



Electrical and Instrumentation Applications & Automation

FINAL PROGRAM

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Conference Site

Hilton Antwerp Old Town
Groenplaats 32, 2000 Antwerp - Belgium
Phone: +32 3 204 12 12

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PCIC Europe Mission

To provide an international forum in the heart of the major source of petroleum products for the exchange of electrical and instrumentation applications technology relating to the petroleum and chemical industry, to sponsor appropriate standards activity for that industry, and to provide opportunity for professional development.

PCIC Europe Strategies

1. The PCIC Europe Annual Conference will be held in locations of industry strength, and its location will be rotated annually in an effort to attract national and international participation.
2. PCIC Europe will proactively promote participation by a broad base of PCIC Europe representatives, with an emphasis on both younger and senior engineers.
3. Attendees will be encouraged to participate in technical activities including authorship of papers and participation in IEC standards development including IECEx.
4. The quality of PCIC Europe papers is essential for the PCIC Europe mission and is given highest priority. Application oriented papers are given priority.
5. The technical content of the PCIC Europe Annual Conference will be continuously evaluated and updated to reflect the evolving needs of the industry.
6. Participation of users, manufacturers, consultants and contractors will be encouraged in the activities of PCIC Europe to strengthen the conference technical base.
7. PCIC Europe will offer tutorials directed towards enhancing the technical, communication, and interpersonal skills of petroleum and chemical industry engineers.

Welcome to Antwerp!



Dear conference attendees,

The Petroleum and Chemical Industry Committee (PCIC) Europe is carefully selecting its knowledge sharing venue cities. We try to be in the vicinity of chemical industrial production locations to attract local engineers and by choosing a different city each time expand our attendee's network. Antwerp is the major hub for many downstream chemical companies. The Chemical, Oil and Gas industry in Antwerp can be found at the harbors of the River Schelde. Please visit <http://www.portofantwerp.com/nl/feelthechemistry>, which gives you a flavour of the importance of the Antwerp harbour for the global chemical industry.

Last year I mentioned that the oil price at that time was at a level that requires the European COG industry to consolidate. The price has raised since, but is not at a level yet to decide on large project developments. The papers submitted for this year's Antwerp conference have a high focus on improvements of existing assets with respect to cost, effectiveness and efficiency. The 2018 main theme is:

Life cycle management and value optimization of electrical systems in petrochemical, oil and gas industry

Did you have a look at PCIC-Europe web page on LinkedIn? You will find some video recordings that address the main vision for PCIC-Europe and especially this year's knowledge sharing event in Antwerp. We will continue with the Mobile Phone App "Event Mobi", which was a great success in Vienna. We have even extended the possibilities. The conference record book does not contain a CD anymore. You can now download the papers from the Event Mobi website if you have registered for PCIC-Europe Antwerp.

To a large extent the success of this knowledge sharing event still depends on the networking advertisement. Many end-users don't know PCIC-Europe and feedback received last year from newcomers learned that they are surprised about the quality of the presentations and network opportunities. Therefore I repeat my call on the Electrical Equipment Manufacturers and Electrical Service Providers, because you have the closest contacts with the end-users and with your positive voice about the Vienna content and networking opportunities, PCIC-Europe with Antwerp and future events will continue to provide this knowledge sharing platform.

PCIC-Europe has a code of conduct that all participants, sponsors, authors and committee members acknowledge by registering for our events. With this code we demonstrate the priority of ethical behaviour and focus on technical content regardless of origin. The content of papers is free of commercialism, but we also acknowledge that PCIC-Europe does not exist if part of its income is generated through sponsorship. Every company can apply for sponsorship and depending on the level, gets privileges in return, like a foyer booth to create visibility which supports getting into contact with attendees.

Finally, I'm very thankful to the Local Committee. Thanks for all the details they have been taken care of and it is because of their teamwork that we join today in this European centre of the chemical industry and I assure you that they have done the utmost to create a comfortable and enjoyable environment for knowledge sharing and networking.

Welcome to Antwerp

Peter Pieters
Chair PCIC Europe

The 2018 PCIC Europe technical program



Dear attendees,
Welcome to Antwerp and to PCIC Europe.

We have a strong theme to the conference this year - Life cycle management and value optimisation in the petrochemical, oil and gas industry. While anyone of us might be hard pressed to come up with a short definition of what this means, we all recognise it when we see it in practice, whether it is in the use of simulation techniques for design of drive systems to the use of data to model and predict failure modes of ageing assets.

I do encourage you to attend the day one tutorials. We have diverse subjects ranging from some of the most mature, well developed technology to the range of equipment and systems we will all be embracing as the connected future unfolds. As an example, we have a tutorial on transformer operation, monitoring and troubleshooting when applied to the production-critical facilities that we all recognise.

Connectivity as a concept is so important that alongside specialist topics we have deliberately chosen papers and presentations where there is a large overlap between the tradition domains of Control & Automation and Electrical. Closer integration and optimisation of this interface will be key as we seek to develop, engineer, construct, commission and operate the facilities of the future.

Digitalisation is the Buzzword of these days, the border between the tradition domains of Control & Automation and Electrical will blur away. We will see a seamless integration between electrical and automation equipment in the mutual evolution of technologies. In a tutorial, we shall conclude on the potential of the Industrie 4.0 architecture for more efficient processes in the Oil & Gas business as well as in the Petrochemical sector.

The rapid growth and use of modern Information and Communication Technologies (ICT) in process plants has changed our security dramatically. For our process asset and the economy, the digital cyber security has become vital importance. Papers in this conference will deal with this topic and show, how to create a secure environment for our ICT, it ensures that possible threats cannot lead to failure or misuse of the ICT.

We are dealing with facilities where health, safety and the environment rightly have the highest priority and are everyday issues which require attention - from the early phases of a project through to operation of ageing assets. We have a tutorial on the implementation of a safety process control system and another on safe operation of electrical systems and equipment.

We have plenary sessions with a wide range technical content, aimed at a broad cross-section of the attendees, with the intent to inform and provoke discussion. Parallel sessions are arranged so that papers with common themes are presented as far as possible in one room for the convenience of presenters and attendees.

In the following pages you can find details of our technical programme complete with short abstract summaries of the individual sessions to help you plan your PCIC Europe experience.

As I mentioned before, connectivity is also a major aim of this conference. Please take opportunity to ask questions, meet with the presenters, authors, exhibitors and conference organising committee. We are happy to discuss your ideas to contribute to the future conference events and welcome your input: What subjects would you like to see more of? Would you like a new or different subject to be covered?

Lastly, a reminder that PCIC Europe depends upon contribution from attendees, including preparation and presentation of papers. If you have an idea for a future contribution, please contact any member of the organising committee; we are happy to discuss and help.

We look forward to the success of PCIC Europe and the engaged discussion with you.

Paul Donnellan
PCIC Europe Vice Chair
(Technical Chair, Electrical)

Diedrich Thaden
PCIC Europe Vice Chair
(Technical Chair, Automation)

www.pcic-europe.com

15th Annual PCIC Europe Conference 2018 in Antwerp

Dear guests,



On behalf of the local committee, **"Welkom in Antwerpen"**.

Following on from Vienna in 2017, Antwerp is as last year's city rich in culture and one of Europe's major industrial centers. It is Belgium's second largest city, and plays the role of the unofficial capital of Flanders owing to its geographic location in the Dutch-speaking part of Belgium.

Excavations have shown that Antwerp was inhabited since the Gallo-Roman period in 2nd or 3rd century A.D. The city has grown up around two establishments: The 'Aanwerps' and the 'Caloes'. 'Aanwerp' means alluvial mound and therefore the city got the name Antwerp.

Antwerp is now home to the second largest port in Europe and its petrochemical industry is second only to Houston, Texas.

Antwerp is known as the world center of diamond trade, its volume being by far the largest in the world. In the 16th century, the city was the main commercial center of Western Europe and flourished culturally with painters such as Rubens, Anthony Van Dyck, Jordaens and Teniers, the printers Plantin and Moretus, and the famous Antwerp harpsichord builders. Churches, museums and historical buildings bear the witness to this golden age.

Culinary specialties include: Belgian chocolate of the finest quality, we hope you enjoy our networking event with the renowned chocolatier Dominique Persoone. Antwerp and Belgium in general is very well known for their high quality chocolate. They have the biggest collection of different designs of chocolate moulds, and customers travel from all over the world to experience this chocolate empire. Another culinary tradition in Belgium is beer brewing. Belgium has a long tradition for brewing beer, and due to many years' experience Belgium is today a global exporter of beer, some of which you can experience at the networking event Tuesday evening.

We hope you will take the time to enjoy the amazing city of Antwerp.

The Local Committee PCIC Europe 2018

Jeremy Andrews – Chair | Alexandra Soares | Sinéad Fraher | Peter Klerkx | Jan Verstraten | Werner Joosens | Thibaut Jouvét | Paul Donnellan | Bert Engbers

Hotel floor plan

Conferences room: Belle Epoque, Tiffany, Sancy

Coffee break and sponsors table: Foyer

Lunches: Teun & Lun



Hospitality Suites

WEG: June 4th, 5th and 6th – Shah Room

Dialight: June 6th – Nassak Room

Panduit: June 5th, 6th and 7th – Koh-I-Noor Room

QHi: June 4th, 5th and 6th – Hope Room

ABB: June 5th and 6th – Florentine Room

HVPD: June 4th, 5th, 6th and 7th – Groenplaats 1 Room

CG Power System: June 4th – Groenplaats 3 Room

Etap: June 6th – Groenplaats 3 Room

Zone Atex (Stahl): June 5th, 6th and 7th – Carrat Room

SCHEDULE AT A GLANCE

Monday June 4th, 2018

18:00 / 21:00	Registration
18:00 / 0:00	Hospitality suites are open

Tuesday June 5th, 2018

Time	Belle Epoque	Tiffany	Sancy
08:45 / 10:15		Tutorial EUR18_13 Our Electrical people work and switch safely and we know it...	Tutorial EUR18_35 - Standards review in connection with Industrie 4.0
10:15 / 10:45	Coffee (Foyer)		
10:45 / 12:15		Tutorial EUR18_25 Transformers: Engineered Products - You Get What You Specify, Not What You Want	Tutorial EUR18_18 PAS IEC 63131 System Control Diagram
12:15 / 13:15	Lunch (Teun + Lun)		
13:15 / 13:30	Notices		
13:30 / 14:15	Plenary EUR18_03 Power Interconnection between two existing deepwater FPSOs - a key enabler		
14:15 / 15:00	Plenary EUR18_14 Cyber Security in Energy Automation		
15:00 / 15:30	Coffee (Foyer)		
15:30 / 16:15		EUR18_11 First global IEC/IEEE standard for generator cb's ...and how it changes the game	18_01 Asset Assessment Method in a MV Predictive Model to estimate the Asset Status
16:00 / 18:15	Hospitality suites are open		
18:30 / 19:00	Keynote speech		
19:00 / 22:00	Networking Social event at Hilton Antwerp Old Town		
20:30 / 0:00	Hospitality suites are open		

Wednesday June 6th, 2018

Time	Belle Epoque	Tiffany	Sancy
08:30 / 09:15	EUR18_12 Lowering the Total Cost of Ownership of Lighting and Improving Safety at Hazard	EUR18_26 Ferroresonance Measurements and Modeling - A Waveform is Worth a Thousand Words	EUR18_20 On line Power System Management
09:15 / 10:00	EUR18_17 Main Electro-Mechanical Design and Tests Challenges for Large E-LNG LCI System	EUR18_16 Reliability Improvement of Refinery Plants, Transient Stability Analysis Approach	EUR18_08 Technology Readiness Level: IEC61850 in Oil & Gas Applications
10:00 / 10:30	Coffee (Foyer)		
10:30 / 11:15	EUR18_09 Monitoring and control devices: The way to improve efficiency and reliability	EUR18_22 MV Cable Life Cycle Management	EUR18_19 The Impact of Scada Protocol Choice on Pipeline Monitoring and Decision Making
11:15 / 12:00	EUR18_23 Plant-wide autosynchronization, based on IEC 61850 and protection relays	EUR18_32 On-Line PD Condition Monitoring Strategies For Oil and Gas HV Asset Optimisation	EUR18_38 Asset Management Solution
12:00 / 13:00	Lunch (Teun + Lun)		
13:00 / 13:45	EUR18_30 MV motors started with auto-transformer	EUR18_31 Back-to-back test for large synchronous motors	EUR18_21 Improved reliability in substations with IEC61850 in a chemical plant in Spain
13:45 / 14:30	EUR18_24 Simulation of variable speed drive systems in oil gas applications	EUR18_15 Active Harmonic Mitigation – What the Manufacturers Don't Tell You!	EUR18_34 Standard devices vs IEC 61508 SIL safety devices Integration in process industry
14:30 / 15:00	Coffee (Foyer)		
15:00 / 15:45		EUR18_04 Digital Twins for Large Electric Drive Trains	EUR18_39 Process efficiency based on future energy management requirements
16:00 / 0:00	Hospitality suites are open		

Thursday June 7th, 2018

Time	Belle Epoque	Tiffany	Sancy
08:30 / 09:15		EUR18_10 VFD Cooling Methods for the Extreme Oil and Gas Installation Conditions	EUR18_29 Safety devices in Ex applications. Are you complying with Ex regulations?
09:15 / 10:00		EUR18_27 Is 15 kV the limit for hazardous areas?	EUR18_40 The importance of standardization and recommended practices for E&I equipment in the Oil&Gas industry
10:00 / 10:30	Coffee (Foyer)		
10:30 / 11:15	Plenary EUR18_06 Leverage the IIoT for a Comprehensive Enterprise Asset Performance Management Strategy		
11:15 / 12:00	Plenary EUR18_33 Replacement of aged electrical infrastructure on a large refinery		
12:00 / 12:30	Closing		

**The following papers will be presented
at the 15th PCIC Europe 2018.**

Ref.	Title	Authors
EUR18_01	<p>Asset assessment method in a MV predictive model to estimate the asset status</p> <p>Healthy equipment are vital for ensuring process uptime in oil & gas production and chemical plants. Advanced monitoring and diagnostic methods are commonly considered the good approach to provide relevant information for a successful condition-based and predictive maintenance. In the paper, a smart computational technique able to consider the impact of the environmental and operational conditions on the health index calculation will be proposed. The combination of this new method with the usage of innovative sensors (IoT) and digital systems allow to include the “real” operative conditions of the apparatus in the update of the health status and to provide more “realistic” Probability of Failure and the Residual Useful Life for the Medium Voltage equipment in Oil and Gas and chemical applications. The use of digital asset management models to monitor the asset status and the availability of data analytics methods, drives the asset maintenance strategy</p>	<p>Massimo Scarpellini ABB</p> <p>Marco Testa ABB</p> <p>Marco Riva ABB</p> <p>Stefano Magoni ABB</p>
EUR18_03	<p>Power Interconnection between two existing deepwater FPSOs - a key enabler</p> <p>The first-ever power interconnection between Deep Offshore floating units, i.e Girassol and Dalia FPSOs, including retrofit of existing power generation and integration of an overall Power Management System, has enable the implementation of subsea multiphase pumping to enhance the asset oil recovery. The paper will present the miscellaneous technical challenges that have been faced during the project development from the early design stage down to commissioning, start up and operation of both FPSOs as an integrated assest while maintaining and enhancing the full oil and gas production. It will cover both the surface and subsurface aspects with the design and implementation of power generation upgrade, electrical network modifications, overall power management system involving load sharing and load shedding as well as the interconnecting power cable with specific dynamic sections and the power supply and integration of the subsea multi phase pumps with an offset up to 18 km.</p>	<p>Bruno Leforgeais TOTAL SA</p> <p>Faradj Tayat Total SA</p>

Ref.	Title	Authors
EUR18_04	<p>Digital Twins for Large Electric Drive Trains</p> <p>The potential of data driven operational support with respect to predictive analysis is limited. A new approach is the model based simulation of operational behavior. The simulation of specific physical effects allows monitoring of the system behavior even of data that cannot be measured directly. A simulation model that supports the plant monitoring is called digital twin. It provides additional information about the asset state. Better knowledge of the system behavior increases the availability of the plant and the possibility to predict potential faults during operation. This paper presents two examples of digital twins. The first digital twin was designed to identify the actual unbalance state of the rotor system. The second realized digital twin calculates the current rotor temperature based on the transferred losses without measuring the temperature directly. The mathematical methods to implement digital twins are explained in detail. The results of numerical simulations are compared to measurements on the real system. Finally, the benefits of the digital twin in terms of failure diagnosis are presented.</p>	<p>Artur Jungiewicz <i>Siemens AG</i></p> <p>Heide Brandtstädter <i>Siemens AG</i></p> <p>Lutz Hübner <i>Siemens AG</i></p> <p>Christoph Ludwig <i>Siemens AG</i></p> <p>Efrossini Tsochnika <i>Siemens AG</i></p> <p>Utz Wever <i>Siemens AG</i></p>
EUR18_06	<p>Leverage the IIoT for a Comprehensive Enterprise Asset Performance Mgmt Strategy</p> <p>The rise of the Industrial Internet of Things (IIoT) has led to a rapid growth of industrial data available through smart sensors and connected devices. This volume of industrial data offers an opportunity for organizations to derive actionable insights from this information. An Enterprise Asset Performance Management (APM) platform allows companies to leverage their data to optimize maintenance, reduce unscheduled downtime and increase asset availability.</p> <p>A comprehensive Enterprise APM platform integrates data collection, predictive analytics, mobile workforce enablement, advanced data visualization tools and other capabilities with open architecture for ease of integration with existing systems. These solutions allow companies in the downstream oil and gas industry to leverage the IIoT to enable their transition from a reactive to a proactive maintenance strategy, thereby improving the reliability of refining process equipment, resulting in improved safety and greater profitability.</p> <p>This presentation will review best practices, methods of implementation and real world applications of Enterprise Asset Performance Management.</p>	<p>Martin Turk <i>Schneider Electric</i></p> <p>Charles Harper <i>Air Liquide</i></p>

Ref.	Title	Authors
EUR18_08	<p>Technology Readiness Level: IEC61850 in Oil & Gas Applications</p> <p>Conventional hard wiring has been used extensively for decades to transfer data between interconnected subsystems in an oil and gas control system. In addition to being tedious to install and maintain, the amount of data that can be transferred between subsystems is limited in hard wired systems, as a dedicated copper wire is required for each I/O point. Even with these drawbacks, due to the quick response time, hard wiring has been the preferred method of integrating subsystems with the main control system. Communication protocols like Modbus and Profibus are unable to provide a satisfactory replacement for hard wired data transfer. The introduction of ethernet based communication protocol, IEC 61850, has heralded a new era of faster communication for interconnected systems. It is slowly gaining popularity in oil and gas control systems as a method to integrate electrical and process automation systems. This paper aims at exploring the extent to which IEC 61850 protocol can be utilized in oil and gas applications, how it can help users to connect to the power of the 'Industrial Internet of Things', and its limitations.</p>	<p>Laya Sathyadevan ABB</p>
EUR18_09	<p>Monitoring and control devices: The way to improve efficiency and reliability</p> <p>As the industry rushes towards the full optimization of processes and methods, the terms “control” and “monitor” are recognized as of vital importance even for small manufacturing companies and not only in major industrial installations. The high equipment cost and the growing aggregated value of products means that every downtime will reflect in large losses, thus concrete means of monitoring and preventive detection of fails are a vital step towards the maintenance of profitable activities. This paper focuses in means of monitoring motors performance and several other variables that are valuable to access the operation condition of the motors and map the correct maintenance plan for the equipment. It is shown also how this monitoring paired with control mechanisms that allow for automatic star-delta commutation may increase the performance of electric motors and it’s driven equipment. Finally, it is presented the method to the full integration of this monitor and control devices in the motor without changing its footprint and the advantages to end user installations.</p>	<p>Pedro Maia WEG</p> <p>Pedro Apóstolo WEG</p> <p>Fernando Ferreira University of Coimbra</p> <p>Fernando Pereira The Navigator Company</p>
EUR18_10	<p>VFD Cooling Methods for the Extreme Oil and Gas Installation Conditions</p> <p>The Oil and Gas industry demands for high power Variable Frequency Drives (VFD’s) in the smallest possible footprint leading to converters with greater power density which are commonly associated to the necessity to operate reliably in extreme ambient temperatures. These opposing necessities have a direct relation with the efficiency of the VFD cooling system. This paper examines the cooling methods for high power converters applied to VFD’s. The heatsink characteristics of water-cooled and air-cooled converters are evaluated. The pros and cons of each cooling method, including requirements and applicability depending on installation conditions are also analyzed. Additionally, a case study on the choice of heatsink and cooling method for a 2.4MW 4.16kV VFD driving an offshore water injection pump is presented.</p>	<p>Adriano Dias WEG Automation</p> <p>Diogo Candido WEG Automation</p> <p>Anand Almeida WEG Automation</p> <p>Joable Alves WEG Automation</p> <p>Martin Brand WEG Automation</p> <p>Ana Margarida Oliveira Petrobras</p>

Ref.	Title	Authors
EUR18_11	<p>First global IEC/IEEE standard for generator cb's ...and how it changes the game</p> <p>The continuously worldwide growing energy demand combined with the distributed electrical power generation structure has brought a rapid spread of Generator applications. The natural need for utilities or independent power producers to ensure safety and protection, continuous operation and full protection of the generation assets with potential unique fault conditions make necessary a better definition of the performances that a Generator breaker must fulfill. The new and first global IEC/IEEE 62271-37-013 Standard, also called Dual Logo Standard, aims to define and rule the Circuit Breakers used to protect these assets. In this paper the main characteristics between this latest Standard, the previous IEEE C37.13 (now superseded) and the actual IEC 62271-100 are presented, in terms of requirements including short-circuit conditions, typical electrical parameter and selectivity logic. Finally, the impact on the Generator Circuit Breakers market is shown, in terms of consequences on available products, main players GCB offering and why customers should care.</p>	<p>Andreas Brandt <i>ABB AG</i></p> <p>Andrea Ferruccio <i>ABB S.P.A.</i></p>
EUR18_12	<p>Lowering the Total Cost of Ownership of Lighting and Improving Safety at Hazard</p> <p>By reducing energy consumption (and carbon emissions) by as much as 60%, and virtually eliminating lighting maintenance, and reducing mandatory ATEX inspection costs, LED lighting is becoming the most sustainable, economical choice for industrial applications worldwide. This is especially true in the terminal business, where storing and handling hazardous materials demands uncompromising lighting safety, reliability and durability, and where routine lighting maintenance is complex and costly.</p> <p>In this session, Dialight Dialight jointly with Rubis will illustrate the substantial benefits of LED lighting in a petro/chemical transport/storage terminal at the zero-emission Rubis Terminal Rotterdam. Attendees will learn how LEDs for both retrofit and new construction at terminal facilities can deliver a significant ROI compared to conventional lighting, while virtually eliminating lighting maintenance and expenses for up to 10 years.</p>	<p>Kellie Quinn <i>Dialight</i></p> <p>Gary Ashburner <i>Dialight</i></p> <p>Arthur Wrana <i>Rubis Terminal</i></p>
EUR18_14	<p>Cyber Security in Energy Automation</p> <p>Cyber-attacks have evolved over the recent years from the untargeted propagation of viruses to increasingly sophisticated attacks tailored against specific companies or entities. The Oil&Gas and process industries as well as the Energy domain have not been left exempt from this phenomenon, which calls for action on all stakeholders.</p> <p>The authors of this paper like to share a number of Cyber Security related topics:</p> <ul style="list-style-type: none"> - What is the legal environment; - How to be informed on vulnerabilities; - Examples of threats and virus details; - What to do when vulnerabilities are detected; - Who are the threat actors and what do they want to achieve; - Some best practices in how to prevent for abuse of vulnerabilities; - Developments in Cyber Security standards; - Information about a national Cyber Security exercise; <p>The authors take great care to make it accessible to participants with basic or no knowledge on cyber security</p>	<p>Hans Meulenbroek <i>Siemens</i></p> <p>Hans Baars <i>Omnetric</i></p>

Ref.	Title	Authors
EUR18_15	<p>Active Harmonic Mitigation - What the Manufacturers Don't Tell You!</p> <p>Despite their high cost, active harmonic mitigation solutions, such as parallel Active Power Filters (APFs) and Active Frontend Drives (AFEs), are growing in popularity. As the latest technology, they are being touted as a better choice than the various forms of passive harmonic mitigation solutions presently available. Is this actually the case? Active solutions incorporate switching strategies using IGBTs or MOSFETs in order to make the current drawn by the variable speed drive, or other non-linear load, more sinusoidal. What manufacturers don't tell you is that this switching introduces higher frequency harmonics. When measurements are taken up to the 50th, current total harmonic distortion (ITHD) is often quite low but when measured up to the 100th or higher, ITHD often exceeds their claimed performance levels. This is certainly a concern as higher frequency harmonics are more likely to cause problems on the power system and with other connected loads. Topics covered in this paper include: How IEEE and IEC standards for harmonics miss an important frequency band, how the active topologies introduce high frequency harmonics and more.</p>	<p>Anthony Hoevenaars <i>MIRUS International Inc.</i></p> <p>Marek Farbis <i>Mirus International</i></p> <p>Mike McGraw <i>NSOEM</i></p>
EUR18_16	<p>Reliability Improvement of Refinery Plants, Transient Stability Analysis Approach</p> <p>Generators are one of the main components of electrical system of industrial plants, such as Oil and Gas refinery units. To maintain and increase the reliability of the refinery plants, it is vital to validate generators and excitation systems' dynamic models and parameters. In addition, to avoid operations downtime and any nuisance tripping, coordination between generators' protective relays and generators' control systems should be verified. This paper presents how testing and modeling of generators and excitation systems can increase the reliability of power systems in refinery plants but at the same time can impact the operation process and cause downtime. Small Signal Stability analysis, simulation results and testing data of a generator and excitation system for a refinery plant in North America are presented in this paper and results are discussed and analyzed in detail. The paper also elaborates on lessons learned and briefly talks the benefit of installation of Phasor Measurement Units (PMUs) for system modeling and explain the benefits of modeling/analyzing PMU data over the results obtained from generator staged tests.</p>	<p>Maysam E-Radvar <i>Ready Technologies Inc.</i></p>

Ref.	Title	Authors
EUR18_17	<p>Main Electro-Mechanical Design and Tests Challenges for Large E-LNG LCI System</p> <p>Up to 120MW, the large LNG trains driven by variable speed motor can an alternative to traditional train driven by gas turbine especially when it is necessary to contain dimension and weight at site and to reduced environmental impacts. In addition, train driven by Variable Speed Drive System allows to regulate the operating speed in a wider range giving more flexibility in term of compressor operating points. This paper will present the main technical aspects that have been encountered for the design and validation of a 75 MW variable speed drive system with particular focus in Medium Voltage Electric Motor fed by a Load Current Inverter. Electromagnetic, Rotor-dynamic, Structural design are for sure the main challenge encountered for the design of this machine. Thanks to advanced simulation tools it is possible to proper design the motor according API 546 minimizing the technical risks. Some measurements including vibrations and Operational Deflection Shape analysis performed during the Factory Acceptance Tests and the String tests will be also presented.</p>	<p>Lionel Durantay <i>General Electric</i></p> <p>Lionel Roth <i>GE Power Conversion</i></p> <p>Sylvain Jalabert <i>GE Power Conversion</i></p> <p>Niccolo Spolveri <i>GE oil & Gas</i></p>
EUR18_19	<p>The Impact of SCADA Protocol Choice On Pipeline Monitoring and Decision Making</p> <p>This paper discusses the methods and protocols used for the acquisition of field based process information to suit requirements for pipeline monitoring and control application categories. These are real-time for model based applications, contextual for decision making and analytical for diagnostics and asset management. The three distinct application categories have different requirements for the trueness and timeliness of classes of data from the field. The limitations and strengths of two main SCADA protocols DNP3 and MODBUS are discussed in relation to the provision of data and conclusions drawn in relation to which protocol features suit which application best. The particularly sensitive model based applications of pipeline leak detection and location are discussed in relation to the resultant error and frequency response created by the transformation of information through the SCADA remote terminal units, communications structures and master station scanning regimes.</p>	<p>Christopher Smith <i>Schneider-Electric</i></p>
EUR18_20	<p>On line Power System Management</p> <p>Kato Engineering and Leroy Somer share a long history for designing and manufacturing synchronous generators globally renowned for their ruggedness and performance. Now, they bring an advanced, flexible asset management tool that monitors, tracks and alerts end users and operators with key data regarding power system performance for both retrofit and new builds. The system presented includes on-site electronics and hardware, secured local and remote processing, and a customizable secured web interface. With asset data remotely available in real time, safety is improved and performance optimized. The paper presentation will focus on the system predictive and predictive maintenance, fleet management centralisation, power quality optimisation and operation cost reduction. System overview : collection of a full range of data from multiple components and/or system onsite, cloud-based data management with state-of-the-art technologies and view and real time response to the diagnostics and performance data .</p>	<p>Gilles Stefanelli <i>Leroy Somer</i></p> <p>Emile Mouni <i>Leroy Somer</i></p> <p>Stephane Amancy <i>Leroy Somer</i></p>

Ref.	Title	Authors
EUR18_21	<p>Improved reliability in substations with IEC61850 in a chemical plant in Spain</p> <p>This article describes the integration of IEC61850 protection relays to a combined Electrical Control and Process Control System, in an existing chemical plant in Spain. Due to aging substations, protection relays needed to be replaced. IEC61850 standard brought the opportunity to remove cable connections and to take an innovative step towards digitalization in the plant. The paper details the technology and how the integrated Control System platform (Electrical and Process) was implemented, considering the best practices identified throughout the project, like interoperability of IEDs and Control System from different brands.</p> <p>The benefits achieved are described, including the improved reliability in the substation operation and maintenance, increased visibility into the asset condition of switchgear and reduced infrastructure due to cable reduction and the control system integration. The lessons learnt due to the challenges of such project in an existing plant are presented.</p>	<p>Leandro Monaco <i>ABB</i></p> <p>Steven de Clippelaar <i>Dow</i></p>
EUR18_22	<p>MV Cable Life Cycle Management</p> <p>A reliable MV cable network is vital for the Petro-chem industry. Outages can result in losses of revenue. A prudent life-cycle management maintains network reliability in a cost effective way.</p> <p>Most cable test technology providers are not able to determine cable condition according to the manufacturer's quality control standards, thus resulting in unreliable cable condition results. These methods risk huge financial loss due to process interruption or unnecessary replacement costs. Nowadays it is possible to evaluate MV cables according to manufacturer's factory standards. Testing based on 50Hz/60Hz testing voltage per the standard's requirements is possible. Partial Discharges can now be measured with a superior sensitivity in the field, measuring values as low as 5pC as specified by the manufacturers.</p> <p>This makes it possible to establish an effective condition based life-cycle management program. When planned and executed properly, management can save millions of Euros in loss production due to unplanned outages. This also provides a cost effective alternative to costly unnecessary cable replacement.</p>	<p>Rene Hummel <i>IMCORP</i></p> <p>Wayne Chatterton <i>IMCORP</i></p> <p>Ben Lanz <i>IMCORP</i></p> <p>Kenneth Bow <i>Kable Consult LLC</i></p>
EUR18_23	<p>Plant-wide autosynchronization, based on IEC 61850 and protection relays</p> <p>Synchronizing a single generator to a bus is a pretty straightforward task, for which numerous dedicated devices are available. Managing synchronization of two independently running network parts by a non-source breaker (for example a tie-breaker) adds more complexity. The complete system is typically built using a synchronizer and selector switches supported by auxiliary relay based logic circuits or a programmable logical controller (PLC). The proposed solution covers both the source breaker(s) and non-source breaker(s) synchronizing. The solution is capable of recognizing the primary network switch positions and selecting the appropriate participating generating units for feasible operation scenarios. The proposed solution uses IEC 61850-8-1 GOOSE signaling between protection relays. The solution does not require any external circuitry to complete the autosynchronizing system. The features of modern protection relays and IEC 61850 standard enabling the proposed autosynchronizing solution are presented. Comparison of proposed and conventional approaches is made to identify differences and benefits of the former.</p>	<p>Olli Rintamaki <i>ABB Oy Medium Voltage Products</i></p> <p>Dibyendu Bhattacharya <i>BP Exploration Operating Co Ltd, UK</i></p> <p>Alok Gupta <i>BP America Inc., USA</i></p> <p>Arinjai Gupta <i>ABB Global Industries and Service Pvt Ltd, India</i></p>

Ref.	Title	Authors
EUR18_24	<p>Simulation of variable speed drive systems in oil gas applications</p> <p>The development in the field of digitalization and computer simulations in the last decade allows us to optimize the drive systems by performing simulations of complete drive train. They can be used to reduce the risks in the complex systems involving a combination of electrical, mechanical and process technologies.</p> <p>This paper presents the cases in oil and gas applications, where the drive system simulations can be effectively used. Different types of simulation technologies available are explained with their pros and cons. The most important prerequisite for successfully employing simulations is the accuracy of the used models. The development of models and their validation are explained.</p> <p>Contents: Need for system simulations involving medium voltage drive systems Different simulation technologies available and their use depending on the requirement Employing drive system simulations in oil and gas – example cases where typically drive system simulations are used. Development of models, validation and their verification Conclusion</p>	<p>Vijay Anantham Ganesan <i>Siemens AG</i></p> <p>Alexander Unruh <i>Siemens AG</i></p> <p>Andy Rudolph <i>Siemens AG</i></p>
EUR18_26	<p>Ferroresonance Measurements and Modeling - A Waveform is Worth aThousand Words</p> <p>Over the last few decades, artificial lifting using Electrical Submersible Pumps (ESPs) became dominant in the oil and gas industry. ESP systems became essential for oil producing countries like Saudi Arabia to meet the global energy demand. Therefore, failures in such systems shall be minimized by proper upfront design. This paper describes the efforts made by the authors to address chronic failures in ESP systems. Numerous ESP transformers have failed in two of the major Saudi Aramco fields with 34.5kV networks. Power quality measurements were conducted to capture ferroresonance during single phase switching. Electromagnetic transient simulation was conducted to address similar installations without having to do the measurements at every location of concern. Mitigation solutions were recommended for existing installations as well as best design practices for new projects.</p> <p>Index Terms — Ferroresonance, Transformer Failure, Power Quality Measurements.</p>	<p>Rakan El-Mahayni <i>Saudi Aramco</i></p> <p>Johnson Thomai <i>Dar Engineering</i></p> <p>Ahd Gheeth <i>Saudi Aramco</i></p>

Ref.	Title	Authors
EUR18_27	<p>Is 15 kV the limit for hazardous areas?</p> <p>The current IEC 60079-6:2015 specifies the requirements for the design, construction, testing and marking of Ex Equipment and Ex Components with type of protection liquid immersion "o" intended for use in explosive gas atmospheres.</p> <p>Since 2015, IEC has limited voltage level for hazardous area equipment at max 15 kV level. This limitation precluded many real world applications where end users would be limited in applying equipment above 15kV in hazardous areas. Therefore during one of IEC/TC31 meeting it was decided to propose an amendment to IEC 60079-6:2015 by the addition of a new Annex D to cover Level of Protection "oc" (EPL "Gc") for voltages exceeding 15 kV r.m.s. ac or d.c.</p> <p>Working group 43 - High Voltage is established in 2013 to prepare standard for voltages exceeding 15 kV with the task "To develop requirements for electrical equipment such as liquid immersed transformers and motors used for high voltage applications in explosive atmosphere. This paper presents details as to what the High Voltage restrictions and requirements in hazardous areas are where voltages exceed 15kV.</p> <p>Finally this paper will also give information about working group responsibilities...</p>	<p>Aycan Duruoglu <i>Siemens Zrt</i></p> <p>Frank Lienesh <i>PTB</i></p> <p>Esa Virtanen <i>ABB</i></p> <p>Samir Boutahar <i>SMB Offshore</i></p>
EUR18_29	<p>Safety devices in Ex applications. Are you complying with Ex regulations ?</p> <p>Safety devices in Ex applications. Are you complying with Ex regulations ? New mandatory requirements for end-users.</p> <p>The case for drive systems or circuit breakers associated with Ex motors. In Europe, ATEX 94/9/EC and 2014/34/EU directives provide mandatory requirements that are applicable to the safety of equipment and protective systems intended for use in potentially explosive atmospheres (ATEX). For Ex "d" & Ex "e" motors driven systems for use in ATEX, the regulations require safety devices for motor protection in case of over temperature or overload in the motor.</p> <p>Those safety devices are covered in Europe by an harmonized standard that is a mandatory requirement : the EN 50495 standard. At IEC level, a document is in progress for worldwide use and will provide similar requirements.</p> <p>The compliance of the requirements from this safety devices' new standard can be done both by manufacturer or by the end user during the choice of the relevant safety device, depending on the Ex motor protection mode.</p> <p>This paper explains the interest of these new mandatory requirements for end users in the case of drive systems or circuit breakers associated with Ex motors.</p>	<p>Eric Fae <i>INERIS</i></p> <p>Martial Patra <i>Schneider Electric</i></p> <p>Stephane Spohr <i>Schneider Electric</i></p> <p>Jerome Almin <i>Schneider Electric</i></p>

Ref.	Title	Authors
EUR18_30	<p>MV motors started with auto-transformer</p> <p>In current context of intelligent motor controls used today the autotransformer motor starting seems somehow overpassed. However it presents many advantages when used for starting of large and critical motors (10 - 20MW range). Its reliability, simplicity in instrumentation and maintenance, extreme endurance to harsh environment make it preferable compared to VSD or soft-starter solutions which would have a better control possibilities. The purpose of the paper is to present the autotransformer method mainly used in chemical and steel industry than in the O&D industry. The article will address the following:</p> <p>When and Why using auto-transformer is preferable for end user? Advantages/disadvantages of this method with respect to the motor and load as well as electrical network; comparison with DOL ,VSD, Soft-starter and other methods How to design and engineer the full package motor + autotransformer? The engineering of the environment (switchgear, control-command sequence) to optimize the motor starting. The article will also address the decision faced by the engineering during the design phase and the dilemmas faced by the end-user.</p>	<p>Cécile Gaudeaux <i>Air Liquide</i></p> <p>Delcho Penkov <i>Schneider Electric - Energy business</i></p>
EUR18_31	<p>Back-to-back test for large synchronous motors</p> <p>For large motors, it is important to check the dynamic behavior of the machine, when the rotor is hot. Sometimes, it is difficult to attain full rated rotor current due to manufacturer testing equipment limitations. However, there are a number of possibilities available as an alternative; for example, increasing the motor cooling medium temperature and thus increasing the temperature of the motor internal components. Another way is a zero power factor test, where an artificial load (large inductor) can be utilized as a load. Also, if a VFD is available at the manufacturer test yard, then it can be used to supply power at a very low power factor (almost zero). Obviously, the motor can be tested at operational rated load conditions if it is coupled to the compressor or a pump during a string test. Finally, a back-to-back test using two synchronous motors of similar rating can be performed to run one of the motors at its full rated rotor current similar to the zero power factor test. The benefit of the back-to-back test is that, limited energy will be taken from the utility grid. This paper will share an experience with a back-to-back test, which was completed successfully.</p>	<p>Ilya Nariyev <i>Fluor</i></p> <p>Roy Hamilton <i>Chevron</i></p> <p>Jeremy Andrews <i>Siemens</i></p>

Ref.	Title	Authors
EUR18_32	<p>On-Line PD Condition Monitoring Strategies For Oil and Gas HV Asset Optimisation</p> <p>With lower-for-longer oil price, asset optimisation is now more critical than ever. To avoid unplanned outages and extend asset lifecycles, condition-based maintenance can be used to prioritise maintenance and/or repair. The early detection of medium and high voltage insulation faults can maximise network safety, improve reliability and help to implement asset extension life programs. On-line partial discharge (OLPD) detection and monitoring is adopted and recognised as one of the best, non-intrusive, early warning indicator of insulation degradation in MV/HV networks. This paper describes industry approaches for OLPD monitoring showing the benefits and results of using such technology. Strategies for condition-based maintenance are discussed along with how data can be used strategically in the operation of the network, including network reconfiguration, maintenance prioritisation, refurbishment and/or replacement. A case study where effective OLPD monitoring of critical 11 kV generators in a downstream European oil refinery were implemented and allowed informed decisions to be made prior to unplanned outages is presented.</p>	<p>Marc Foxall <i>HVPD Ltd.</i></p> <p>Blake Sheen <i>Essar Oil (UK) Ltd.</i></p> <p>Malcolm Seltzer-Grant <i>HVPD Ltd.</i></p> <p>Riccardo Giussani <i>HVPD Ltd.</i></p>
EUR18_33	<p>Replacement of aged electrical infrastructure on a large refinery</p> <p>Over the last decade many refineries throughout the world, especially the ones that were built in the 1950's, 1960's and 1970's began facing the problem of ageing electrical infrastructure. Ageing electrical infrastructure comes with concerns around Technical Integrity (including Safety) and Reliability. This paper addresses the issues experienced with aged electrical infrastructure on Shell Netherlands Refinery, the largest refinery in Europe, and describes the various stages of development leading to large scale infrastructure replacement, the challenges and learnings. Specific areas addressed include:</p> <ul style="list-style-type: none"> integrity and reliability of switchgear, switchhouses and transformers strategies for managing electrical infrastructure components that are near end of life project justification and managing your manager's needs and expectations project examples, contracting strategies, safety and reliability during execution 	<p>Marcel Visser <i>Shell Global Solutions</i></p> <p>Arjan Vromans <i>Shell Nederland Raffinaderij B.V.</i></p>

Ref.	Title	Authors
EUR18_34	<p>Standard devices vs IEC 61508 SIL safety devices Integration in process industry</p> <p>In process industries like in other sectors, two mains systems are working together.</p> <ul style="list-style-type: none"> · The control system and, · The safety system <p>If the requirements for the control system are mostly based on the performance of the devices (sensors PLC and actuators) in terms of computation, response time that depends mostly to the process, the answer for the safety is mostly based on requirements defined in IEC 61511 standard that defines the application of IEC 61508 for the process industry. According to IEC 61511, for the realization of the safety function, end user can reach the requirements of IEC 61511 by:</p> <ul style="list-style-type: none"> · Using PRIOR USE HARDWARE DEVICES or by · Using HARDWARE DEVELOPED AND ASSESSED ACCORDING TO IEC 61508 with for software some limitations. <p>Because standard devices do not always comply with all requirements for safety applications in terms of : architecture, EMC levels, self tests and functional tests, this article will focus on the additional requirements end users have to take into account to comply the IEC 61508 / IEC 61511 requirements and will give them the keys to select and choose the adapted and compliant devices. This article will focus on sensor through the case of a radar....</p>	<p>Eric Fae <i>INERIS</i></p> <p>Fabrice Marcel <i>KROHNE SAS</i></p>
EUR18_38	<p>Asset Management Solutions</p> <p>The high investment in petrochemical plants needs a stable and continuous operation over years. Field components like intelligent transmitters, actuators, motors and pumps are more and more complex and total costs of maintenance increase especially because of more complexity of those devices and their needed intelligent handling. Depending on logistic and location of the plant spare parts of those devices are cost intensive to get on the plant. Future oriented asset management solutions should protect against shut down and help the operation manager to know early enough about upcoming technical failures. Therefore it's not enough to have a look on measured values and to react if limit values surmounted. It's necessary to interpret a set of process values and their history to get the right interference for decision. Therefore it's necessary to integrate asset management data points into the plant, their digital vertical connection and their data analytics for data interpretation. The presentation include the implementation of asset management into existing plants including the use of data analytic tools based on cloud architecture.</p>	<p>Norman Südekum <i>WAGO Kontakttechnik GmbH & Co. KG</i></p> <p>Ulrich Hempfen <i>WAGO Kontakttechnik GmbH & Co. KG</i></p>

Ref.	Title	Authors
EUR18_39	<p>Process efficiency based on future energy management requirements</p> <p>Energetically optimized processes and a transparency of the energy flow are, in addition to cost reduction, the basis for competitiveness, sustainability and the fulfillment of legal requirements. The revision of the ISO 50003 Standards considerably increases the demands of a ENMS according to ISO 50001. The legal requirements of a modern energy management are to demonstrate the improvement of the energy-related performance. This must be visualized by the generation of meaningful KPI´s from process and energy data measured by a modular data acquisition solution from the field level up to local or cloud analysis systems. The action plans for control and monitoring of energy savings are placed in the focus of the traceability. This resulting assessment will flow into the certification decision and if there is a deviation to the target, the certificate could be withdrawn. In our paper, we will present important legal changes of the ISO series revision, as well as best-practice examples of future-proofed EM. Based on our innovative projects we give you an view of practical applications, new and future-oriented ideas and impulses for your energy Management.</p>	<p>Lukas Dökel <i>WAGO Kontakttechnik GmbH & Co. KG</i></p>
EUR18_40	<p>The importance of standardization and recommended practices for E&I equipment</p> <p>In this paper we will discuss how standardization of equipment specifications for procurement can benefit the industry, and introduce JIP33, a joint industry project that is working to deliver this. Furthermore, IOGP (International Association of Oil&Gas producers and USPI-NL and the CFIHOS activities will be explained as well.</p>	<p>Elbert van der Bijl <i>Yokogawa Europe Solutions B.V.</i></p>

The following tutorials will be presented at the 15th PCIC Europe 2018.

Ref.	Title	Authors
EUR18_13	<p>Our Electrical people work and switch safely and we know it...</p> <p>Strategic theme: Personal Safety, sub theme: Staff Competency. The proposed subject calls for an interactive session on electrical staff competency on the subject of switching High voltage systems in the Oil and Gas industry. what works and what can be improved? How do we train up Electrical Operational staff, and even more important: How do we make sure that they perform in a recognised and auditable safe way? What can we learn from each other in terms of training systems in use, and from some European country regulations? And do these basis procedures work anywhere or are they different between parts of the industry for a reason? And what Electrical switching actions can we allow to be performed by non Electrical skilled people? The author proposes to run an interactive discussion session on the subject in which he will share his experience (from 37 years in Shell) with a paper on background and experience in Electrical Safety, real life cases discussion, training and audits in the oil industry. The session will be fully interactive for the full duration of the presentation time (90 minutes).</p>	<p>Wim de Wilt <i>Independant power consultant</i></p> <p>Paul Donnellan <i>Shell Global Solutions b.v.</i></p>
EUR18_18	<p>PAS IEC 63131 System Control Diagram</p> <p>Tutorial on the content of new PAS IEC 63131 ED1 System Control Diagram. (NORSOK I-005). This standard consist of two main parts. A set of well defined Function blocks. And a new type of logic diagram. This PAS will provide the means to fill the gap between the P&ID's and the Functional requirement diagrams. (Ref IEC 61804.) The control functions definitions include required behavior descriptions of control modes, interlocking (Safeguarding), blocking and other operator commands. It gives a standardized operator interface on a functional level. The logic diagrams carry a simplified process sketch as background, inherited from PFD/P&ID's, which enables reviews of the control applications in a multi-discipline environment. It includes a method of defining the interface of an ICSS system and MCC / IED with the purpose of control from same control system in the control center.</p>	<p>Idar Pe Ingebrigtsen <i>Statoil</i></p>
EUR18_25	<p>Transformers: Engineered Products - You Get What You Specify, Not What You Want</p> <p>Transformers are key equipment for power systems. They have been manufactured for a long time and their characteristics are well known. In spite of this, there are still many issues with transformers not fulfilling the requirements at site. This tutorial will provide attendees with information based on the authors' experiences in many projects that will help ensure that what you get is what you really need. The main focus will be on correctly specifying your requirements which also implies a good understanding of the international standards that are available for transformer design, manufacturing and use. Things can also happen to transformers during their travels from manufacturer to site. Guidelines will be provided that can help to eliminate or mitigate some of these issues. Understanding that a transformer manufacturer will provide what you specify, but cannot guess what you really need, is the first but most important step in getting not only what you specify, but also what you need.</p>	<p>Terry Hazel <i>Consultant</i></p>

Ref.	Title	Authors
EUR18_35	<p>Standards review in connection with Industrie 4.0</p> <p>In previous PCIC Europe Conference several papers and tutorials were referring to standards in connection with Industrie 4.0. The purpose of this Tutorial is to propose an inventory of all these standards, local, regional or international and to review them in connection with Industrie 4.0. Most of the standards were existing far before digitization invaded industry, especially in the Oil & Gas and Petrochemical sector where all practices are based on standards. Therefore the development and adoption of digitization technologies such as proposed by Industrie 4.0 will be facilitated as soon as it can refer to a standards ecosystem. In parallel, the technical committees working on standards have realized the urgent need to review them in integrating this disruptive digitization reality.</p> <p>In this Tutorial we shall review standards about functional safety, cybersecurity, products classification, communication protocols, interface configuration, engineering, digital factory reference model.</p>	<p>Jean-Charles GUILHEM <i>2B1st Consulting</i></p>

**The following poster will be presented
at the 15th PCIC Europe 2018.**

Ref.	Title	Authors
EUR18_02	<p>Life Extension Program of Wellhead Booster Compressor</p> <p>The proactive advance maintenance tools and techniques are used to evaluate mechanical condition and performance of wellhead booster compressor package in order to extend its major preventive maintenance interval while maintaining overall machine reliability with 40% expected reduction of maintenance expenses in long-run.</p> <p>The decision-making to defer major PM schedule is based on a cost-effective advance maintenance tool specific for reciprocating and rotating machinery which provides information used to assess the mechanical condition and performance of reciprocating compresses and gas engines, as well as their cooler fans. The combination of data acquisition and method using advance tool are mentioned literally for reader as a guideline. Together with other OEM advised condition base techniques, it is advisable that this implementation could give actionable economic data to support maintenance and operational decision-making to extend major PM of wellhead booster compressor. This is engineered to help operators defer maintenance schedules to 56,000 hours from 48,000 hours with expected relative cost reduction of 40%.</p>	<p>Winyou Rinnanont <i>PTT Exploration and Production Public Company Limited</i></p> <p>Apichat Bamrungwong <i>PTT Exploration and Production Public Company Limited</i></p> <p>Graisit Teerawongsakul <i>PTT Exploration and Production Public Company Limited</i></p>

PCIC Europe Code of Conduct

1. PCIC Europe missions

The scope of the association is to hold an annual technical conference in Europe in the field of electrical, non-electrical and safety related items in connection with production, treatment and transport of crude oil and related raw materials and products, chemicals and chemical products and products of the Pharmaceutical Industry.

The purpose is to share good practices and improve competencies of engineers working in the field of process industries.

2. Purpose of the Code of Conduct

European Petroleum and Chemical Industry Committee (PCIC Europe) is a not-for-profit association managed and operated by representatives of the process industry on a voluntary basis. Therefore it can only work from the dedication and commitment of the volunteers in charge.

PCIC Europe Conferences involve different categories of people: Organizing Committees, Authors, Delegates and Sponsors. Each one of these categories has rights and duties to contribute to the success of the conferences. These rights and duties are described in different documents available when someone is joining one of these categories.

In any case these documents may be subject to interpretation and cannot claim to be exhaustive. In order to avoid misunderstandings and misleading expectations, this Code of Conduct intends to draw the guidelines to contribute positively to the development of PCIC Europe and eliminate inappropriate behaviour that could compromise PCIC Europe missions.

3. Member / Organizing Committees

The members of the different Organizing Committees are volunteers. Generally their respective time allocation and costs are supported by their respective companies.

Therefore the different Organizing Committees members:

- Shall register at the conference according to the conference terms and conditions
- Shall not benefit of any advantage

regarding the conferences

- Shall not use their position in the Organizing Committee to "invite" people or give any advantage to other conference Delegate, Author, Sponsor.
- Shall not disclose unofficial information from internal documents or discussions to third parties without prior agreement from the organizing committee
- Shall adhere to anti competition rules as described in paragraph 7

4. Authors

The Authors contribute to the success of the conferences by the quality of their papers and presentations. In compensation they contribute to promote the expertise of their respective company. The PCIC Europe copyright is intended to give permission to PCIC Europe to publish the paper and to use it to promote its Technical Conferences. The copyright also states that the contents of the paper are the sole responsibility of the author(s). Authors retain all rights to the technical contents.

Therefore the Authors:

- Shall register at the conference (as a minimum the presenting author) according to the conference terms and conditions
- Shall not benefit of any advantage regarding the conferences
- Shall not use their position to "invite" people or give any advantage to other conference Delegate, Author, Sponsor.
- Shall adhere to competition law code PCIC Europe as described in paragraph 7

5. Sponsors

The Sponsors are essential to the financing of the conferences and PCIC Europe is committed to maximize Sponsors visibility in respect with the sponsorship terms and conditions. PCIC Europe is also welcoming Sponsors initiatives that may contribute to the conference attractiveness within the PCIC Europe commercialism rules and sponsorship terms and conditions.

In purchasing a sponsorship, the Sponsors:

- Shall register their representatives at the conference according to the conference terms and conditions
- Shall not benefit of any advantage

beyond the sponsorship terms and conditions regarding the conferences.

- Shall not use their position to “invite” people or give any advantage to other conference Delegate, Author, Sponsor.
- Shall adhere to competition law code PCIC Europe as described in paragraph 7

6. Delegates / Conference attendees

The venue of the Delegates is the fundamental goal of PCIC Europe and in that respect all efforts are mobilized to satisfy them. As part of these efforts PCIC Europe is calculating the registration fees fairly in order to maximize the conference attendance. In addition PCIC Europe is welcoming all remarks and suggestions from the Delegates for improving the conferences year to year.

In registering at the conference, the Delegates:

- Shall register at the conference according to the registration terms and conditions
- Shall not benefit of any advantage beyond the registrations terms and conditions regarding the conferences.
- Shall not transfer his/her registration to another person
- Shall not use their position to “invite” people or give any advantage to other conference Delegate, Author, Sponsor.
- Shall adhere to competition law code PCIC Europe as described in paragraph 7

7. Competition Law Code PCIC Europe

All members of and participants to meetings and events of PCIC Europe (collectively “Participants”) are held to comply with the prevailing antitrust and competition law rules. For that purpose, each Participant shall:

- avoid to discuss or share any commercial and/or strategic company information, including information about prices, profit margins or costs, bids, offerings, market share, distribution practices, terms of sales, specific customers or vendors
- avoid to engage in any agreements - formal or otherwise - to fix or set prices or allocate products, markets, territories or customers;

Participants will ensure that meetings and conferences are preceded by an agenda listing legitimate topics and are followed by minutes in compliance with antitrust and competition law rules. Participants

agree not to exchange any commercially sensitive or company strategic information during any formal and informal PCIC Europe gathering.

Non-compliance with this Competition Law Code may, at the discretion of the PCIC-Europe Executive Committee, result into the withdrawal of PCIC Europe membership and exclusion from PCIC Europe's activities.

8. Freedom from Commercialism

The technical papers, tutorials and poster and related presentations will be free from commercialism by all authors whether affiliated with manufacturers, users, or contractors. It is acceptable to present valid technical data. It is not acceptable to show company logos, use company names, use trade names, use trademarks, use facility names, or use facility locations. This applies to written paper, the presentation file, and to the contents of the oral presentation. Company names may only be used together with the authors' names and email addresses at the start of the paper and the first slide of the presentation file. They may not be included anywhere else in the presentation file, including the information band in the bottom of the slides.

During question and answer sessions, participants shall refrain from asking any commercial questions. The PCIC Europe appointed session chair shall stop any discussions that contain commercial content. Sponsors shall confine commercialism at the conference within the limits agreed with PCIC Europe.

9. Closing remark

This code of conduct is required to be accepted by:

- authors and presenters, during the paper submission process,
- conference attendees, when registering
- sponsors, when accepting PCIC Europe sponsor quotation
- committee members, before the General Assembly accepts their nomination

NOTES

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Call for Papers 2019 Annual Conference Calendar

7th Middle East Conference – February 2019, Abu Dhabi, UAE
16th European Conference – May 7th-9th 2019, Paris, France

Abstract submission deadline for both conferences: July 3rd 2018

Why submit an abstract?

Present your knowledge and practical experience to our worldwide discipline forum of industry experts, numbering over a combined 220 during the last year. The depth of cross industry representation at conference enables you to raise your personal and your organisation's profile at a senior industry level and network efficiently amongst your engineering peers. Meet like-minded professionals and enjoy the stimulating discussions as a result of the fruits of your effort. This makes PCIC surely the annual must-attend event for authors and delegates, so why not?

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- Present their paper or technical tutorial at their selected conference
- Have their paper or tutorial published with the official conference proceedings
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Technical focus for potential authors of papers and tutorials:

The emphasis for potential authors is on the development of technical papers, presentations and tutorials on the practical application of electrical and control technology in the petroleum and chemical industries. Specific priority will be given to those subjects addressing field experience and lessons learned, as well as new solutions to enhance safety and operational excellence. Conference delegates and authors represent industry experts drawn from end-users, engineering companies and contractors and manufacturers, regulators and insurance institutions, standardization bodies, certification bodies and other international organizations. The technical content of the papers, presentations and tutorials should talk to this specific peer group of expertise.

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