ACE

Aquatic Control Engineering

HSEQ Design Management Policy

Date Reviewed: 14/06/2023
Next Scheduled Review: 14/06/2024

Contents

1- HSEQ Design Management Statement and Introduction

Aquatic Control Engineering Ltd understand the increasing importance of a design management policy and the affects it has on reputation, quality of delivery, compliance with standards and consistent communication within the business and with external parties.

The HSEQ Design Management Policy will be in accordance with the Integrated HSEQ Manual and Management system, accredited to ISO 9001, 14001 and 45001.

The purpose of a design management policy and process when addressing suppliers, clients, contractors and other related organisations is to ensure they conform to Occupational, Health & Safety, Environmental and Quality management systems in place.

The Design management process will be used to determine, assess and eliminate hazards to reduce Occupational Health and Safety risks associated with, for example, the fabrication and assembly, installation, operation, maintenance and disposal of our products, and advise on any working practices or residual hazards that remain following risk reduction through design.

It is the duty of all employees involved with any element of design (not exclusive to CAD operators) to understand and comply with this policy and process.

ACE are committed to:

• Delivering value for money, ensuring quality and sustainable products with competitive TOTEX value.

• Comply with legislation, in particular to product and site safety practice. For example, UKCA requirements and The Health and Safety at Work Act 1974 as shown in the HSEQ Legislation log

• A Design practice that upholds ACE's environmental, quality and safety aims and objectives whilst adhering to external standards and customer specifications.

• Recognising efficient and innovative design as a significant contributor to enhancing business performance.

• Maintain and develop a healthy supply chain and supplier risk management process

• Providing leadership, coordination, appropriate resources, information, instruction, training and supervision to all design staff.

• Achieving good overall environmental performance through lower embodied carbon, recycled content.

Promote and adhere to the company's Environmental and Sustainability policy and arrangements

• Take into consideration ACE's 'Reduce, Reuse, Recycle, Think policy for all goods designed

• Promote innovation through lateral thinking, use of new technology and research and development.

Our core design principles are:

• To conduct all design activities taking into account the ACE INSPIRES values (Innovation, Nature, Safety, Passion, Integrity, Respect, Empowerment and Sustainability).

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

• To comply with legislation, standards and regulations

• To innovate, develop and improve

• To incorporate sustainable aspects in the design, using sufficient but not excessive material, considering carbon reduction and design life wherever practicably possible.

2- Design Management Standards / Regulations

To ensure compliance with legislation and relevant quality standards, ACE adhere to:

- The Construction (Design and Management) Regulations 2015
- Industry Guidance for Designers as published by the CITB /Construction Skills
- UKCA Legislation requirements
- Applicable standards e.g. BS7775 for penstocks, Eurocodes etc

Where required, ACE can also comply with customer specified standards, such as Environment Agency MEICA MTRs, Water Authority Specifications etc. Further information on ACE Design Capabilities is found in the Design Capabilities Statement.

3- ACE Scope of Design Capabilities

3.1 ACE Design Competence

Our design employees have a range of relevant training, including degree level engineering qualifications , in a variety of relevant sectors and disciplines. All CAD operators are fully qualified in the use of Solidworks, as well as other software dependent on their role. See section 4 for details of key personnel, their roles and their specific qualifications.

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

3.2 ACE Product design scope

ACE's in house design team are capable of providing:

- Design of eel passage equipment
- Design of fish passage equipment
- Design of water flow control equipment-AQUIKO range

ACE also work with a number of suppliers who carry out design works for products supplied to ACE.

Regardless of the source of supply, we are required to:

- Assess the hazards associated with the design, reducing risk through design wherever possible, and communicate residual risks
- Review design inputs meet the required level, to comply with our commitments
- Meet the requirements of safety, buildability and environmental performance
- Ensure the equipment meets all the relevant legislative standards, such as UKCA, LOLER, etc

3.3 ACE Design Deliverables

ACE primarily use Solidworks, in conjunction with the PDM vault to produce and manage design outputs. We can then provide design deliverables as applicable in various formats, including:

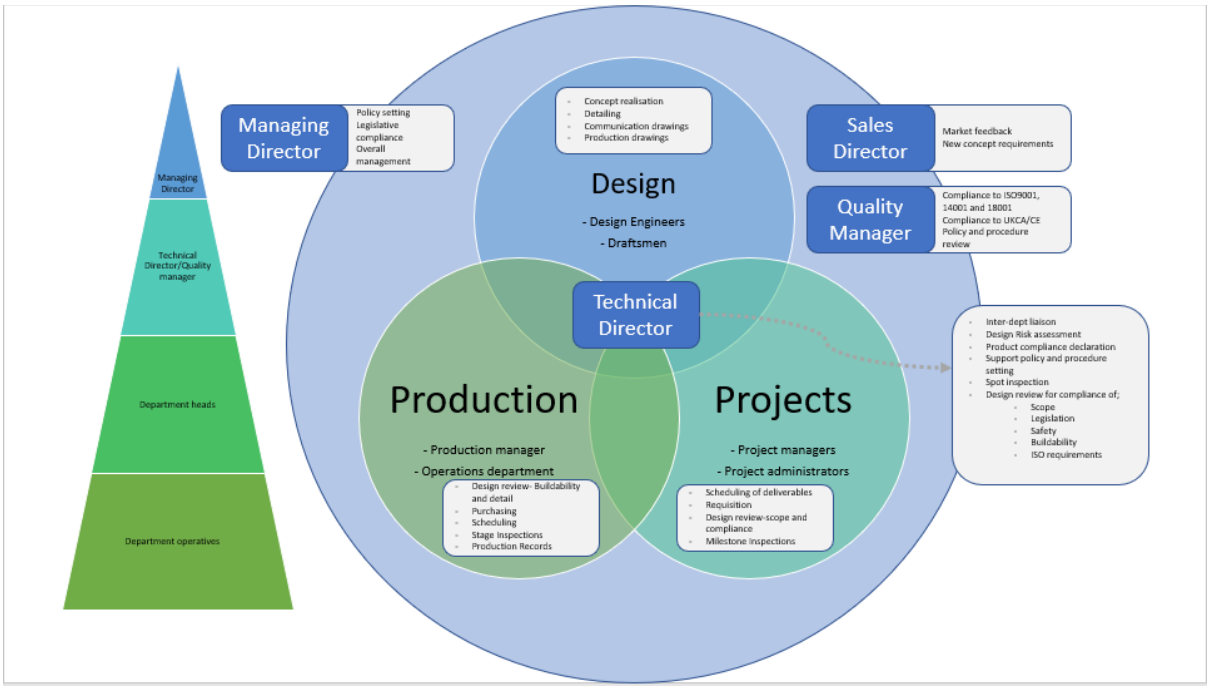
- 3d models compatible with Solidworks, Autodesk applications and EDrawings. Where required, 3d models can incorporate BIM data for incorporation into wider BIM models.
- Images in JPG/PDF format- this includes photo-realistic renders
- 2d isometric drawings in PDF, DWG and DXF formats, which can also include:
    - Bill of material data
    - Alternative position views, hidden detail etc
    - DXF 1:1 scale drawings for fabrication
- Design risk assessment, including Buildability Statement and SHE information, provided in PDF format.
- FEM modelling for material performance analysis.
- Calculation reports covering the key design elements of our products.

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

4 Designers Duties and Responsibilities, internal and external

The Technical Director is responsible for controlling, leading, planning, organising and coordinating the company's in-house design works.

The Technical Director is responsible to the Managing Director



The ACE design management procedure is based around the Designer's duties required by CDM regulations 2015. Our responsibilities include:

- Alert clients to their duties
- Cooperate with Principal Designers and other designers who have an interfaced input into the project
- Avoid or minimise risk of designed structures which could arise during construction, maintenance and repair of the structure and its associated parts
- Consider measures which will protect workers, risk assess and reduce risk via design (e.g. construction, cleaning and maintenance workers)
- Pass on adequate info for inclusion in H&S plan and file to the Client and the Principal Designer. Advise of any residual risk in writing, or relevant health and safety information relating to the design, such that they can fulfil their statutory obligations.
- Where possible and requested, provide data for BIM purposes
- Contribute to the technical file for UKCA/CE purposes

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

5 Design Management Process

5.1 Design Considerations

During the design, the following are to be considered:

- The purpose and intended use of the product
- Performance and function requirements
- Customer choice and opinion
- Required standards and specification (including ISO9001, 14001, 45001)
- All relevant legal and regulatory requirements *such as e.g.* the Workplace (Health Safety & Welfare) Regulations 1992
- Compliance with UKCA/CE Regulations
- Required calculations
- Required life expectancy
- Required maintenance
- Reduction of design, construction, installation, maintenance and dismantling hazards and risks
- Environmental Aspects and Impacts
- Selection of construction technique
- Selection of materials and evidence of material review and improvement (i.e. Solidworks materials and their formulas, material carbon footprint, recycled materials etc.) and notes of material on the drawing.
- Incorporate of best environmental/quality/health and safety practice e.g. using a notes or construction consideration SHE box in the drawing
- Reduction of waste through smart design
- Reduce Reuse Recycle
- Existing installation environment e.g. the designation of the site and any relating restrictions such as NNR, SSSI, SPA, SAC
- Social considerations
- Consent requirements (see our consent check list)
- Transport and Lifting Requirements
- Fabrication and assembly method
- Installation method
- Dismantling method
- Disposal of dismantled materials in an environmentally responsible way
- Information derived from previous similar designs
- Interfaces with other equipment/trades

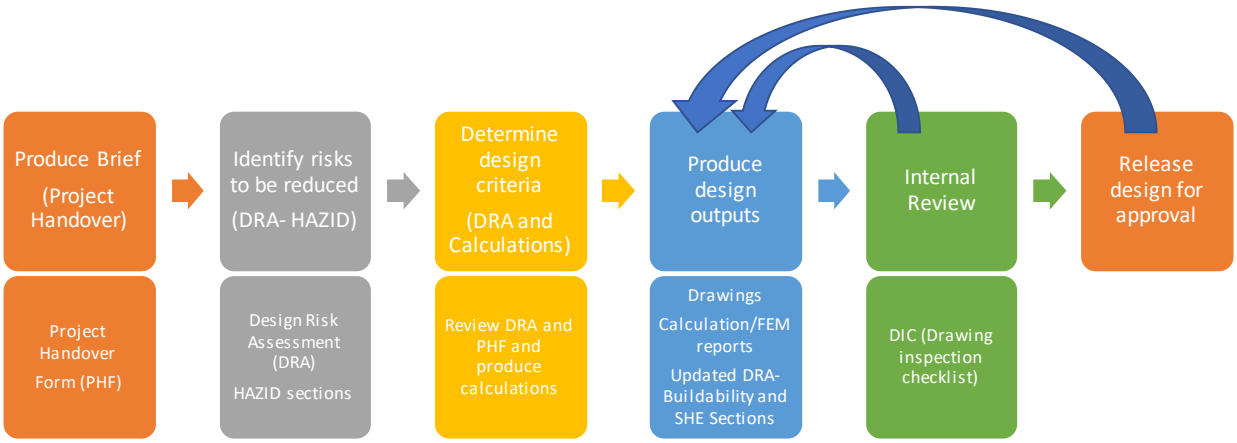
Where a new design is required, the scope and design brief should be clearly defined, and reviewed within design team- i.e. peer review, to determine best concept and method prior to design.

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

5.2 Design reviews including Design phases

To ensure compliance, various reviews take place throughout the design phase, which are set out in the inspection and test plan, which is produced at the start of each design.

During the design, there are key elements of the process that are carried out prior to approval by our customer, as follows:



The above are covered within the ITP (Inspection and test plan), and following design, this is also used to monitor reviews and checks that are carried out during the production process. In some cases, the design may also be revisited as a result of checks carried out, or issues identified in the production or installation process.

At various key points within the design process, the design will change status in our PDM system- see section 6.

5.3 Ensuring design risk reduction (Design Risk Assessments, ITPs)

A key requirement of the design process is to assess the risk of all activities relating to the product being designed, and to do this, ACE use a Design Risk Assessment.

Many of ACE's products come from a standard range, and are assessed against their intended use at the initiation of a new product design. This provides details for the safe use of our products where the site specific hazards are not known- for example where ACE are providing a supply-only service.

Where applicable, ACE may also carry out a Site Design Risk Assessment, where site specific hazards are also assessed- this is usually applicable where ACE are combining products, carrying out installation or there is a bespoke requirement.

In both cases, this follows a similar process:

1- Identify the Hazards (HAZID)
2- Quantify the risk- assess against the severity, likelihood and outcome
3- Identify how we can reduce risk through design and implement these features in the design
4- Highlight the areas of risk we have reduced (Buildability section)

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

5- Highlight any residual risk and instruct this to the client (SHE information)

5.4 DIC (Drawing Inspection Checklist)

The DIC (Drawing inspection checklist) provides a consistent check prior to formal release of the design package, to check for:

- Compliance with the requirements of the brief
- Compliance with ACE's design detailing standards (to ensure consistency)
- Confirms buildability and communication of SHE information
- Compliance with safety requirements

5.5 External Designs

All suppliers are vetted via our HSEQ Supplier and Subcontractor Vetting process, to confirm minimum design standards are met.

ACE liaises with their manufacturers regarding design requirements.

ACE carries full design responsibility for all their projects, where required with a back to back agreement with the manufacturers.

When working with specific suppliers and our inhouse designs, a non disclosure agreement is agreed

ACE ensures and assists in compliance with designer duties.

ACE produces (or vets) all designs and design risk assessments.

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

6 Control of Documented Information and Securities

The company's Control of Company Document policy outlines the use of controlled documents including Storage of information, Naming Conventions relating to Design documentation.

6.1 Documentation formats/locations

Document type	Prefix	Native Format	Secure location	Shared format	Shared location
Drawing Inspection Checklist	DIC	.doc	Z: Templates	.pdf	Project files- HSEQ
Product Design risk assessment	DRA	.xls	Q:\01 - QUALITY SYSTEM\04 - Quality Documentation\Product Conformity UKCA Marking & Standards\Product Design Risk Assessments	.pdf	Project files- HSEQ
Site design risk assessment	SDRA	.xls	Z: Templates	.pdf	Project files- HSEQ
Solidworks layout drawing	DRW	.drw	PDM	.pdf	Project files- Drawings
Solidworks Part model	PRT	.prt	PDM	NA	NA
Solidworks Assembly	ASS	.ass	PDM	NA	NA
Calculation summary	CAL	.xls	PDM	.pdf	Project files- Drawings

Drawings in their native format are stored within a secure vault (PDM) until released for use- only General arrangement drawings in PDF format are stored in the project files, to maintain security of intellectual property.

6.2 PDM Design Management system

PDM for Solidworks is a digital vault facility which controls design documentation, managing drawing status, version and revision control. The facility also provides user level security to prevent error, manage document security and provide suitable user-level access to relevant tools and detail.

Key features:

- Files are "checked out" by the user to allow the drawing to be edited- while checked out the drawing cannot be edited by any other user. Drawing is then checked back in to register the changes. Each check out/in action prompts creation of a "version".

- All files have an assigned status, reflected on the drawing border, which allows access and permission control to be applied. PDM operates via a Workflow system, which is available for reference in the PDM Workflow Guidelines Document.
- Versions and revisions are all stored and accessible on request, but by default, the latest version and revision is visible.
- Live Bill of Materials (BOM) and Data card detail
- Preview of drawings, with measurement features (for non Solidworks Users)

Solidworks utilises 3d solid models of "parts" (Items, PRT) which make up assemblies (products, ASS), subassemblies (smaller assemblies within a larger assembly e.g. A gearbox in a car, also ASS) and drawings (DRW).

Solidworks and PDM use a system which reference the parts and their location within the IT system, so that as a part is updated, the assembly and drawing will also update accordingly. PDM prevents duplication and manages version control, so that if a part is updated after a product is delivered (for example a repeat order) both sets of drawings remain available, showing both versions.

6.2.1 Vault facility

The Solidworks PDM vault is an isolated drive within the ACE IT system, and requires software installation to allow access. Each user is assigned a role within a group, which has specific permissions and access restrictions for each stage in the workflow.

To allow a document to be edited, the user checks out the file- this also prevents change by others (to avoid duplication). Once the change is made, the file is checked back in, and the version number is increased by 1.

To avoid duplication, PDM also will not allow items of the same type with the same name to be checked in to the PDM vault.

By the end of the PDM workflow, each part is likely to have corresponding drawings, in a variety of formats, with the same name- these are differentiated in PDM by the file extension (i.e. .prt, .drw etc) and it's icon. The vault system also allows storage of other file type such as PDF, DXF, EDRW (EDrawing), DWG, however these are not controlled by the workflow (i.e. their status control is purely manual).

6.2.2 Version/Revision Control

PDM manages version and revision control of the drawings, in line with the PDM workflow. The workflow is designed to work in line with the ACE ITP format, so that as reviews are carried out and released, this releases the PDM element into it's next stage also. See Appendix 1.

Versions are iterations of drawings/models that update each time the drawing is checked out then checked back in. This monitors changes to the drawing, but does not update the revision status on each change.

Revisions are iterations of the drawing as it is released into the stages of the workflow- the revision is updated if a change to a "published" drawing is made as it is re-issued at key points in the workflow. For example- if a drawing is released for approval by the customer, comments are made and the drawing is changed. The revision will be updated +1.

If required, older versions can be called up for reference, however as a default, the latest revision and version are visible within PDM.

NOTE: Where a version/revision is reverted to work in progress and checked out, some user groups will see the latest available version. (E.g. a part is checked out for development, but is used in current products, the OPS team still see the published version)

6.2.3 Security/Permissions

PDM has four specific user groups, plus an administration group.

These groups cover viewers (e.g. ops), approvers, editors and checkers.

PDM allows group-level customisation of view, edit, check in/out and other administrative permissions, based on drawing status.

This allows each drawing status to allow differing facilities based on user responsibility (e.g. drawings that are work in progress are not visible to Ops users, but become visible once released to production).

6.2.4 Naming Conventions

All parts, drawings and assemblies are named using the Project number, and a basic description of the part.

By the end of the workflow, each part is likely to have corresponding drawings, in a variety of formats, with the same name- these are differentiated in PDM by the file extension (i.e. .prt, .drw etc) and it's icon.

6.2.5 Bill of materials/Data Card

The Bill of Materials (BOM) is accessible for all assembly drawings within PDM. The BOM is automatically updated with changes, and it's key feature is to show the quantity and name of all the parts within the assembly. In PDM it has the added feature of providing access via link to each part, search facilities, and filtering based on BIM data within PDM.

The Data Card facility is attached to every part, assembly, drawing or other file, and allows custom reference data to be added. This allows the drawing information to be used for external BIM purposes, and also for filtering when searching. Examples of data available include material, weight, processing requirements and supplier, however custom data fields can also be added on request.

For standard products, the Data Card also contains a 13 digit SKU, which allows integration with the Stock inventory system, and barcodes to be generated.

T: 01777 249080
E: info@aquaticcontrol.co.uk
W: aquaticcontrol.co.uk

Appendix 1- PDM Workflow

Z:\7. Procedures\PDM Workflow Guide.pdf