OPERA & MET-CERTIFIED PROJECTS

real world experience of application of the IEC standards

Technical Note

Workshop at the All Energy 2019 conference, Scottish Event Campus (SEC) in Glasgow

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1. INTRODUCTION

A workshop on the application of International Electrotechnical Commission (IEC) standards was organised as part of two EU funded projects OPERA and MET-CERTIFIED. It was held in the Scottish Event Campus (SEC) in Glasgow and was a side event for the All Energy 2019 conference. Both the OPERA and MET-CERTIFIED projects have been applying the IEC standards to real world wave and tidal energy offshore deployments.

Led by TECNALIA, OPERA project objectives are to collect, analyse and share open-sea operating data and experience to validate and de-risk the following industrial innovations for wave energy, taking them from TRL3-4(1) to TRL5(1) and opening the way to long term cost-reduction of over 50%. Within the project, one work package was aiming at applying IEC technical specifications:

- 62600-10 Moorings
- 62600-30 Electrical power quality requirements
- 62600-100 Power performance assessment
- 62600-102 Power performance assessment at a second location
- 62600-101 Wave energy resource assessment procedure compared

MET-CERTIFIED aims to accelerate the adoption of insurable and bankable tidal power projects in the 2 Seas region through the development of internationally recognised standards and certification schemes. The key objectives are:

- Development of tidal energy specification and certification schemes by testing their practicality and providing feedback.
- Design, build and certify a state-of-the-art Universal Floating System (UFS) for tidal turbines.
- Dissemination of results, and provision of recommendations to the European Commission.
- Collaboration between the Interreg 2 Seas region for tidal energy, with international outreach.

MET-CERTIFIED is contributing to both conformity assessment and technical committees within the International Electrotechnical Commission (IEC). The expectation is that mature standards and certification schemes will come into play in support of IEC developments for marine energy converters over the next few years.

This workshop is part of the dissemination and communication activities of both projects. It consisted in a description of IEC standards, of both projects involved, the technical specifications used in these projects and feedback to IEC from experience gained in both projects.

24 persons registered and attended this workshop. In order to increase the dissemination impact, this report aims at sharing the outcomes of the workshop to all stakeholders with interest in the application of IEC standards on open-sea operation of ocean energy devices.

2. SHORT PRESENTATIONS OF SPEAKERS

The following speakers were involved in the workshop:

- **John Griffiths, European Marine Energy Centre**: John is a chemical engineer, with over 40 years experience, including 30 years in the offshore industries, as a General Manager, Consultant, Project Manager and Engineering Manager as well in a range of Operational and Technical roles. John acted as non-Executive Director of EMEC from the company being established until 2017, and now provides consultancy support on various projects.
- **Peter Scheijgrond, Dutch Marine Energy Centre**: Chairman of the Dutch mirror committee for IEC TC114 and co-convenor in the IECRE Working Group on Scope of Certification
- **Prof Lars Johanning, University of Exeter**: Leading the Offshore Renewable Energy group at the University of Exeter and has led the development of the Falmouth Bay marine energy test site. He provides expert advice within the mooring standard committee to the IEC/TC114.
- **Dr James Kelly, University College Cork**: James is an Electrical Engineering in University College Cork. He is working as a researcher in marine renewable energy at UCC and has been in the field since 2009. James is also an advising technical expert to IEC/TC114 for both the power quality (TS30) and power performance (TS100) standards.
- **Dr David Crooks, University of Edinburgh**: David is a mechanical engineer in the University of Edinburgh and specialises in the physical and numerical modelling and analysis of wave energy converters. David works on the development of techno-economic models of wave energy converters, their components and arrays. David also evaluates the socio-economic impacts of marine renewable energy deployments; their impacts on regional GVA and job creation.
- **Florent Thiebaut, University College Cork**: Florent is an Engineer in renewable energy technologies. He is a senior Project and Testing Engineer on physical testing of Offshore Renewable Energy systems at University College Cork. Florent is leader of the work package 5 in the OPERA project, which is focused on Applicability and Extension of IEC Technical Specifications

3. WORKSHOP OVERVIEW

3.1 SCHEDULE

The initial workshop schedule is shown in the table below.

Start time and speaker	Presentation / Breakout Session
14:00 Peter Scheijgrond (DMEC)	Workshop Introduction
14:15 John Griffiths (EMEC)	Introduction to IEC Standards • The IEC and the development of standards for the ORE Industry in general • The current state of standards and certification for tidal and wave energy • Project financing and the relevance of certification
14:45 Peter Scheijgrond (DMEC)	Documented application of International Standards. Experience in the MET-CERTIFIED • A high-Level overview of MET-CERTIFIED • An in depth look at how the MET-CERTIFIED project is applying and contributing to the development of standards
15:05	Breakout Session 1: Barriers to the practical application of standards • Groups form and each group is tasked with identifying the barriers to applying the standards to the wave and tidal sector • Discussion of results
15:40	Coffee Break
15:55 Florent Thiebaut (UCC) David Crook (UEdin) James Kelly (UCC) Lars Johanning (UExe)	Documented application of International Standards. Experience in the OPERA Projects • A high level overview of OPERA • An in depth look at how the OPERA project is applying and contributing to the development of standards ◊ TS100/102 ◊ TS30 ◊ TS10
16:20	Session 2: Mini-Test Case • Each group selects a technology & defines the role that certification plays in accessing finance/business risk reduction • Discussion of results
16:55 Peter Scheijgrond (DMEC)	Concluding remarks and networking

3.2 INTRODUCTION

After a short welcoming and an introduction of the workshop schedule and objectives by Florent Thiebaut, Peter Scheijgrond started the workshop with a round table, asking each participant and speaker to introduce themselves and their area of work. This is logged in the table below and highlights a variety of work area for the development of technology and standards.

Test facilities	Certification body
• Fast Blade • Exeter • UCC – MaREI • EMEC	• Loyd's register • NSAI
Technology Developpers	Consultants:
• Resolute Marine Energy (WEC) • Nautricity (TEC) • QED naval (TEC) • Marine Power Systems (WEC) • Nova (TEC) • Trafalgar (materials)	• Renewable dynamics • ORE. Glas. • Xodus • Wave Canundrum • BME consulting • Wave venture

3.3 PRESENTATIONS

Presentations were given on the following topics:

- Introductions to IEC standards
- Introduction to MET-CERTIFIED feedback from application of IEC standards
- Introduction to OPERA feedback from application of IEC standards

Presentations were shared with all attendees after the workshop

3.4 BREAK-OUT SESSION: IEC PROS AND CONS

A breakout session was organised where the attendees and speakers were split in 3 groups, each one asked to discuss pros and cons of IEC certification. Results from each group is listed below.

Group 1 (Pros):

- Trusted independent body approval making it easier to finance and insurance

- Removes ambiguity in design
- Turns technology into a product
- Identifies concerns and remedial actions for the next stage (feed-forward)
- Provides industry credibility
- Delivers a more reliable technology
- Safety provision
- Comparison between various technologies
- Provides convergence of technologies
- Helps to identify potential deployment sites
- Common framework for the technology
- Good source of information for the developers – best practice

Groupe 2 (Pros)

- Keeping jobs
- Investors / government confidence
- Independent verification / insurance
- Guidance for good practice
- Insure confidence
- Recognition of industry practice
- De-risking
- Avoid or reduce catastrophic failure
- Marketing tool
- International commercialisation

Group 3 (Cons)

- Costs (short term)
- Delay to installation
- Perceived complexity
- Learn more by doing
- Already covered elsewhere
- Risk to intellectual property
- Not compulsory, don’t do it
- Is it a universal certification?
- Competitor input
- Quality of standards / certification

4. ATTENDEES FEEDBACK

At the end of the workshop, each attendee and speaker were asked to give feedback on the workshop. Overall feedback, written or during discussions after the workshop, was very positive. All feedback received are listed below:

Workshop:

- More time to complete all tasks and presentations would be good
- Presentations were clear and very interesting
- Good open discussions
- Opera presentations not focused enough on IEC but very interesting
- Introduction of all attendees at the start was interesting
- Flow of the workshop was good, excellent moderator and well-prepared presentation
- Participants felt engaged and involved throughout
- Please consider making the event a full day
- Good overall level of detail
- Should not be using plastic water bottles
- Good structure taking through elements
- Good breakout session but session 1 came before OPERA presentations where real examples could have informed discussions
- Good mix of materials
- Informative and pitched at a good level
- Enjoyed networking with people in industry and OPERA project
- Nice mix of expertise
- More time for technical content
- Excellent overall
- Focus of the second part was too technical and should have focus on how OPERA will feed into standards development
- Good level of engagement in the presentations
- Good coordination between the 2 projects
- Good to see real data and feedback from real experience

IEC standards

- Interesting to see how standards are being tested on devices
- Would like to know how much of the feedback these project influences the next round of IEC
- Very useful to hear feedback from workers and developers in the field
- Use a project like MaRINET to provide some of the expensive equipment required to follow the standards

- Clear and useful presentation of the process required for certification
- Good to have a more direct feed back process in comparison with older concepts
- Feedback on standards was super, both met-certified and EMEC
- It would be great to have DNVGL / Lloyds revisions presented at an event
- Not enough information on “what’s next”
- Tidal should be better represented in standard presentation
- Check out innovation vs certification: innovation-policy.org.uk
- Good experience of technical difficulty implementing TS100 power performance, both technically and cost
- When going to an open ocean grid connected test facility (eg. EMEC) should they or the developer implement TS100 and TS30?
- the finance, investor, insurance industries should be asked about the influence of certifications in choosing projects
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