Environmental Compliance in Construction & Engineering

6 September 2016
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Introduction

- Prof George Fleming FREng FRSE FICE FCIWM Cenv
- Background to EnviroCentre

www.envirocentre.co.uk
Presentation objectives

• Provide an overview of environmental legislation affecting Engineering processes
• Summarise the key compliance areas (i.e. waste, noise, etc.)
• Explain the tools that can be used to help ensure compliance;
Regulatory Drivers

- Environmental Management System
- SEPA
- Marine Scotland
- Building Control
- Environmental Health
- SNH
- Planning Departments
Environmental Legislation

- Control of Substances Hazardous to Health Regulations 2002 (as amended);
- Protection of Badgers Act 1992 (as amended);
- Clean Air Act 1993
- Water Environment (Oil Storage) (Scotland) Regulations 2006.
- Waste Management Licensing Regulations 1994 (as amended)
- Environmental Protection Act 1990 (as amended) Part 2A
- Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended)
- Waste (Scotland) Regulations 2012
- Nature Conservation (Scotland) Act 2004

Brexit
Compliance Issues

• Flooding
• Noise & Vibration
• Dust
• Water Pollution
• Waste/Contamination
• Ecology – Marine & Terrestrial
• Invasive Species
• Sustainability
Flooding

- Compliance with SEPA flood plain zones both coastal and fluvial
- Flood Risk Assessment
- Sustainable Urban Drainage
- Pollution control during construction
Noise & Vibration

- Proximity to sensitive receptors
- Frequently a planning condition – e.g. marine mammals
- Timing of noisy activities can be key i.e. piling works
- Complaints by members of the public
- Damage to buildings (from vibration)
- Disturbance to wildlife
Dust

• Location is important
• Local Authority regulates sources on a site
• Nuisance is the most common concern
• Sites need to identify sensitive receptors
• Monitor regularly (can be visual checks)
• Good housekeeping
• Dedicated controls – i.e. suppression systems
Water Pollution

- Control of surface water is often key
- Map drainage network – consider indirect effects
- Hazardous material storage (i.e. chemicals)
- Good practice on soil stockpiling and storage (i.e. physical effects)
- Good housekeeping
- Surface water management plan
Waste/Contamination

- Duty of care-effective control and waste
- Ensure segregation and control of hazardous waste
- Aim to reduce waste to landfill (Zero Waste Regs.)
- Identify/assess potentially contaminated soil and other materials- evidence led process
- Significant liability
Ecology

• Good practice to survey site prior to construction
• Bats, badgers, amphibians, reptiles, nesting birds - protected species
• Designated habitats - indirect effects
• Sensitive receptors - indirect effects, i.e. rivers
• Avoid problems before they arise!
Invasive Species

Japanese Knotweed

Giant Hogweed

Himalayan Balsam
Sustainability

a. Resource Efficiency - Zero Waste
   1. Waste elimination
   2. Optimising water consumption
   3. Greening the supply chain

b. Circular economy
   1. Cradle to Cradle principles
   2. Product designed for re-use
   3. Working with supply chain
Overarching Sustainability

a. Green is now ‘mainstream’ and increasing tech drive
b. Improvements need to be quantifiable
c. Still good PR & Marketing tool
d. Staff awareness and happiness
e. Corporate responsibility
Tools for compliance

- For industry, commerce and on engineering projects
  - Environmental management system (EMS)
  - Construction environmental management document (CEMD)
- To comply with planning conditions through implementation of environmental protection measures;
- Complying with licence or permit requirements;
- Meet legislative obligations;
- Achieving internal sustainability objectives or KPI’s (design or site based.)
The Role of Environmental Management Systems (EMS)

• Initial review to establish key environmental aspects;
• Development of aspect and legal register;
• Setting objectives and targets (KPI’s);
• Writing environmental policy;
• Applying the feedback loop (PDCA) to monitor improvement; and
• Management review, revising objectives and setting new ones.
Benefits of developing an EMS

- Provides a means to understand your companies or projects impact on the environment;
- Provides a framework for driving environmental improvements;
- Potential competitive advantage;
- Establishes an internal audit framework;
- Potential financial and resource savings;
- Employee empowerment;
- Encourages supply chain engagement;
- Helps push towards sustainability;
- Links with other tools like CEMD; and
- Accreditation to ISO 14001.
Plan-Do-Check-Act

- **Plan**
  - Identify aspects and environmental impacts by implementing goals and objectives.
  - Implement; Environmental Management Plan including training and operational control measures.

- **Do**
  - Decide on changes needed to improve process and environment.

- **Check**
  - Assess the measurements by monitoring and report results to decision makers.

- **Act**
Application of Environmental Management Systems (EMS)

- Initial review to establish key environmental aspects;
- Development of aspect and legal register;
- Setting objectives and targets (KPI’s);
- Writing environmental policy;
- Applying the feedback loop (PDCA) to monitor improvement;
- Management review, revising objectives/and setting new ones
ISO 14001

• Internationally recognised standard for EMS;
• Important in this global village;
• For small to large organisations (i.e. scalable);
• Encourages supply chain engagement;
• Provides a framework to build your EMS around;
• Externally audited and verified
Construction Environmental Management Document (CEMD)

• Environmental conditions, licenses and environmental protection measures to be applied;

• Containing environmental sensitivities plans;

• Contain specific Environmental Management Plans (EMPs’) for each construction phase or environmental sensitivity; and

• Ultimately developed to ensure that all necessary environmental protection measures are identified to all contractors on site.
Implementing your CEMD

One approach is to employ an independent Environmental Clerk of Works, defined as:

‘An EcoW / EnvCoW is a qualified professional, responsible for the independent monitoring of compliance of development projects with environmental legislation and policy and with site-specific planning conditions, mitigation and environmental protection plans.’
ECoW / EnvCoW

• Ideally on engineering and construction projects;
• Role as an environmental auditor to match performance, on site, to compliance requirements;
• To use the CEMD as a guide to achieving compliance;
• To record success of environmental protection measures;
• To report to the developer/client; and
• To liaise with developer, contractor and regulators.
Environmental Compliance Monitoring

• On land
• In the air
• In water
• Ecology
• In buildings
• Environment
• Marine
Monitoring on Land

- Land contamination
- Soil Chemistry
- Transport network
- Docks and Harbours
Monitoring Air

• Air pollution
  – Carbon Dioxide (CO$_2$)
  – Nitrogen Oxide (NO$_x$)
  – Sulphur Oxide (SO$_x$)
  – Particulates
Monitoring Water

• Water Pollution
• Flooding
• Low flows
• Drinking Water
• Dredging
Ecology

- Bats
- Mammals
- Birds
- Flora
- Trees
- Protected Species
- Invasive Species
Monitoring in Buildings - Why?

• Measuring for regulatory compliance;
• Achieve key objectives within EMS;
• Measure the quality of the internal environment; and
• Set high standards and work to Lean Environment principles;
• Ensure safe working environment;
What?

- Air quality;
- Dust;
- Noise;
- Hazardous substances; and
- Waste;
Air Quality

• Monitoring exposure levels to vapours and gases for:
  o individuals, or
  o work place.
• Using tools like Kitakawa Tubes or handheld devices;
• To provide a safe working environment;
• Test protective measures (i.e. hood cupboards in labs); and
• Individuals can now measure air quality.
Dust & Particles

- Monitoring particles in ambient air e.g. traffic;
- Assess particle type and exposure pathways;
- Assessing control measures, e.g. extraction or personal protection; and
- Overlap with health & safety practices
Noise

- Developing a clear policy on internal noise;
- Identifying noise risks and meeting legislative compliance;
- Developing 'noise protection zones';
- Setting minimal personal protection requirements; and
- Auditing effectiveness and applying corrective actions;
Hazardous substances

- Risk of pollution - short to long term;
- Developing effective control measures;
- Working with the Control of Substances Hazardous to Health (COSSH) requirements; and
- Hazard elimination or minimisation (material or product substitution, i.e. solvent free chemicals).
Waste

- Meeting your duty of care;
- Meeting trade effluent consent levels;
- Managing hazardous waste;
- Applying the waste hierarchy; and
- The future is *Circular*
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