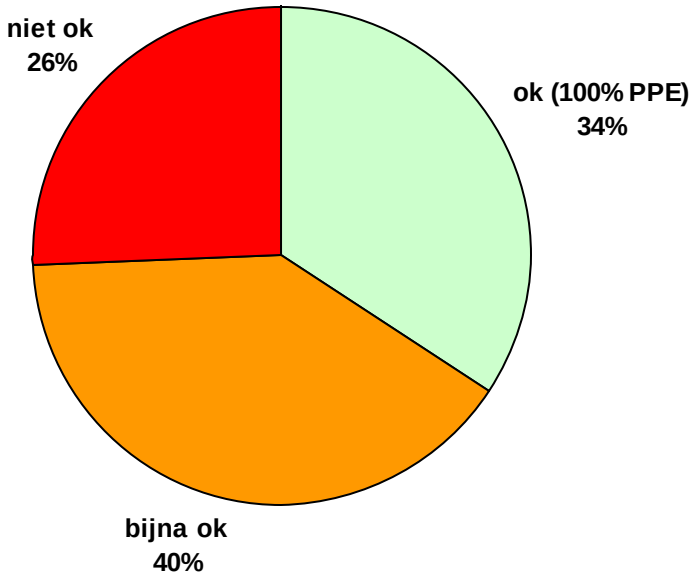
Hot spot definition

- One set of OEL's for all sites
  - Dust: 2 mg/m^3
  - Quartz: 0.1 mg/m^3
- Probability of exceedance: 5%

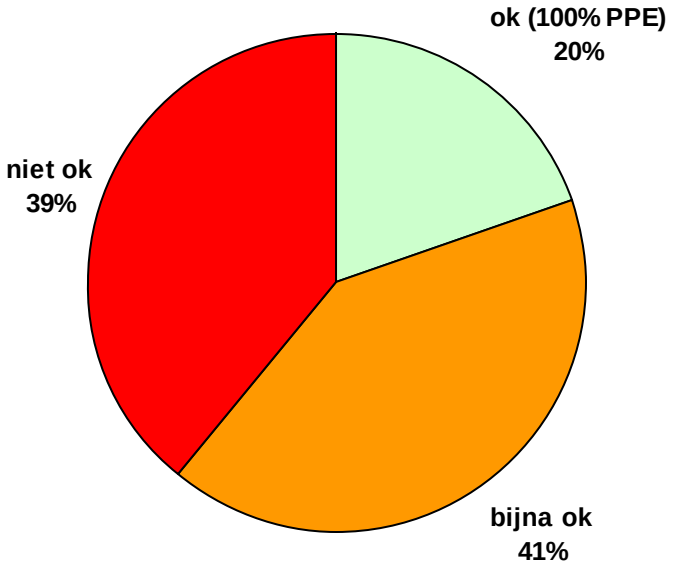
- % of workers wearing ppe when > 0.5 OEL
  - Red hot spot: < 50% ppe
  - Orange hot spot: 50-99% ppe
  - Green hot spot: 100% ppe

35 respirabel stof en 51 respirabel kwarts “hot spots” in laatste campagne

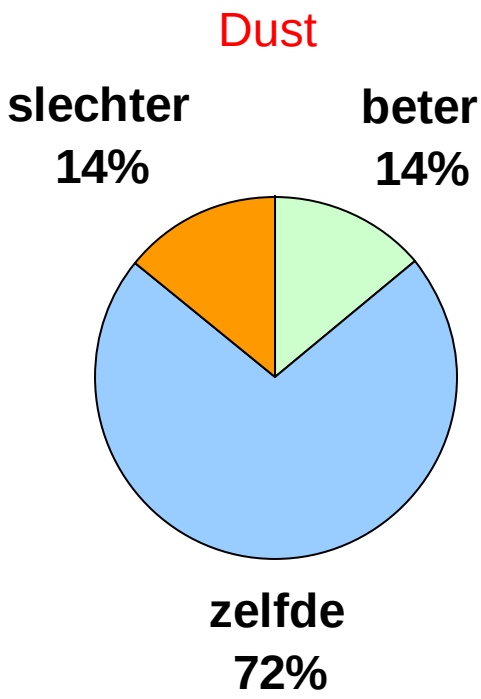
Dust

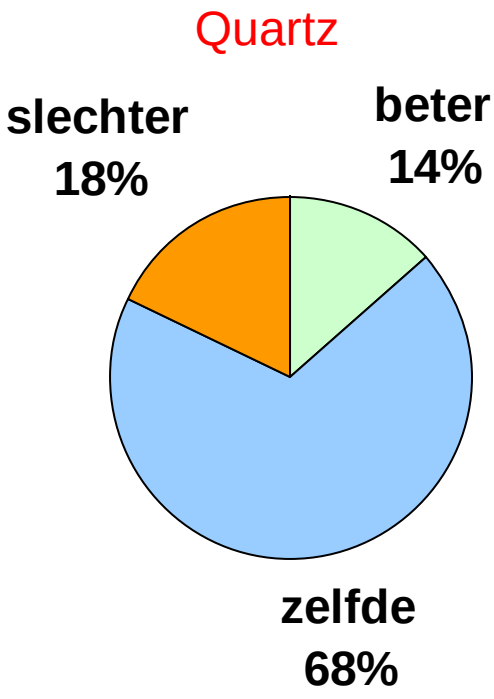


Quartz



Wat gebeurde met 35 respirabel stof en 51 respirabel kwarts “hot spots” in laatste twee campagnes





Conclusions: unique database

- Possible to build an industry-wide occupational exposure database
  - Multi-national
  - Both large companies & SME
  - At reasonable costs
  - With high quality exposure data

- Potential of this unique database is high
  - Risk management tool for individual companies
  - Risk management tool for industry sector
  - For future evaluation of health effects due to exposure to respirable crystalline silica

Conclusions: downward exposure trends

- Clear and statistical significant overall downward trends in exposure levels were observed
  - Over the years 2000 - 2009
  - Both for dust and quartz exposure
  - Trends ranging from -2% to -26% per sampling campaign
  - For the majority of job titles
  - Although the probability of exceeding national occupational exposure limits can still be high in several occasions (hot spots)

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