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Approach to codes and standards in the UK

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Structure of presentation

- Approach to codes and standards
- Safety Assessment Principles
- Gaining confidence in codes
- Conclusions

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SFAIRP and codes and standards

- ONR's role is to confirm the licensee is controlling risks So Far As Is Reasonably Practicable (SFAIRP)
  - Equivalent to **A**s **L**ow **A**s **R**easonably **P**racticable
- The licensee is expected to establish and/or use relevant good practices (RGP) and standards
- If these are not sufficient the onus is on the licensee to implement measures to the point where costs of further measures are disproportionate to the risks they would reduce

Non prescriptive regulation

- ONR does not approve or specify nuclear codes and standards
- It is for the licensee (or GDA Requesting Party) to choose the standards and justify that they are RGP
  - But ONR provides advice to support uncertainty and guidance on our expectations
- Important RGP comes from the IAEA and the Safety Reference Levels from WENRA
  - There are also many other sources of RGP as outlined later

Relevant Good Practice

- **Relevant Good Practice (RGP)** is those standards for controlling risk which have been **judged and recognised by ONR** as satisfying the law, when applied to a particular relevant case in an appropriate manner
- **RGP** is the starting point in any ALARP demonstration:
  - Focus on appropriate engineering, operations and management of safety
  - Defence-in-depth / hierarchy of control measures:
    - **1** Prevent the hazard → **2** Protect → **3** Mitigate

Sources of RGP

- Guidance in Approved Codes of Practice (ACoP)
- Current UK engineering standards
- Standards and guidance documents from international bodies
- ONR Safety Assessment Principles (SAPs)
- ONR Technical Assessment Guides (TAGs) and ONR Technical Inspection Guides (TIGs)
- Practice on similar facilities

Evolution of RGP

- RGP is not static
- New RGP → ONR specialism → TAGs → SAPs
- However, there is a benefit for the design referential of a new plant to be frozen before start of construction and/or detailed design
  - There are challenges if reference codes and standards keep changing
  - Small changes can be picked up by periodic safety review (PSR) arrangements
- But, if the codes and standards related to the civil design are 20 years old at the start of construction, they could be 100+ years old at the end of life!

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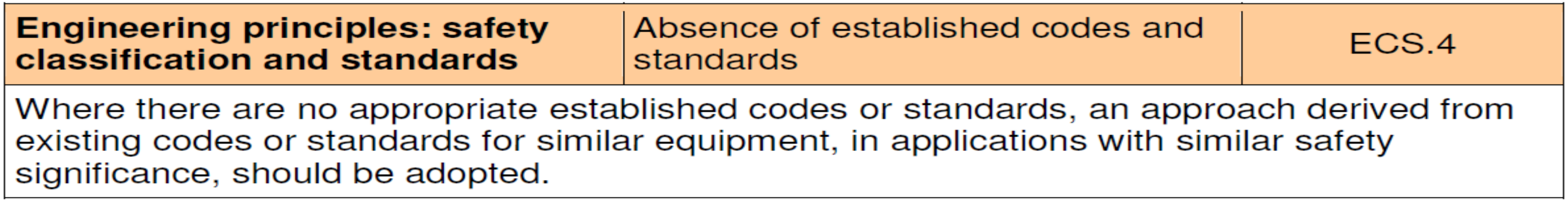
SAPs codes and standards

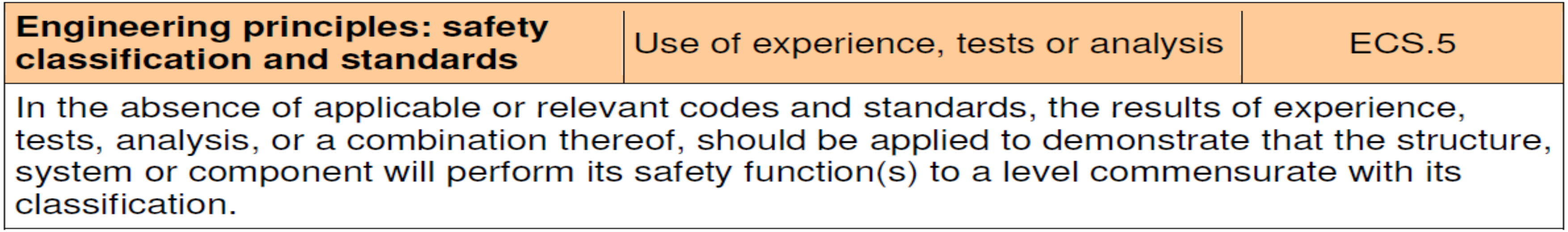
Engineering principles: safety classification and standards	Codes and standards	ECS.3
Structures, systems and components that are important to safety should be designed, manufactured, constructed, installed, commissioned, quality assured, maintained, tested and inspected to the appropriate codes and standards.		

- Guidance is provided in paragraphs 169 to 173 of the SAPs
  - Appropriate nuclear industry-specific, national or international codes and standards should be adopted for **Class 1 and 2** structures, systems or components
  - For **Class 3**, if there is no appropriate nuclear industry-specific code or standard, an appropriate non-nuclear-specific code or standard should be applied instead

SAPs codes and standards



Engineering principles: safety classification and standards	Absence of established codes and standards	ECS.4
Where there are no appropriate established codes or standards, an approach derived from existing codes or standards for similar equipment, in applications with similar safety significance, should be adopted.		



Engineering principles: safety classification and standards	Use of experience, tests or analysis	ECS.5
In the absence of applicable or relevant codes and standards, the results of experience, tests, analysis, or a combination thereof, should be applied to demonstrate that the structure, system or component will perform its safety function(s) to a level commensurate with its classification.		

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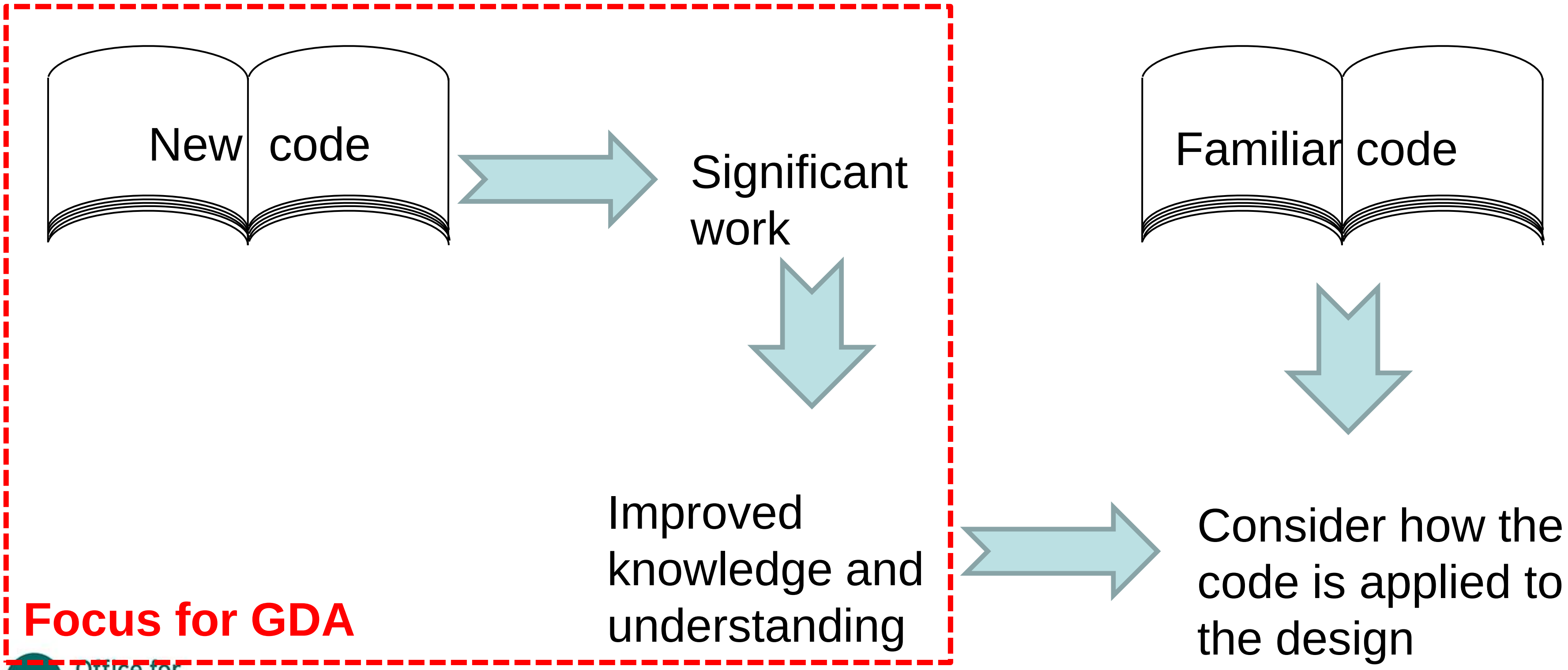
Unfamiliar codes

- Challenge for a non-prescriptive regulator when it comes to assessing designs from a range of countries and designers is the introduction of new and unfamiliar codes
- While we do not approve any codes we need to be confident that our SAPs and RGP are being met
  - Focus is on equivalent outcomes
- As our knowledge and confidence of a code increases so will our confidence in its use in the UK

Gaining confidence in codes



New code

Significant work

Improved knowledge and understanding

Focus for GDA

Familiar code

Consider how the code is applied to the design

Gaining confidence in codes

- For the first GDAs ONR had significantly more knowledge of US based codes
- For those designs based on US codes ONR only had to focus on application of the code
- Significant more work for the GDA based on non-US codes
  - ONR did not have the level of confidence we needed in these codes

Gaining confidence in codes

- Is it a code for nuclear applications (safety class 1 or 2)?
- Is it a nationally or internationally approved code?
- Is it an in-house code developed by the designer? If so what independent checks and challenges have been applied?
- Is the code unambiguous so that a consistent design will be obtained by different users?
- Does the code incorporate another country’s legal requirements which will not apply in the UK?
- Does the code give similar results to a code we are familiar with?
- Are the results of the code acceptable?

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Conclusions

- ONR is a non-prescriptive regulator
- We do not recommend or approve codes and standards
- The licensee selects the appropriate codes and standards
- Where we are familiar with a code we will challenge its application
- Where we are unfamiliar with a code we will challenge both the code and its application

Thank you