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BAE Systems

Managing Occupational Hygiene in a Multinational Company

- Management of significant workplace health risks from hazardous substances

Introduction

At BAE Systems, we provide some of the world's most advanced, technology-led defence, aerospace and security solutions and employ a skilled workforce of some 83,400 people in over 40 countries.

Working with customers and local partners, we develop, engineer, manufacture and support products and systems to deliver military capability, protect national security and people and keep critical information and infrastructure secure.

Key facts

- International capability
- One of the worlds leading defence companies
- A world leading innovator
- Over 83,000 employees worldwide
- Customers in more than 100 countries
- 2014 sales of £16.6billion
- Working with universities worldwide (over 30 in the UK)
- £70m+ invested annually in education and skills globally
- £9bn+ spent with over 33,000 suppliers globally



Introduction

Our capabilities are founded on a heritage of excellence, earned through some of the most demanding design and manufacturing challenges in the world today

In the **Air** domain we provide advanced military air capability through combat aircraft and jet trainers. We are addressing the emerging global market for autonomous systems and related technologies

The **Land** domain we provide armoured combat vehicles, tactical wheeled vehicles, missile launchers, artillery systems and munitions

The **Maritime** domain we provide above and underwater battlespace capability through the delivery of surface ships and nuclear submarines

Supported from design to disposal, these platforms and products have a proven ability in the most demanding operational environments



The Problem

- Safety issues tend to be the burning issues
- Injuries are obvious however, long latency health effects aren't
- Safety practitioners are generalists in their field
- They don't tend to understand hygiene in any detail
- Senior managers only tend to ask about safety
- Therefore safety generally is seen as a priority
- However, 13,000 annual deaths in UK from work related disease which are difficult to measure at company level



Health vs Safety

- Occupational Hygienists are a scarce skill and most tend to work alone
 - Unlike safety, haven't got peers to confer with
 - Kept busy doing the basics, monitoring, report writing
 - In many cases, if they highlight an issue it becomes their problem
- No current (weekly monthly) indicators for Occupational Hygiene, near miss reporting, first aid etc..
- RIDDOR reportable occupational diseases tend to be few and far between
- All assessments in place; monitoring and statutory checks OK
- So we haven't got a problem!



What got my attention

- HSE Strategy
- Conversation with HSE - what can we do?
- Breathe Freely Campaign construction - simple, powerful messages
- We, BAE Systems, are the largest engineering company in the UK comprising many legacy companies

However:

- Very few RIDDOR reportable diseases
- All assessments in place; monitoring and statutory checks OK



How did we engage with the organisation?

- BAE Systems/HSE Health Risk Management Strategy
- Investigating leading indicators e.g. numbers of LEV checked Pass/Fail
- Training for SHE generalists
 - Running BOHS certificate in house to enhance core skills
 - Moving towards Hygienists becoming the Strategist, specialist advisors
 - Assurance to the 'more competent' SHE generalists
- Identified top ten hazardous substances, carcinogens, mutagens, reprotoxins, sensitisers
 - Detailed risk assessments generated centrally
 - Comprehensive awareness sessions to convey health effects, controls required and how to use, monitoring? health surveillance?



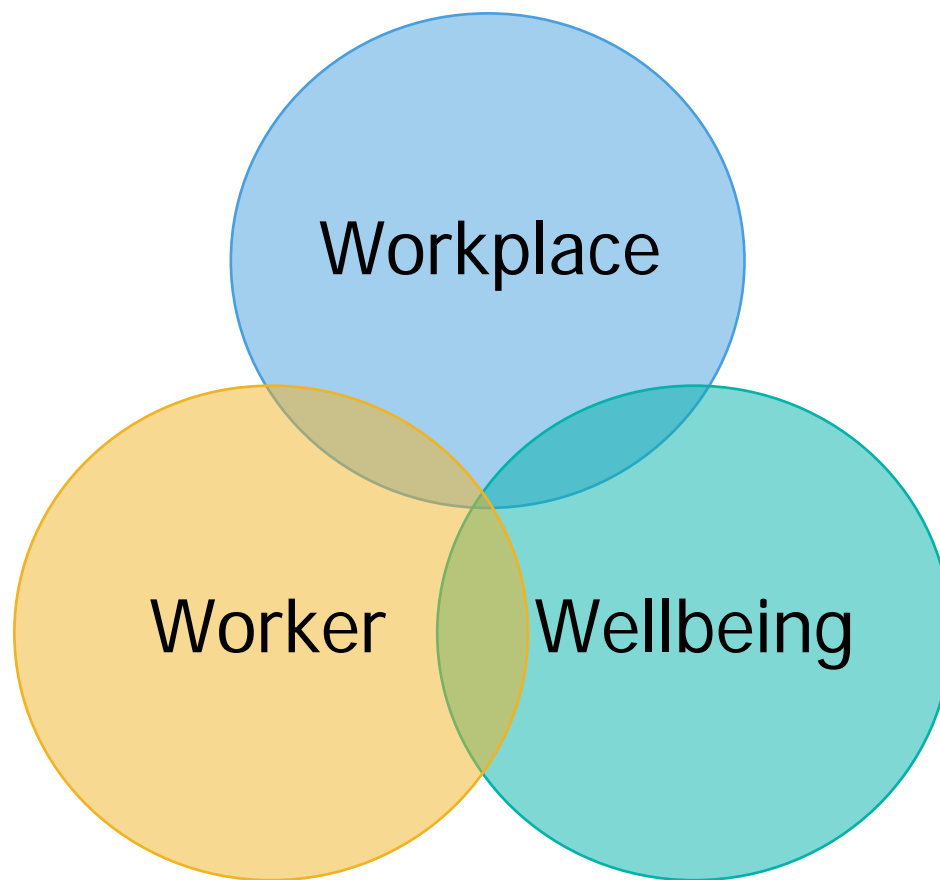
Discussion with the Board

- Statistics show that in 2013/2014 133 workers died in accidents at work and approximately 13,000 people died from work related diseases. Meaning 99% of deaths caused by work can be attributed to ill health
- The strategic aim will be to systematically move up the hierarchy of controls to remove our employees from risk to their health, with a drive towards moving away from the need to use Personal Protective Equipment



“We aspire to create a workplace where our employees have no direct exposure to carcinogens, reprotoxins, mutagens and sensitisers”

Health & Wellbeing



Health & Wellbeing

- Common health conditions which can be caused or made worse by work
- Long-latency conditions which can be caused by previous work activity and where symptoms can appear many years after exposure



Carcinogens

Trichloroethylene
- degreasing



Chromated primers
- paints - sprayed and touch up



Chromic acid
- treatment bath
- touch up



Cadmium Oxide
- corroding parts
- also a mutagen



Reprotoxins

Leksol (n propylbromide)

- degreasing
- cold cleaning

Chrome VI

- treatment bath
- touch up

Chromated Primer Sanding

- generating dust on shop floor
- also a carcinogen

CN20 Gun wash solvent (contains Toluene SK)

- Teratogen (harms unborn child)



Sensitisers

Nickel

- drilling/countersinking carbon components



Metalworking fluids

- coolants



Epoxy resins

- adhesives
- fillers (hysol)



Sensitisers - processes

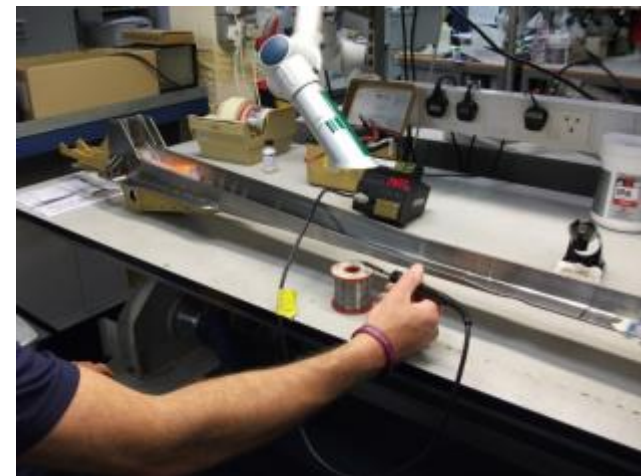
Welding

- stainless steel, chrome nickel



Soldering

- Rosin

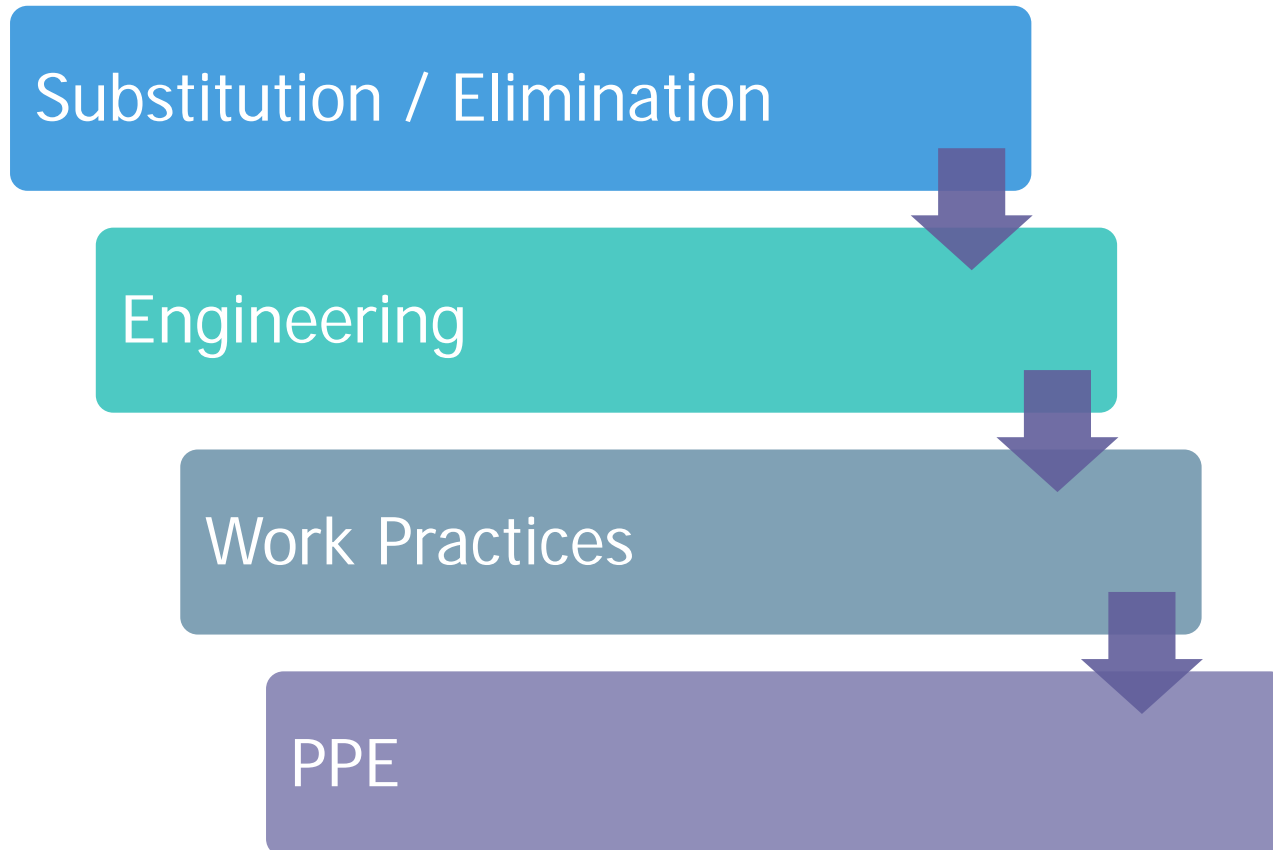


What we are doing

- HAV measurement strategy and dose calculation,
 - Investigating design changes
 - Daily average calculated over a week
 - Aim to use action value as limit value 2.5 m/s^2
- Noise assessors trained and assessments planned
- Deep Dive COSHH, Noise and Vibration audit programme for major sites
- Audit to test current Health surveillance programmes
- Occupational Hygiene working group
- Health Steering Board chaired by board member



Hierarchy of controls



Focus Areas - Examples

- Health Leading Indicators
- LEVs design specification
- Training - occupational hygiene specialists
- Leksol (reprotoxin) - remove from bases
- Reduce Chromated Epoxy Primers dust (carcinogen)
- Epoxy resin layup (skin sensitiser) - eliminate skin contact
- Review all current welding activities (LEV use / controls)
- Review all current soldering activities (LEV use / controls)
- Review solvent cold cleaning - elimination of unnecessary cleaning
- Increased focus on finding alternatives to chrome paints and process treatments, anodise and alocrom

Hierarchy of controls - worked examples

Substitution/Elimination

- RCF (Refractory Ceramic Fibre - carcinogen) to AES (Alkaline Earth Silicates)
- Chromated paints to non chromated paints
- Masking off before we paint to avoid further removal and carcinogenic dust
- Changing Diestone SAT wipes to Aquaforte (water based wipes)
- Potential new technologies - Chrome VI to TSA (Tartaric Sulphuric Acid)

Engineering controls

- Leksol/Trichloroethylene - fully enclosed degreasing systems
- Design spec for LEVs

Process Controls

- Use of Sempens, Semkits instead of open tubs
- Use pellets (chrome flake) instead of powders (chrome powder)

Personal Protective Equipment

- Carbon fibre lay up – Impervious gloves

Significant health risk leading indicators

Purpose: To provide guidance for managing significant health risks for 2016

Focus for 2016

- Statistics show that in 2013/2014 133 workers died in accidents at work and approximately 13,000 people died from work related lung diseases and cancer; caused primarily by exposure to chemicals and dust. Meaning 99% of deaths caused by work can be attributed to ill health
- We shall aspire to create a workplace where our employees are not directly exposed to carcinogens, reprotoxins, mutagens and sensitisers
- Our aim should be to systematically use the hierarchy of controls to remove our employees from risk to their health, with a drive towards reducing the need for resorting to Personal Protective Equipment



Health Risk leading indicators/ Objectives 2016

- All carcinogens, mutagens, reprotoxins and sensitisers have been assessed for substitution or elimination and all COSHH assessments identifying these substances are signed off by an occupational hygienist.
- Top five significant risks have detailed plans in place, identifying targets to reduce risk to ALARP, including a set of measures detailing how this is going to be achieved.
- LEV's – commissioning/ design data, registers and drawings are available. Every LEV should have a corresponding COSHH assessment, be on a PPM schedule, be tested and inspected by a competent body and operators conduct pre use checks and these are documented.
- Risk assessments demonstrate consideration of the hierarchy of control including elimination and substitution and engineering controls (for all health risks).
- Sites have access to an occupational hygienist, and all risk assessors have had appropriate training.
- Health surveillance is identified through risk assessment in consultation with an occupational hygienist or specialist, health surveillance is delivered in line with a set schedule and any issues identified are reported through the identified channels for further investigation.

Health Leading Indicators scorecard

- The Health Leading Indicators scorecard is designed for each SHE Plan area to be able to demonstrate that they are managing their health related risks.
- It must be completed monthly by each SHE plan area where CoSHH / Noise or HAVS risks may be encountered.

Indicator	Target	Actual	Comments	Score
1. All carcinogens, mutagens, reprotoxins and sensitisers have been assessed for substitution or elimination and all COSHH assessments identifying these substances are signed off by an occupational hygienist.	100%	100%	All COSHH assessments are signed off by an occupational hygienist.	5
2. Top five significant risks have detailed plans in place, identifying targets to reduce risk to ALARP, including a set of measures detailing how this is going to be achieved.	100%	100%	Detailed plans are in place for the top five significant risks.	5
3. LEV's – commissioning/ design data, registers and drawings are available. Every LEV should have a corresponding COSHH assessment, be on a PPM schedule, be tested and inspected by a competent body and operators conduct pre use checks and these are documented.	100%	100%	All LEV's have COSHH assessments and are on a PPM schedule.	5
4. Risk assessments demonstrate consideration of the hierarchy of control including elimination and substitution and engineering controls (for all health risks).	100%	100%	Risk assessments consider the hierarchy of control.	5
5. Sites have access to an occupational hygienist, and all risk assessors have had appropriate training.	100%	100%	Occupational hygienist is available and trained.	5
6. Health surveillance is identified through risk assessment in consultation with an occupational hygienist or specialist, health surveillance is delivered in line with a set schedule and any issues identified are reported through the identified channels for further investigation.	100%	100%	Health surveillance is identified and delivered in line with a set schedule.	5
Total Score				30

Health Risk management leading indicators

COSHH & identification of high risk substances	All substances used within the business have been identified (15)	All substances used within the business have a relevant COSHH assessment (25)	Every business has a register for high risk substances Inc. Carcinogens, mutagens, reprotoxins and sensitisers (20)	All COSHH assessments that identify an uncontrolled risk rating of 20 or above or include a substance with a health hazard of 5, are signed off by a hygienist (20)	An action plan is in place for uncontrolled risks of 20 or more demonstrating the risk is ALARP and that the hierarchy of control has been applied (20)	
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Carcinogens	All carcinogens in the area have an appropriate COSHH assessment that is signed off by a hygienist (25)	All carcinogenic substances have been considered for elimination or substitution (25)	All these substances have risk reduction plans that detail progress on substitution or elimination and demonstrate that risk is ALARP (25)	Process confirmation is carried out of existing controls to ensure that they are effective and adequate in line with the risk assessment (25)		
Mutagens & Reprotoxins	All mutagens and reprotoxins in the area have an appropriate COSHH assessment that is signed off by a hygienist (25)	All mutagens or reprotoxins have been considered for elimination or substitution (25)	All these substances have risk reduction plans that detail progress on substitution or elimination and demonstrate that risk is ALARP (25)	Process confirmation is carried out of existing controls to ensure that they are effective and adequate in line with the risk assessment (25)		
Sensitisers	All sensitisers in the area have an appropriate COSHH assessment that is signed off by a hygienist (25)	All sensitisers have been considered for elimination or substitution (25)	All these substances have risk reduction plans that detail progress on substitution or elimination and demonstrate that risk is ALARP (25)	Process confirmation is carried out of existing controls to ensure that they are effective and adequate in line with the risk assessment (25)		

Health Risk management leading indicators

Noise	A noise map is in place for the area (15)	Areas that require a detailed Noise assessment have been identified (20)	Plan is in place to carry out detailed noise assessments within the year and all assessments are written up in the appropriate reporting format (20)	Hierarchy of control is applied to all assessments and engineering controls are considered (15)	Where hearing protection is identified as a control measure the appropriate signage and information, instruction and training has been deployed (15)	Risk assessments identifying the need for health surveillance are supported by an up to date noise assessment (15)
Vibration	Activities with the potential to cause HAV's are identified (20)	Assessments are in place for all HAV's activities and measurements have been taken (20)	Immediate action is taken for any measurements at or above the limit value of 5m/s ² . (20)	Plans are in place to reduce exposure where measurements show levels at or above the action limit of 2.5m/s ² . (20)	Maintenance programme is in place for vibrating tools that pose a significant risk to health (20)	
Local Exhaust Ventilation	All LEV's in the business are identified and marked up appropriately (15)	Ensure all LEV's are registered with relevant drawings and commissioning data. (15)	All LEV's are a specified control measure within an existing COSHH assessment (10)	All pre use checks/ inspections are untaken and recorded (20)	All LEV's have magnahelic gauges or similar to check the status of air flow and filters, process confirmations have been carried out to ensure these are working and appropriate (20)	PPM's are up to date and carried out for all LEV's (20)
Health Surveillance	All risk assessments review the need for health surveillance and state if it is not required. (15)	A register is in place to identify tasks that require health surveillance and that states individuals identified for health surveillance. (15)	A plan is in place for the delivery of health surveillance across the business (20)	All individuals identified for health surveillance are aware of what surveillance is required, why and how frequently. (25)	Any issues identified during health surveillance are escalated to the site hygienist and an investigation is completed (25)	
Training & Competence	Health training is identified, COSHH ETM's, COSHH assessors and hygiene training. (20)	A training plan is in place (20)	The training plan is implemented and reviewed (20)	SHE training records are maintained and stored. (20)	Businesses have trained COSHH/ noise/ HAV's etc. assessors (20)	
Operational Control	Process Confirmations are carried out for all significant health risks (25)	OCSAs are carried out (25)	Actions from OCSAs & Process Confirmations are raised where required (25)	Actions arising from OCSAs and Process Confirmations are closed (25)		

What we learned

- Basic understanding of Occupational Hygiene in SHE community
- SHE community tend to underestimate the health risks to employees
- More focus on getting involved at design stage to design out risk to health (like safety)
- Increased competency allows basics to be completed and more complex issues flagged up.
- More focus on Occupational Hygiene strategy, communication, raising awareness and overall competency.
- You don't know what you don't know, until you have thoroughly reviewed and strategised **'the Big Picture'** !



What we learned...cont.

- It's not a numbers game...accidents
- It's about articulating risk
- The use of words is important
- What does COSHH, CMRS or HAVS mean to managers?
- Subjects like COSHH can be seen in some areas to be too big and in other areas quite trivial
- Hazardous substances such as **CARCINOGENS**, **MUTAGENS**, **REPROTOXINS** and **SENSITISERS** get management attention



Summary

- Strategic not tactical use of hygienist
- Identify the Occupational Hygiene risks
- Tell the story / paint the picture
- Be good communicator
- Sell your passion for the long term health of employees and the potential risks
- Give them the solution with the problem, but remember it's their problem not yours



Thank you Any Questions?

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