How are do you select Assessors?

Competencies and all that

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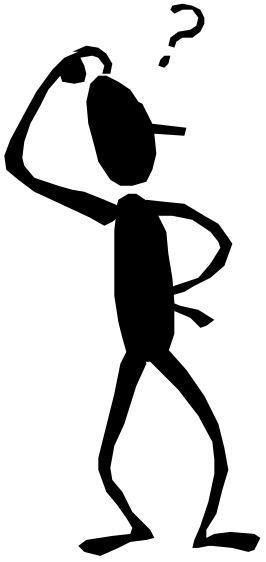
Why am I here?

- Describe the development of the CASS Assessor Competency scheme

- ABB Eutech project management of the CASS Scheme



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Competence

- Why is competence important?
  - Organisations have a corporate responsibility
  - Professional have a personal responsibility
  - Standards such as IEC 61508

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Outline of Presentation

- Scene setting
  - Definitions
  - IEC61508
  - The CASS Scheme
- Development of Assessor competency
  - Workshops
  - IEE/BCS Guidelines

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Outline of Presentation

- **Scene setting**
  - **Definitions**
  - **IEC61508**
  - **The CASS Scheme**
- Development of Assessor competency
  - Workshops
  - IEE/BCS Guidelines

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ABB

Defintions

- Conformity Assessment of Safety-related Systems
- Accredited Certification to IEC 61508

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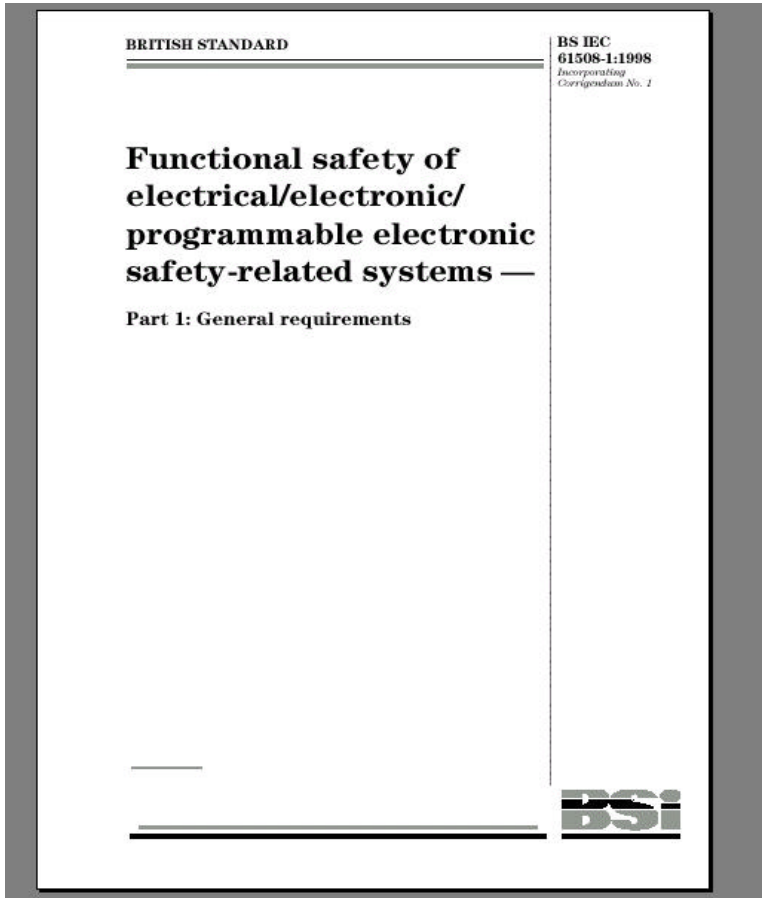
Definitions


BRITISH STANDARD

BS IEC 61508-1:1998
Incorporating Corrigendum No. 1

Functional safety of electrical/electronic/ programmable electronic safety-related systems —

Part 1: General requirements

BSI

- IEC 61508 - Functional safety of electrical/electronic/programmable electronic safety-related systems
- Abbreviated to E/E/PES

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IEC 61508

- Concerned with the performance of E/E/PES safety-related systems

- Where might these systems be found?
  - Process plant - emergency shut-down systems
  - Power stations - boiler management systems
  - Offshore - Fire & gas systems on oil platforms
  - Trains - Railway signalling systems
  - Factories - Machinery guards/access interlocking systems
  - Fairgrounds - roller-coaster control systems
  - Cars - ABS, engine management systems

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IEC 61508

- Why do we need IEC 61508?
  - Rapid development of microprocessor based systems
  - Common approach to design and implementation

- What happens when these systems fail?

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IEC 61508 - example from Process Sector

© ABB Eutech

IEC 61508 - example of Procedure Failure

© ABB Eutech

IEC 16508 - Software Failure

© ABB Eutech

IEC 61508 - ATP System Failure

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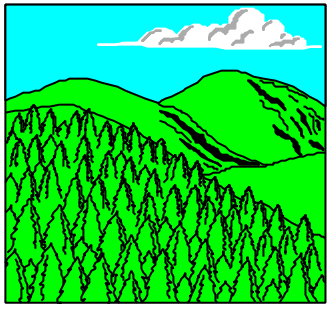
IEC61508 - Scope

E/E/PE safety-related systems

Where failure could have an impact on the safety of

Persons



Environment

And where failure could have

Serious economic implications

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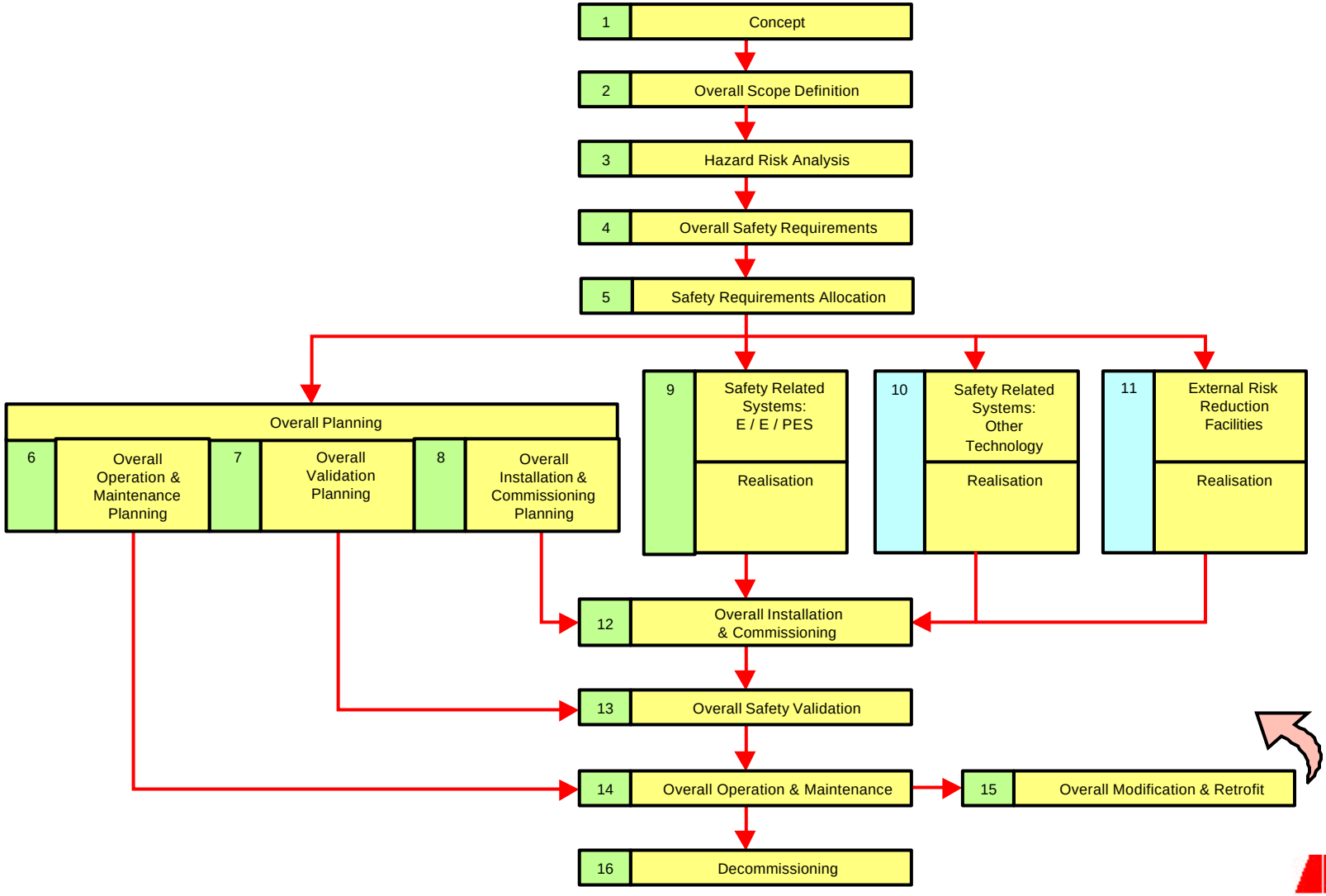
IEC 61508 - Lifecycle



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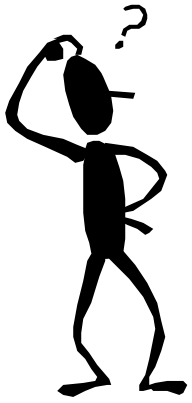
CASS - Convincing others

- Your Organisation
  - How do you convince others that you understand IEC61508 and its requirements
  - How do you show that are capable of operating within the guidelines of IEC 61508



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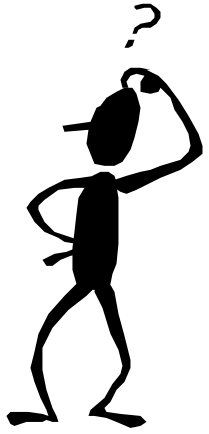
CASS - Convincing You

- Other Organisations
  - How do they convince you that they understand IEC61508 and its requirements
  - How do they show you that they are capable of operating within the guidelines of IEC 61508



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CASS

- Conformity Assessment of Safety-related Systems
- Accredited Certification to IEC 61508

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The CASS Project - Industry Support

- *Stakeholders - Advisory Group*
  - EEMUA, GAMBICA, EIC, MIRA, FIG+, GAMP, CAA, FEI,
  - RIA, UKOOA, MTTA

    Observers
    - HSE, UKAS

  - *Consultative Group*
    - IEE, BCS, ICSE, Hazards Forum, HMRI
    - InstMC, SaRS, IGasE, Inst RSE, IChemE

- *Technical Group*
  - Eutech, CSE, Lloyds Register, NEL, Ideo, CAA, HSE, EECS
  - Honeywell, SI Process Control, ICS Triplex, Rotork, Hima-Sella
  - Yokogawa, Railtrack, Moore, AEA, Praxis, Moore Hamlyn

- *Project Management*
  - Eutech
    - Virkonnen

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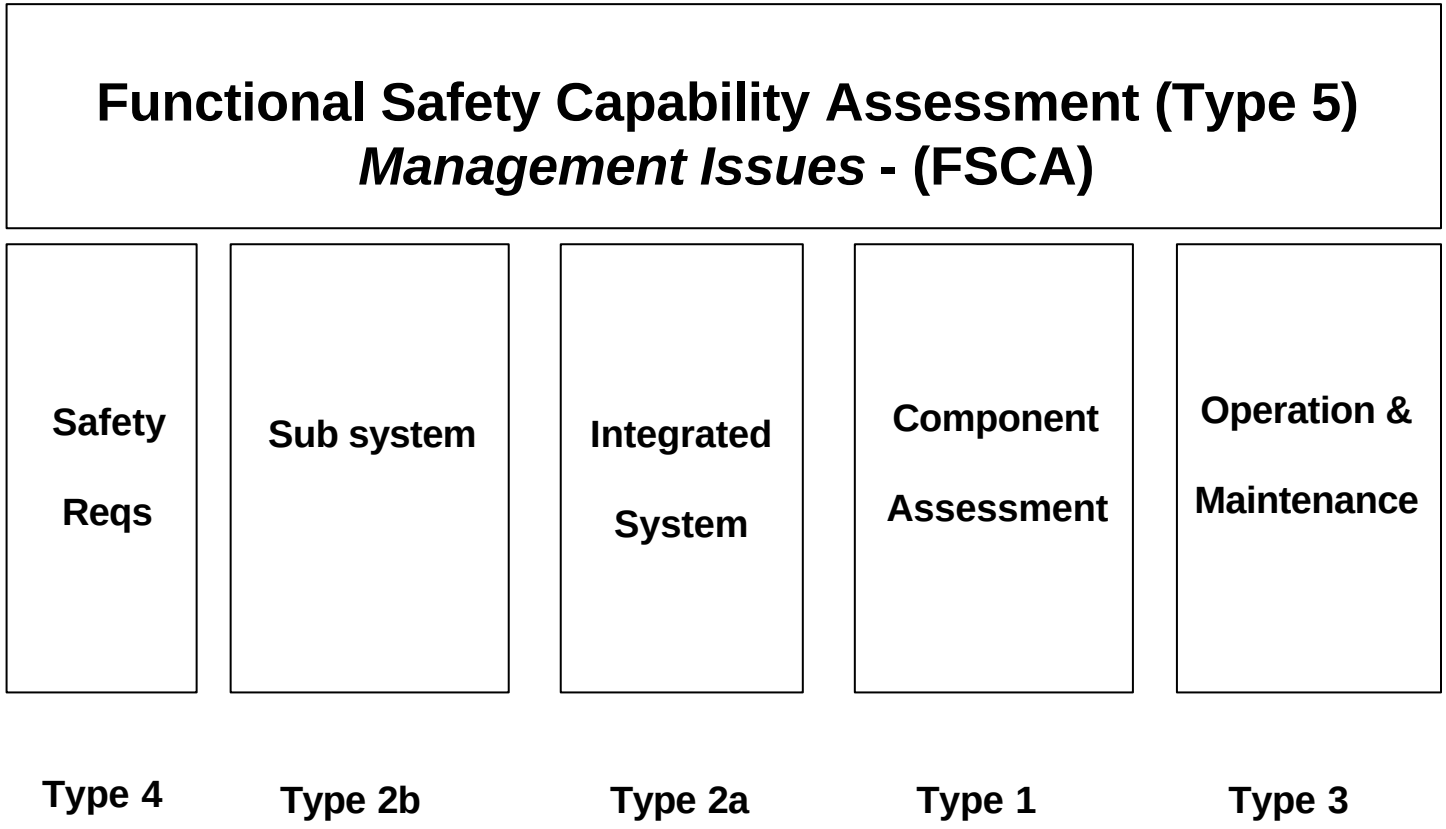
CASS - Assessment Types



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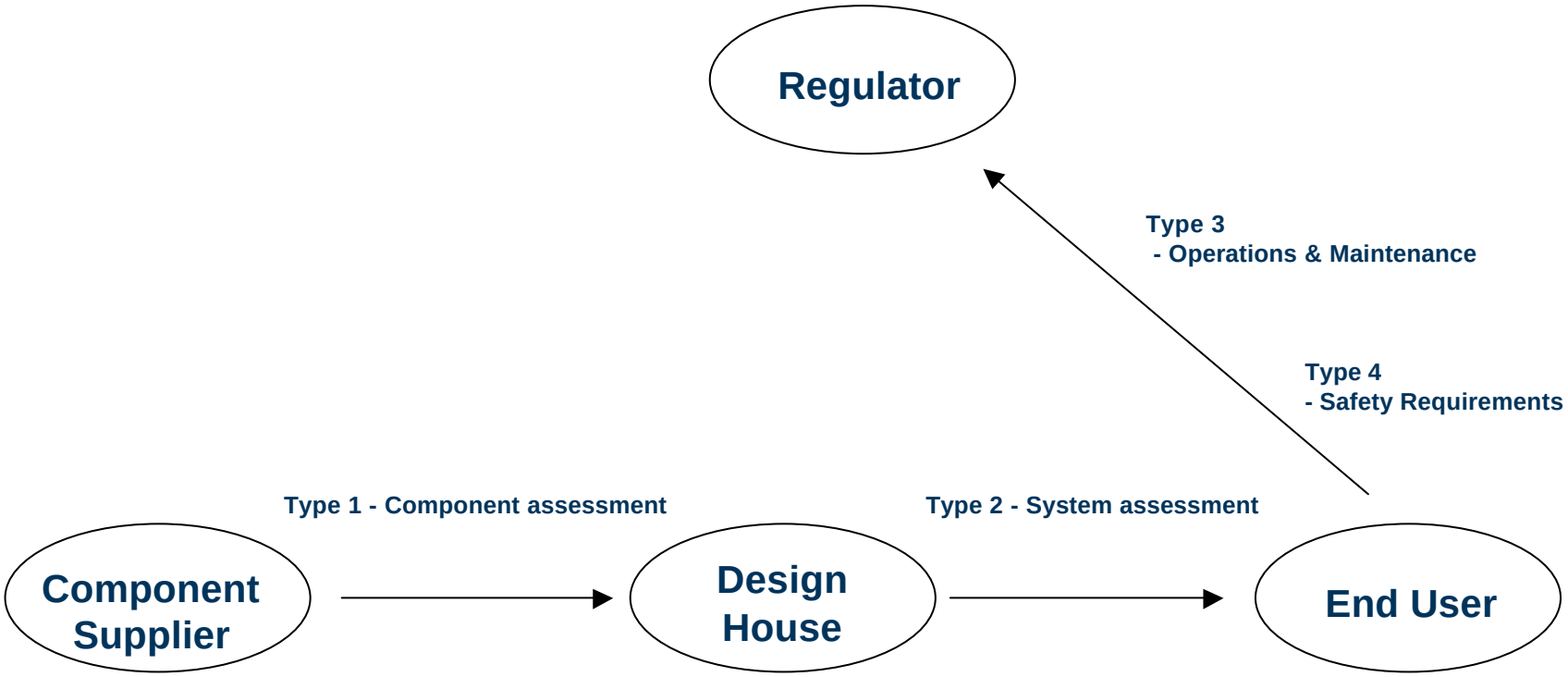
CASS Supply Chain



FSCA is also required by each organisation

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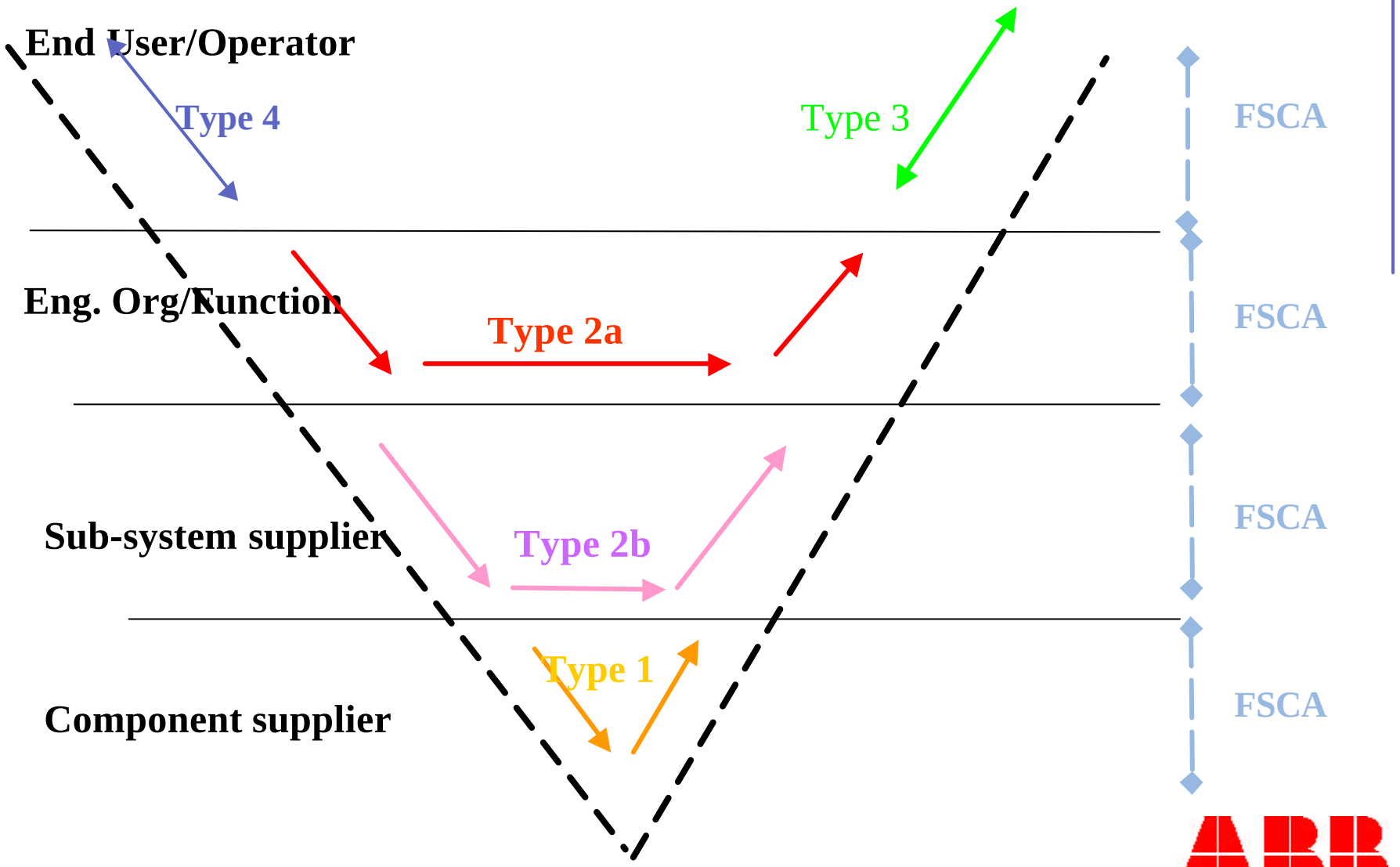
CASS - Supply Chain



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Recap - CASS & IEC 61508

- We have the standard - IEC 61508
- We have a mechanism for measuring compliance - CASS
- How do we select the right people to carry out these independent assessments?
- Hence the need for the CASS Assessor Competency Scheme

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Outline of Presentation

- Scene setting
  - Definitions
  - IEC61508
  - The CASS Scheme
- **Development of Assessor competency**
  - **Workshops**
  - **IEE/BCS Guidelines**

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Assessor Competency

- First meeting to start to develop ideas Oct 1999
- Series of workshops to gain feedback from industry

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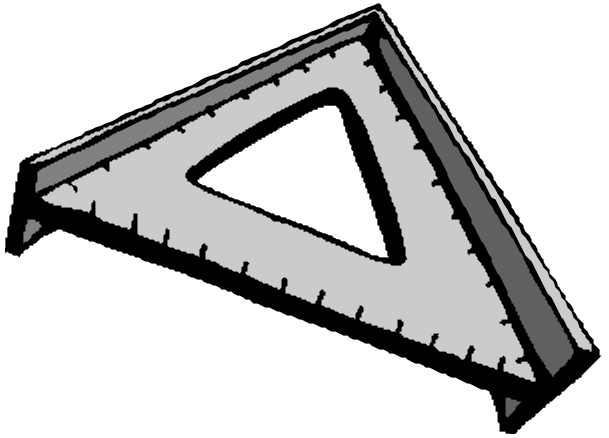
How do you measure competency?

- Assessors
- Different backgrounds
- Different industries
- Different phases of the lifecycle
- All shapes and sizes
- How do we cater for all these?
- Assessor profile - but against what?



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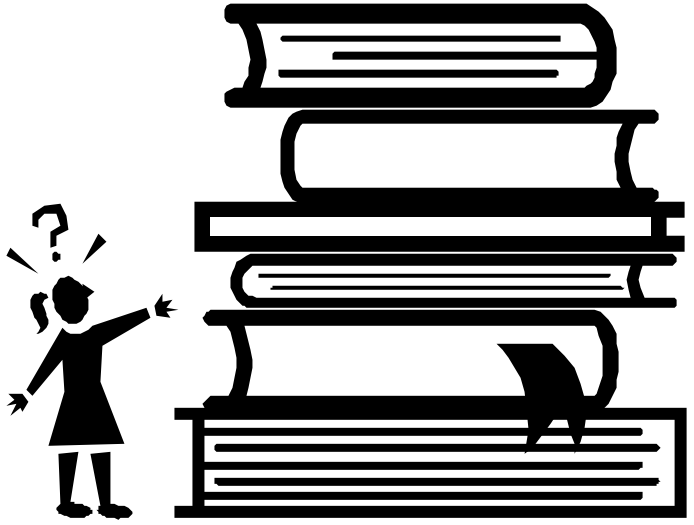
Reference Sources

- IRCA TICKIT scheme - ISO 9000
- BSI C:CURE scheme - BS 7799
- IRSE scheme
- IEE/BCS competency guidelines



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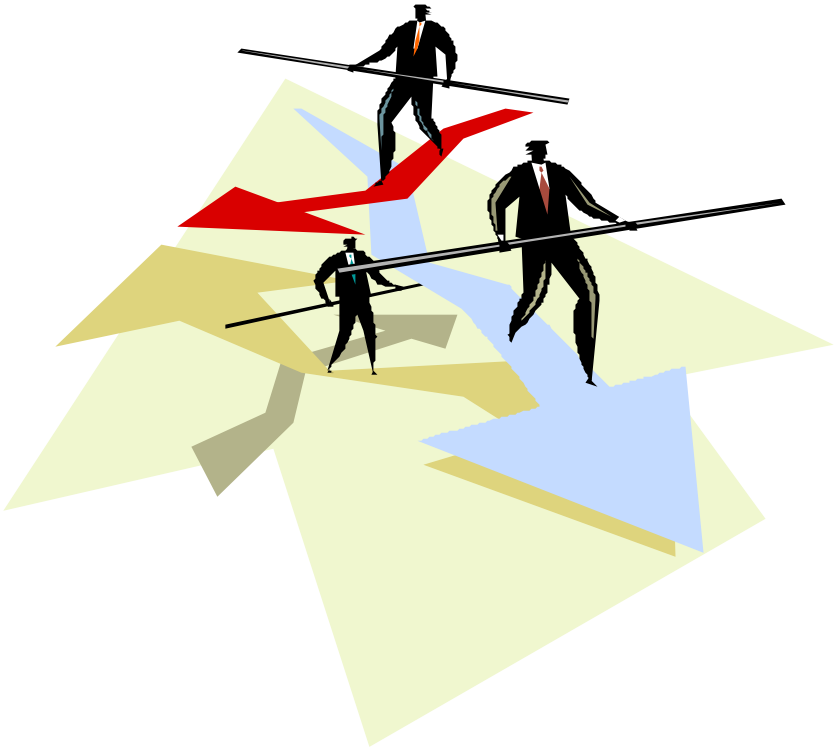
Proposed - Assessor Grades

- Provisional Assessor
- Assessor
- Lead Assessor



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Assessor Grades - structure

Assessor Grade

- Experience
- Competence
- Maintaining Competence

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Requirements by Grade

Competence (1 of 2)

- Have a broad understanding and working knowledge of all aspects of CASS and safety-related systems coupled with possession of at least one area of safety-related systems specialism to substantial depth
- Demonstrate a broad understanding of the range and capability of safety-related systems, safety management systems, and the relationship between hardware and software at all levels
- Be aware of the legal framework associated with safety-related systems
- Under supervision, be able to apply organisational and relevant technical skills to the analysis, examination and validation processes involved in carrying out a CASS assessment across a wide spectrum of organisations of varying size and complexity

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Evidence

- How would you demonstrate your competency against these descriptions?
- How many statements would we need to generate to cover the scheme adequately?
- How would we address areas such as supply chain, industry sector, phases of the lifecycle?

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Number of Assessors

- 3 Assessor Grades
- 5 Assessment Types
- Many different industry sectors

- 3 x 5 x ? = Too many differing grades of Assessor

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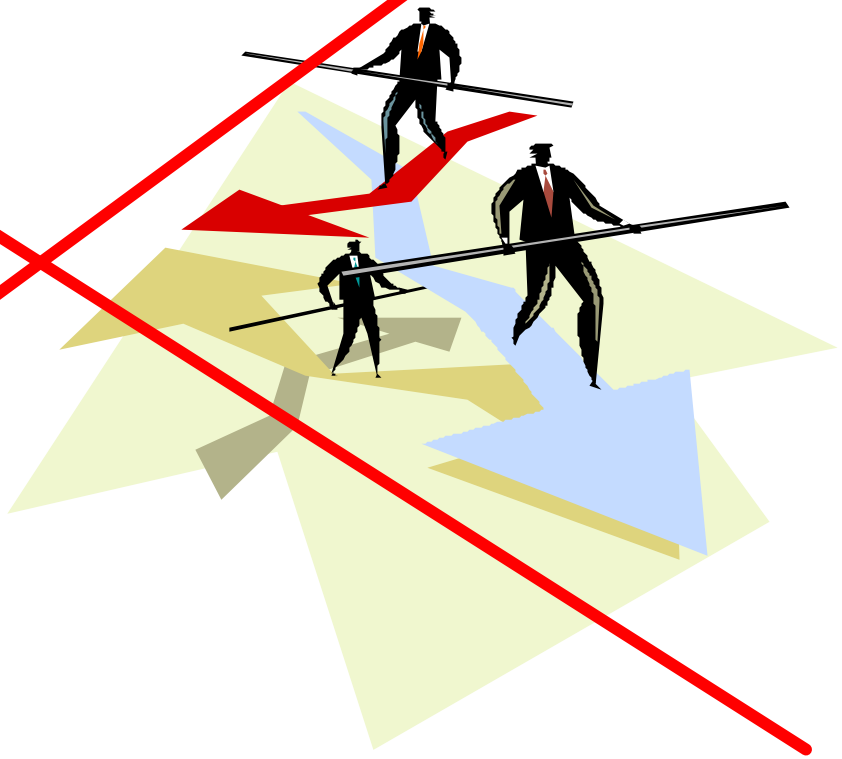
Proposed - Assessor Grades

- Provisional Assessor
- Assessor
- Lead Assessor



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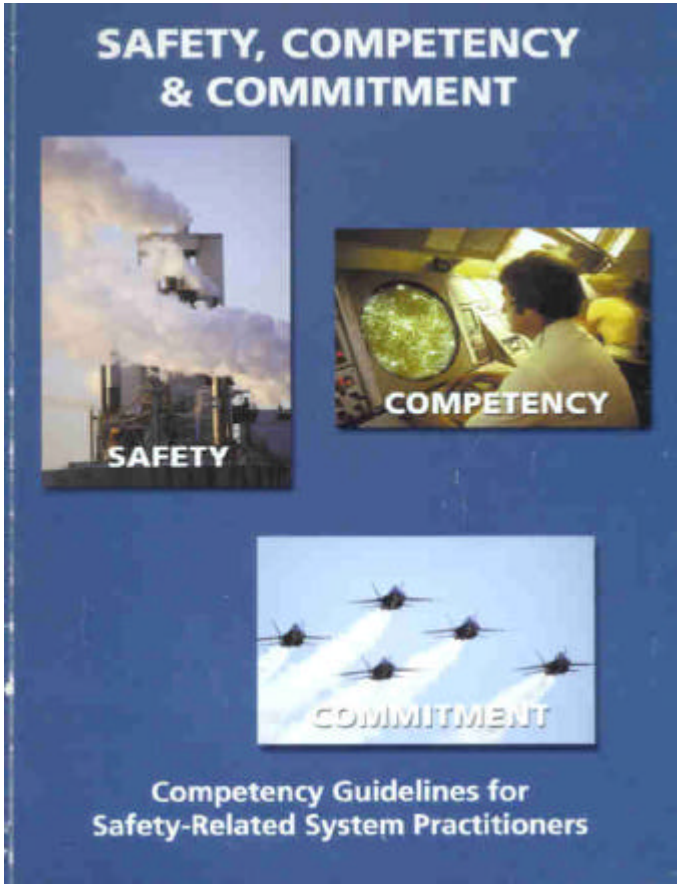
IEE/BCS Guidelines

- IEE/BCS Study - Competency Guidelines for Safety-Related System Practitioners



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IEE Professional Brief

- Competence requires all practitioners to have qualifications, experience, and qualities appropriate to their duties. These include:
  - such training as would ensure acquisition of the necessary knowledge of the field which they are required to perform
  - adequate knowledge of the hazards and failures of the equipment for which they are responsible
  - knowledge and understanding of the working practices used in the organisation for which they work
  - the ability to communicate effectively with their peers, with staff working under their supervision, and with their supervisors
  - an apprecaition of their own limitations and constraints, whether of knowledge, experience, facilities, resources, etc. and a willingness to point these out

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IEE/BCS Guidelines

- www.iee.org.uk/PAB/CompSafe/scc_snip.html
- Help organisations assess competencies of staff working on safety-related systems
- Framework for the development of a competency scheme within an organisation
- Used for company scheme, self assessment, professional development, or an industry wide scheme

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IEE/BCS - 12 Functions

THE SAFETY FUNCTIONS	CODE
Corporate Functional Safety Management	CFM
Human Factors Safety Engineering	HF
Independent Safety Assessment	ISA
Project Safety Assurance Management	PSM
Safety Hazard and Risk Analysis	HRA
Safety Requirements Specification	SRS
Safety Validation	SV
Safety-Related System Hardware Realisation	SHR
Safety-Related System Architectural Design	SAD
Safety-Related System Maintenance and Modification	SRM
Safety-Related System or Services Procurement	SRP
Safety-Related System Software Realisation	SSR

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IEE/BCS - Competencies

Competencies	Safety Hazard and Risk Analysis
TASK-RELATED	
Defining the scope of a hazard and risk analysis	HRA1
Identifying hazards	HRA2
Hazard analysis	HRA3
Risk assessment	HRA4
Eliminating or mitigating hazards	HRA5
Formation and control of hazard log	HRA6
FUNCTION-RELATED	
Principles of functional safety assurance	HRA7
Application domain knowledge	HRA8
Systematic approach	HRA9
Systems viewpoint	HRA10
Professional standing and personal integrity	HRA11
Team-working	HRA12

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IEE/BCS - Competency statements

HRA3 Hazard analysis		
Analyses whether a hazard can be caused by the behaviour of the safety-related system and how a hazard might lead to an accident by: • systematically deriving, collecting and analysing relevant information in determining hazardous system behaviours • analysing the operation and maintenance aspects of the system • determining and analysing accident sequences		
Supervised Practitioner	Practitioner	Expert
Can describe the range of hazard analysis techniques normally employed within the organisation or industry sector. Given a typical project scenario, is able to select an appropriate set of hazard analysis techniques.	Can illustrate, through hazard analysis reports, how the relevant hazard analysis techniques have been correctly employed. Can justify the use of selected hazard analysis techniques by correctly referencing relevant standards and information regarding the capabilities of the organisation.	Can illustrate project situations in which the selected hazard analysis techniques were not appropriate to the specific requirements of a project. Can illustrate, through hazard analysis review procedures, how actions have been taken to ensure that the appropriateness of selected hazard analysis techniques is adequately considered.
Has successfully performed review work requiring a high degree of conceptual thinking.	Has analysed hazardous event sequences using conceptual thinking and can illustrate this by reference to hazard analysis reports and related system documentation.	
Can describe the role of operators and maintainers in typical safety-related systems developed or operated by the organisation.	Can illustrate, through hazard analysis reports, how human factors have been addressed in the performance of hazard analysis activities.	Can illustrate the importance of paying sufficient attention to human factors issues in hazard analysis activities. Can show the actions which have been taken (e.g. development of hazard analysis procedures, organisation of training courses, recruitment of human factors specialists) to ensure human factors issues are addressed properly.

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Competency Functions

- C1 Corporate Functional Safety Management (CFM)
- C2 Project Safety Assurance Management (PSM)
- C3 .Safety-Related System Maintenance (SRM)
- C4 Safety-Related System Procurement (SRP)
- C5 Independent Safety Assessment (ISA)
- C6 Safety Hazard and Risk Analysis (HRA)
- C7 Safety Requirements Specification (SRS)
- C8 Safety Validation (SV)
- C9 Safety-Related System Architectural Design (SAD)
- C10 Safety-Related System Software Realisation (SSR)
- C11 Safety-Related System Hardware Realisation (SHR)
- C12 Human Factors Safety Engineering (HF).

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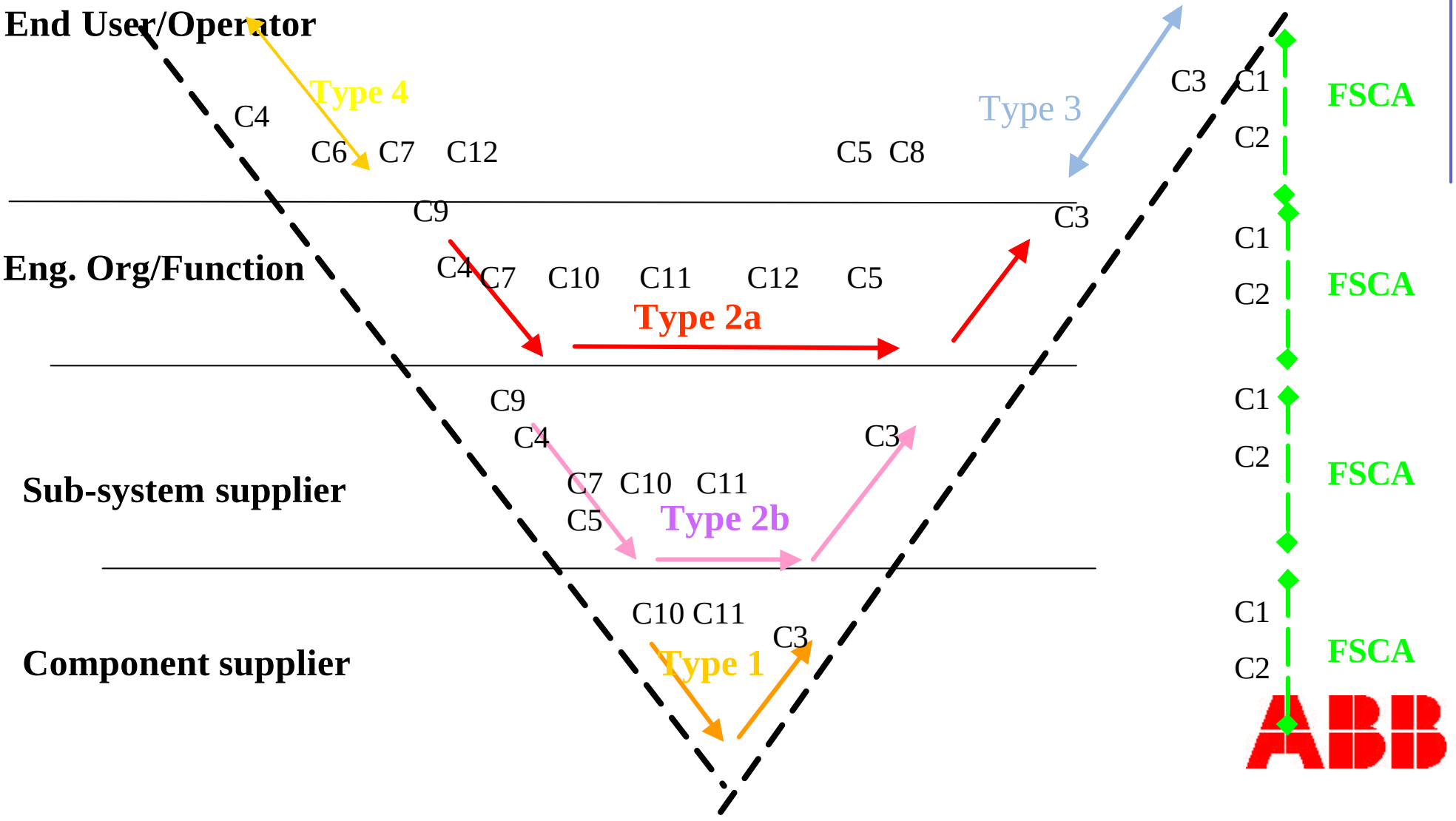
CASS Supply Chain



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Common - Competency Functions

- C1 Corporate Functional Safety Management (CFM)
- C2 Project Safety Assurance Management (PSM)
- C3 .Safety-Related System Maintenance (SRM)
- C4 Safety-Related System Procurement (SRP)
- C5 Independent Safety Assessment (ISA)
- C5 Independent Safety Assessment (ISA)
- C6 Safety Hazard and Risk Analysis (HRA)
- C7 Safety Requirements Specification (SRS)
- C8 Safety Validation (SV)
- C9 Safety-Related System Architectural Design (SAD)
- C10 Safety-Related System Software Realisation (SSR)
- C11 Safety-Related System Hardware Realisation (SHR)
- C12 Human Factors Safety Engineering (HF).

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Common Functions - ISA/CFM Levels

Levels	CFM 1	CFM 2	CFM 3	CFM 4	CFM 5	CFM 6	CFM 7	CFM 8	CFM 9	CFM 10	CFM 11	CFM 12	CFM 13	CFM 14	CFM 15
Super.	√	√	√	N/A		√	√	N/A						√	
Pract.					√				√	√	√	√	√		√
Expert															

Levels	ISA1	ISA2	ISA3	ISA4	ISA5	ISA6	ISA7	ISA8	ISA9	ISA 10	ISA 11	ISA 12	ISA 13	ISA 14	ISA 15
Super.	√	√	√			N/A			N/A					√	
Pract.				√	√		√	√		√	√	√	√		√
Expert															

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CASS Assessor scheme model

- One grade of assessor
- IEE/BCS key reference document
- Interview panel
- Operate within a defined scope
  - Industry sector(s)
  - IEC 61508 Lifecycle phase(s)
  - SIL

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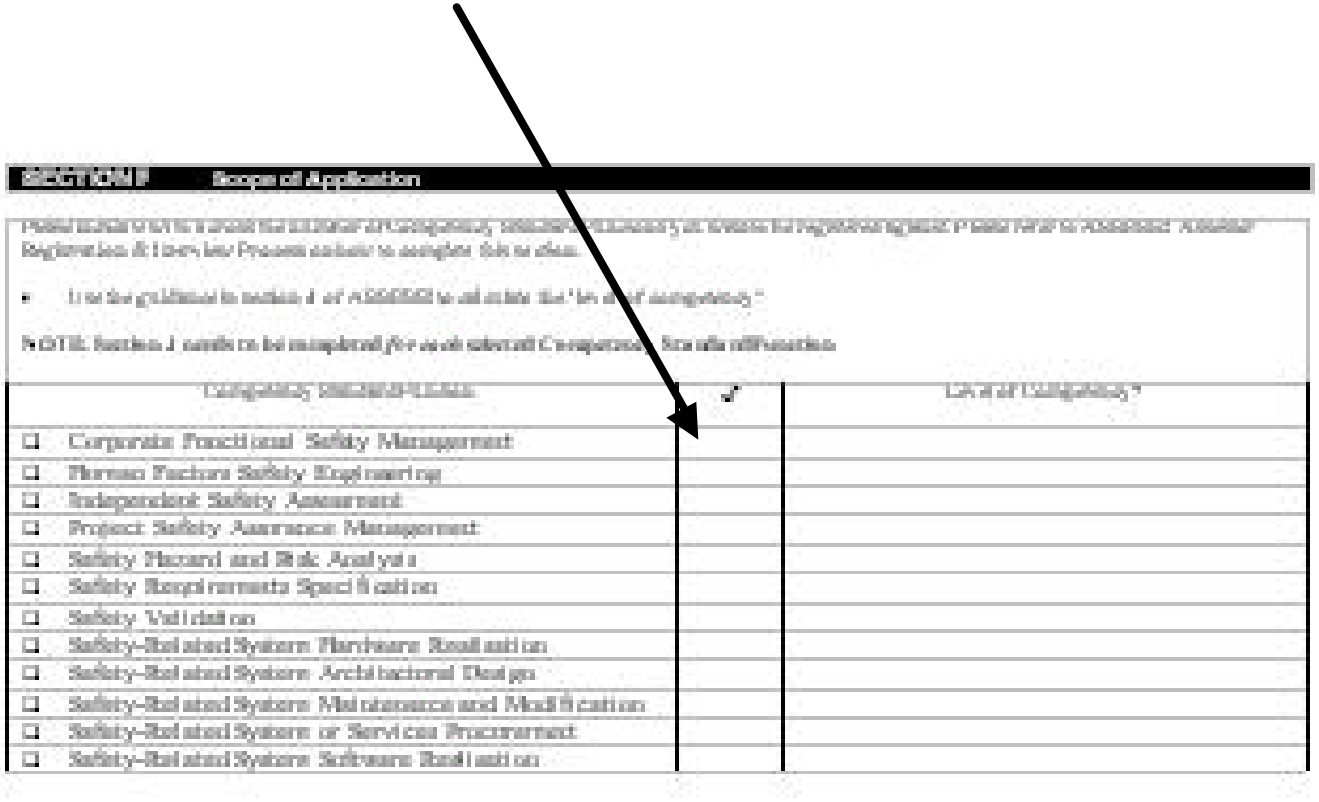
CASS Application form

Select from the 10 safety functions the functions you wish to claim for your CASS registration



	✓	
☐ Corporate Functional Safety Management		
☐ Human Factors Safety Engineering		
☐ Independent Safety Assessment		
☐ Project Safety Assurance Management		
☐ Safety Hazard and Risk Analysis		
☐ Safety Requirements Specification		
☐ Safety Validation		
☐ Safety-Related System Hardware Realisation		
☐ Safety-Related System Architectural Design		
☐ Safety-Related System Maintenance and Modification		
☐ Safety-Related System or Services Procurement		
☐ Safety-Related System Software Realisation		

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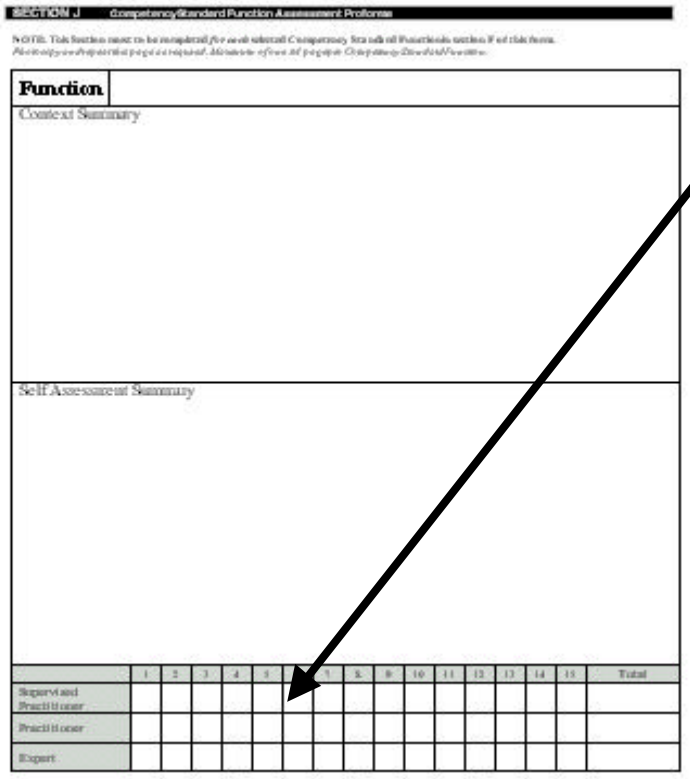
CASS Application Form

For each function, complete the profile and evidence to support your claim



Function	
Context Summary	
Self Assessment Summary	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Supervised Practitioner																
Practitioner																
Expert																

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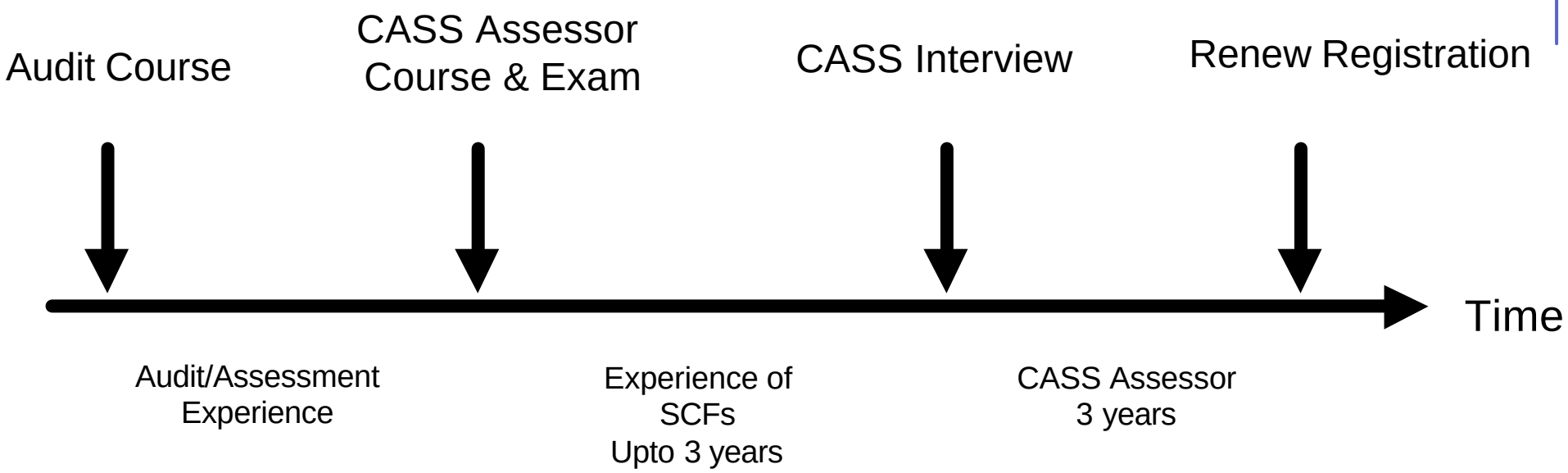
CASS Assessor - Application Process



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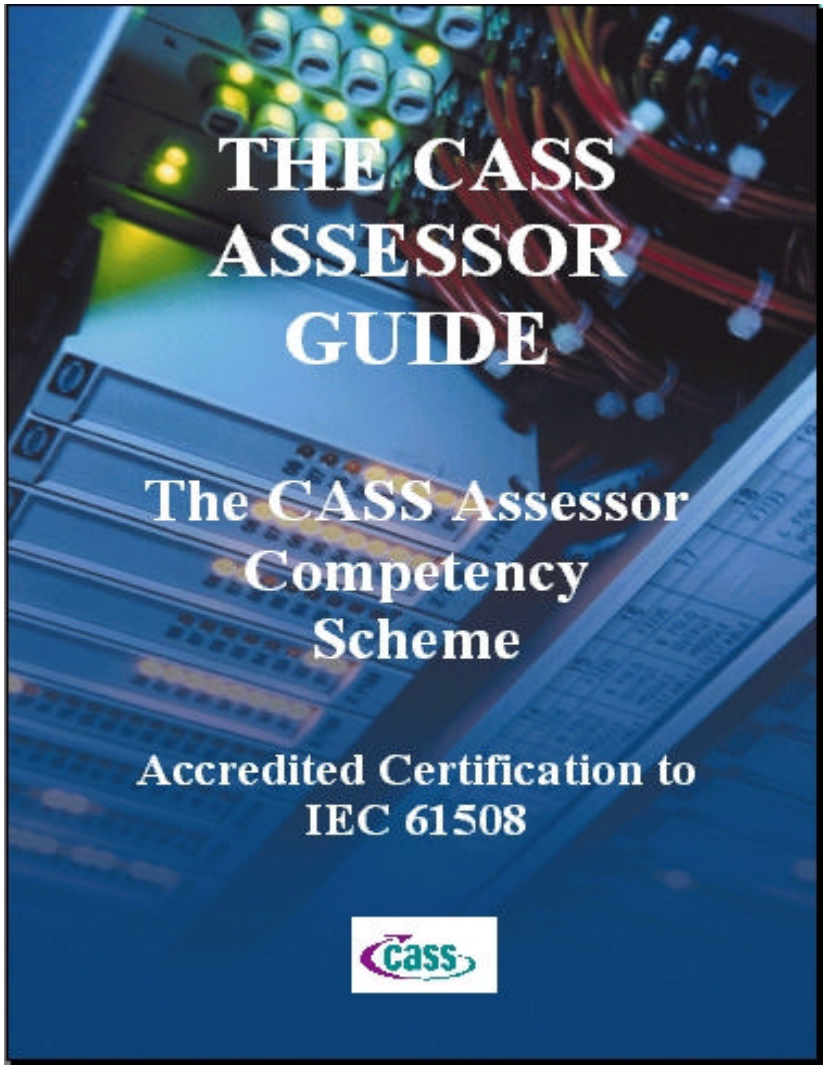
CASS Guide - www.cass.uk.net



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CASS Assessor’s Certificate

CERTIFICATE OF REGISTRATION

as a

CASS ASSESSOR

This is to certify that

XXX XXX

has been assessed by The CASS Scheme Ltd and has satisfied the requirements of the CASS Assessor Competency Scheme as specified in Issue 1.1 of the CASS Assessor Guide.

The scope of registration is defined in the attached schedule

Certificate Number:
Date of initial registration:
Date of certificate reissue:
Renewal due:

Director

The use of this certificate is subject to the conditions specified in the CASS Assessor Guide.

page 1 of 2 pages

The CASS Scheme Ltd
Post House - South Hl - Chatham - Kent ME7 5EF - UK

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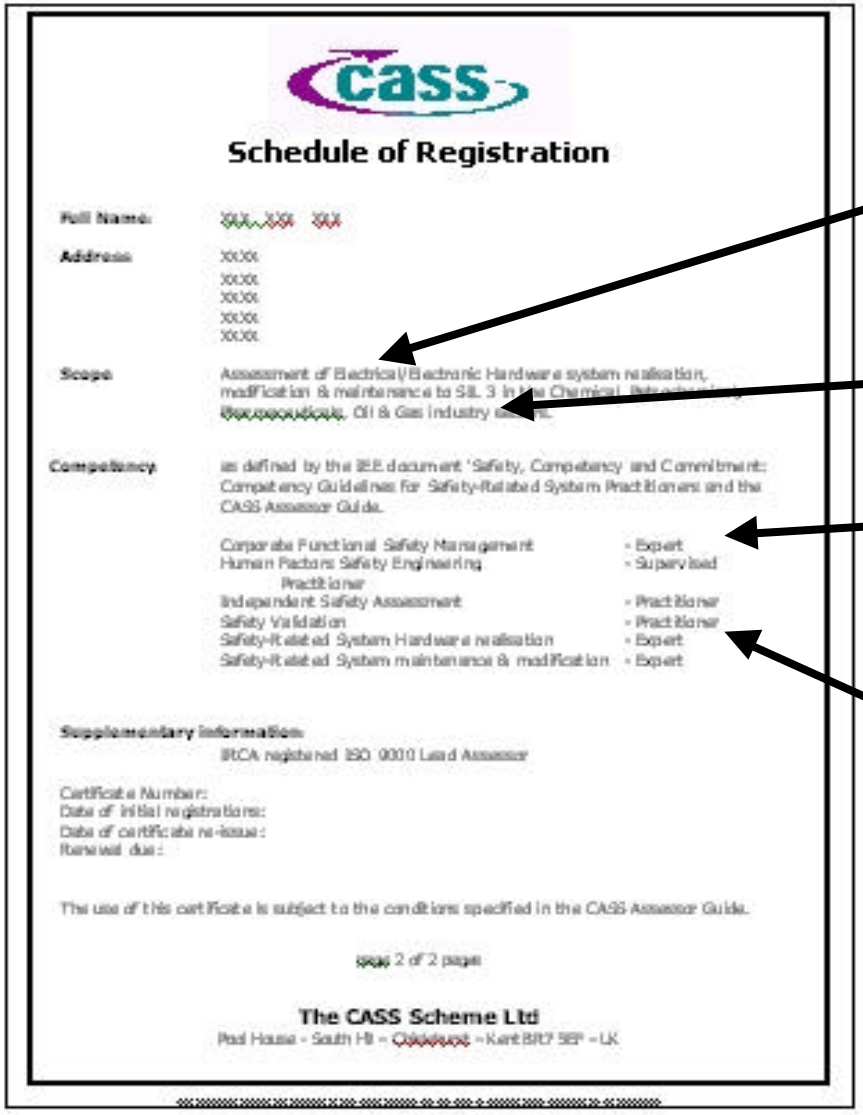
CASS Assessor's Certificate



cass

Schedule of Registration

Full Name: XX, XX XX

Address: XXX
XXX
XXX
XXX
XXX

Scope: Assessment of Electrical/Electronic Hardware system realisation, modification & maintenance to SIL 3 in the Chemical, Petroleum, Petrochemical, Oil & Gas industry sectors.

Competency: as defined by the IEE document 'Safety, Competency and Commitment: Competency Guidelines for Safety-Related System Practitioners and the CASS Assessor Guide.

Corporate Functional Safety Management	- Expert
Human Factors Safety Engineering	- Supervised Practitioner
Independent Safety Assessment	- Practitioner
Safety Validation	- Practitioner
Safety-Related System Hardware realisation	- Expert
Safety-Related System maintenance & modification	- Expert

Supplementary Information:
IRCA registered ISO 9001 Lead Assessor

Certificate Number:
Date of initial registration:
Date of certificate re-issue:
Renewal due:

The use of this certificate is subject to the conditions specified in the CASS Assessor Guide.

page 2 of 2 pages

The CASS Scheme Ltd
Peel House - South Hill - Chislehurst - Kent BR7 5EP - UK

Lifecycle phase

Industry sector

Two required functions

Remaining selected functions

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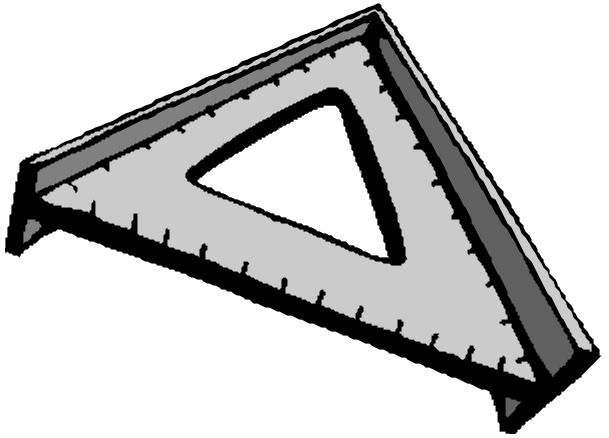
ABB

How do you measure competency?

- ✓ Assessors
- ✓ Different backgrounds
- ✓ Different industries
- ✓ Different phases of the lifecycle
- ✓ All shapes and sizes
- ✓ How do we cater for all these?
- ✓ Assessor profile - but against what?



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Conclusions

- Seek many sources of help
- Seek advice from piers
- Keep it simple

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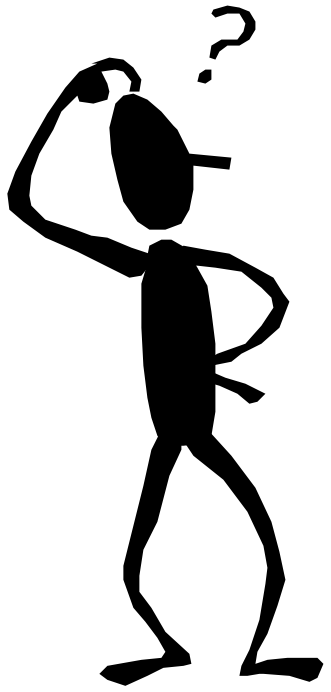
Thank you

- Any questions?



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