

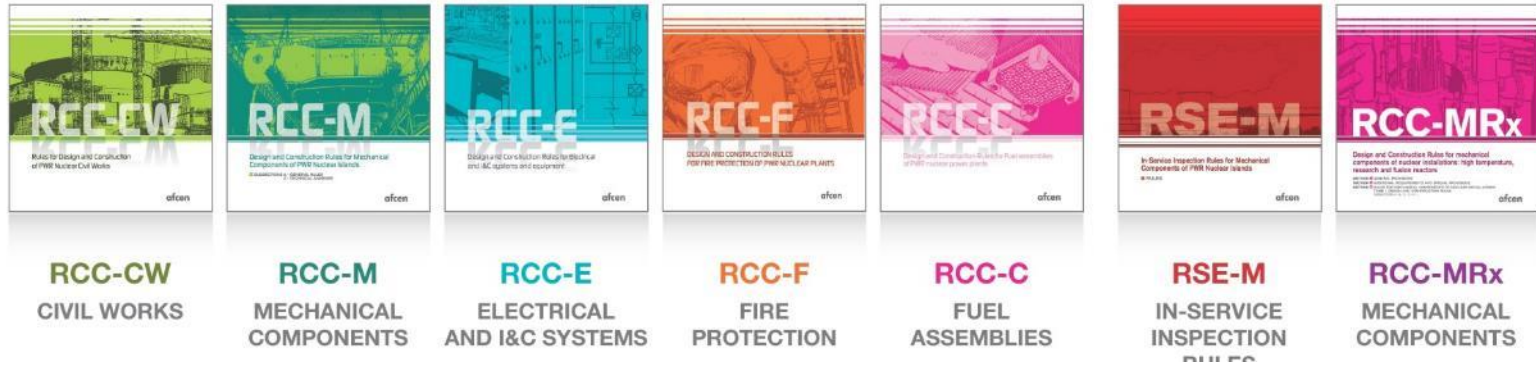


AIEA Technical Meeting on Codes & standards for SMR,

AFCEN insight on SMR
May 10 – 13 2022

Bruno MARQUIS , AFCEN deputy general secretary

- ❖ AFCEN is an international association (40 years of existence): Members (about 70 in 2022) are companies involved in the nuclear industry, with activities related to the technical fields covered by AFCEN codes
- ❖ Our mission: Develop and provide codes and reference documents offering accurate and practical rules for the design, construction and in-service inspection for Nuclear facilities
- ❖ Our Ambition: to provide reference nuclear codes in Europe, chosen around the world for their guarantee of safety and their effectiveness in standardizing industrial practices and building on feedback.
- ❖ Our values: Collaboration, Expertise, Accountability



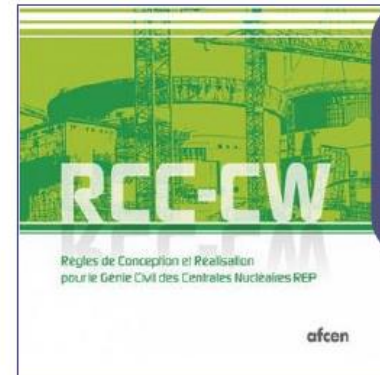
- ❖ AFCEN codes are referenced in several nuclear projects in Europe : EPR projects OL3 (Finland), HPC (UK), EPR2 (France) ; research reactor MYRRHA (Belgium), ITER (France), RJH (France)
- ❖ AFCEN Codes have been accepted by 3 European Regulators (ONR, STUK, ASN) and also NNSA (Chinese Nuclear regulator)
- ❖ AFCEN Codes include appendices to meet European Directives (PED...) and country specific legislation as necessary (ESPN, FR/UK Fire regulations...)

- ❖ AFCEN Codes have a solid European foundation, as mainly based on ISO, IEC and EN/Eurocodes



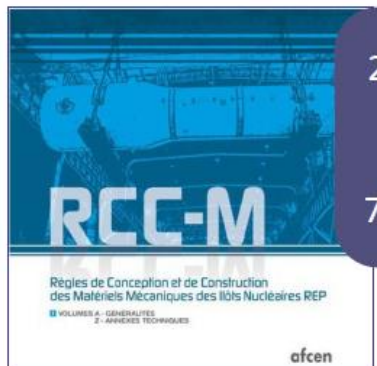
82 referenced Standards

87% CEI & ISO



393 referenced Standards

88 % CEN & ISO



230 referenced Standards

72% CEN & ISO

3 major AFCEN nuclear codes are mainly based on ISO and EN standards

- ❖ AFCEN is active in several initiatives fostering harmonisation or developing approaches to facilitate equivalence between Codes & Standards for safety classified SSC, at the European level and beyond
- ❖ CEN Workshop 64 (Europe)
 - Workshop held under the umbrella of European Committee for Standardisation
 - Involving various European stakeholders (utilities, vendors, suppliers, engineering, Regulators and Technical Support Organisations, research institutes, SDO)
 - Assessing requirements and rules in AFCEN codes, taken as a reference to discuss the opportunities for harmonisation considering the variety of industrial and regulatory practices across Europe for the assessment of new build projects and LTO demonstration of existing plants
 - Raising proposals for Code Evolutions to AFCEN and for Research & Development to EC
 - Expected benefit: a common set of reference codes and guidelines would facilitate the work performed by regulators to consistently assess projects based on various standards
 - Phase IV of CEN/WS 64 to be launched in 2023, with possible consideration of SMR topics

- ❖ HARMONISE Euratom project (Europe)
 - Harmonisation of licensing procedures, C&S for future fission and fusion plants (include SMR)
 - Project approved in February 2022, AFCEN involved in WP4 on Codes & Standards
 - Expected benefits on the implementation of a performance-based regulatory approach using desired and measurable outcomes, and on the harmonisation and standardisation of component assessments, methodologies and C&S.
- ❖ Board of Standards Developing Organisations (SDO) for mechanical equipment
 - Sharing insights on SDO rules and development programme
- ❖ Interactions with WNA/CORDEL/MCSTF (industry forum)
 - Reviewing CORDEL/MCSTF reports on comparison of rules and recommendations for harmonisation involving AFCEN (e.g. fatigue life analysis, non-linear analyses)
- ❖ Interactions with OECD/NEA/CNRA/WGCS (Regulators forum)
 - Giving occasional technical insight on AFCEN rules (e.g. on Technical Qualification)

- ❖ Agreement set up between AFCEN association and NUWARD
 - To assess the suitability of AFCEN Codes and the need for adaptation to meet NUWARD™ requirements and specificities
 - To perform comparison studies with other standards and assess the impact on NUWARD™ design
 - Covering mechanical components, civil structures, electrical and I&C systems and equipment, fire protection arrangements
 - Activities beginning in 2022, with a first assessment of the suitability of AFCEN RCC-E Code on electrical and I&C systems and equipment

Perspectives with other SMR project developers:

- ❖ Licensing an SMR product or component is easier and more robust if it is based on nuclear code and not on a project specification.
- ❖ It is difficult to find in current nuclear codes the codified design and manufacturing items that meet the needs of SMR developers: all codes have limitations.
- ❖ Developing codes to meet Project needs is a core issue of the AFCEN development plan. Tools are available:
 - Join CEN/WS64 to express codification needs, as SCK CEN did for MYRRHA
 - Contact AFCEN to assess the adequacy of the current codes to the SMR product you developed, and to identify what deserves additional codifications, as NUWARD did
 - Then, participate in codification within AFCEN to ultimately serve the ambitions of the project

A few messages to IAEA:

- ❖ Few nuclear codes to comply with the diversity of SMR designs, of national regulations and of industry practices (their harmonization being out of reach)
- ❖ Difficult and expensive for a project to satisfy multiple codes & standard with a unique and standardized product
- ❖ Acceptance of several Codes and Standards in a country should be an international target endorsed by IAEA
 - How about IAEA defining tools, processes for code evaluation under IAEA umbrella and controlled by WENRA and other Nuclear Safety Authorities. It should ease final recognition.