EASA
The Electro•Mechanical Authority
EUROPEAN & WORLD CHAPTER

March 2015
Volume 44

NEWSLETTER

Presidents Message

Dear Members, Affiliates and Friends,
At a time we are preparing to gather in San Antonio, Tx on June 14-16th and in September 24-26th in Barcelona, Spain for our annual EASA conventions, I would like to share with you a very interesting report I have found about the importance and benefits of belonging to a professional association like EASA even in a world were social media or internet are ruling and supporting our business.

"Why should I deal with an association when I have access to all the information I could ever want online?"
"Times are tough, and volatility seems to rule the markets. The workforce is more age-diverse and changing more rapidly — due to technology — than ever before. Social media rules — or so it seems. But none of that diminishes the importance of a long-time standard business practice — belonging to a professional industry-focused association.

Associations are one of the most valuable, inexpensive and under-utilized businesses resources we have. They give us the ability to affiliate with others who have common needs and interests. Association events are where I can find people to quickly and easily relate to, people I can share frustrations and success with, people who care aboutmy experiences and people whose experiences I want to learn about. And attending association events just make me feel good.

A few of the many benefits associations offer include: •Providing a window into the future of an industry or market •Reducing costs by combining the purchasing power of others •Gaining insights from colleagues who have been there before •Improving your skills and those of your staff •Finding solutions to problems you don't have to figure out how to fix both a time and cost savings •Leveraging the work of others for your own benefit •Developing a community of practice you can call on for help, advice, collaboration, and many other things too big, too time-consuming, and too expensive to do on your own.

In the world of LinkedIn, Facebook and YouTube, professional associations may seem ancient, archaic, possibly obsolete, maybe even prehistoric. But they haven't lost their usefulness just yet. It always surprises me how often the answers to problems can be found through an association. When I talk to clients about them, they often ask **"Why should I deal with an association when I have access to all the information I could ever want online?"**

When it comes to social media and the Internet, conferences, conventions and industry-focused gatherings are still huge. That's because business still happens between people — face-to-face. It's true that the impact of the Internet in general and social media in particular cannot be over stated. And yes, it has had a dramatic impact on how business is done. It's also true that for most of us, particularly entrepreneurs and business people, it's easier to make connections with others when you have face-to-face contact and meet because of common goals, especially when those goals are Internet-oriented. Search for associations in your industry and see what surprising things you come up with. You're sure to find classes, seminars, collaboration opportunities and conferences that will bring instant value to you and your business. If you get only one thing out of this column, please remember: there's more opportunity out there than you can ever capture yourself. Don't be afraid to look for others you can collaborate with.

Find a group of like-minded people and start a dialogue with them. Develop relationships with them and build a virtual advisory or mastermind group. I promise, there's nothing you can do for your business, regardless of the industry you're in, that will bring more immediate and powerful returns on your investment of time."

This report was extracted from a very interesting report from Larry Madelberg (http://www.bizjournals.com/sacramento/print-edition/2011/06/10/belonging-to-professional-associations.html?page=all)

I thought it was important for me to share some parts of that report with you. Hope you have enjoyed it and if you have any comments or suggestions on that report, please share them with me and Frederic Beghain at fbeghain@easa9.org. We will be happy to hear you and to work with you on having more members,

Best wishes, Mathis Menzel, President European & World Chapter Limited

EASA Region 9 - Spring Council - Hamburg - 24th of April 2015 - We encourage our members who wish to raise any points for consideration at the next Council meeting in Hamburg to do so by 24th March. It is important to hear from you, Many thanks, Mathis Menzel,

EASA Region 9 - Hamburg - 24th of April 2015 - Roadshow - On the 24th of April, EASA is organizing a Roadshow in Hamburg to present all benefits of our association and the reason why it is important for our industry to belong to that community. All potential members who are interested to join that event in German, please contact Frederic Beghain, our General Manager for the Region 9 at fbeghain@easa9.org It is important to hear from you, please contact secretary@easa9.org Many Thanks, Mathis Menzel.

Always important to hear from you, please contact secretary@easa9.org

EASA R9 Technical Committee - Ex Training Update

At the 2013 AGM in Palma, EASA European & World Chapter – Region 9 Members approved our technical committee proposal to close down the EASA/SIRA Scheme for the assessment of competency of personnel in Ex Equipment Overhaul & Repair and only offer training in Ex Equipment overhaul and repair.

This proposal had to be made by the technical committee to ensure that EASA was not seen to be challenging the status of the IECEx Personnel Competency Scheme, Unit of Competency Ex 005 for Overhaul & Repair of Ex Equipment. The guidance from the technical committee is that all EASA R9 members, who are providing services to overhaul and repair Ex Equipment, where practicable, attain IECEx Certification within the IECEx 03 Scheme for Service Facilities, and all personnel requiring certificates of Personnel Competency attain IECEx Certification within the IECEx 05 Scheme for Ex Personnel Competency Certification in unit of competency Ex 005.

2014 has been a transition year with the courses in the first half of the year operating to the old EASA/SIRA Ex Competency Scheme with certificates awarded by SIRA SCS, whilst the courses in the second half of the year were the first of our EASA Ex Training with Certificates of Assessed Training awarded by EASA.

After reviewing our training courses run in the second half of 2014 at our Technical Committee meeting on 23rd December we agreed to expand participation on our full 5 day training courses. The first training day would be made available to anybody who wanted awareness training in Ex Equipment and Overhaul, this is to enable Ex Equipment Users and Commercial & Sales Management & personnel to attend. There will be no pre-requirement of experience in equipment repair but the number attending will be limited to 20. A certificate of attendance will be provided.

The three training days would be made available to anybody who wanted awareness training in Ex Equipment Overhaul & Repair, this is to enable Ex Equipment Users and Commercial Managers who require greater knowledge of Ex Equipment Overhaul & Repair to attend. There will be no pre-requirement of experience in equipment repair but the number attending will be limited to 9. A certificate of attendance will be provided.

The full 5 day training and assessment program will be available to personnel with experience in equipment repair, with the number attending limited to 9. Certificates of Assessed Training will be awarded by EASA for personnel who have demonstrated the skill, knowledge and understanding to the standard defined for Operatives and Responsible Person. Details of the EASA Ex Training are available in the Ex Training and Assessment Scheme Rules.

Members wanting to apply for IECEx 03 Service Facility Scheme or the IECEx 05 ExPCC Scheme should visit the www.iecex.com web site to identify IECEx Certification Bodies accredited within these Schemes within their region. In the UK go to www.competency.baseefa.com .

Dates for your Diary

EASA European & World Chapter - Spring Council Meeting 24th April 2015 – Hamburg, Germany
Webinar Assessing Impeller Damage - Wednesday, April 8, 2015 12:00pm to 1:00pm Central Time Zone
3 Year Refresher - April 14th and 15th, 2015 Birmingham, England
1 Day awareness - 27th of April 2015 Birmingham, England
3 days EX Equipment Users and Commercial & Sales Management - 27th - 29th April 2015, Birmingham, England
Explosive Equipment FULL course – 27th April - 1st May 2015, Birmingham, England
Webinar Troubleshooting AC Generators and Alternators - Wednesday, May 13, 2015 12pm to 1pm Central Time Zone
EASA International - Convention - 14th to 16th June 2015 - San Antonio, Texas, USA
EASA European & World Chapter - AGM & Convention 24th to 26th September 2015
Explosive Equipment 1 Day Awareness – 16th November 2015, Birmingham, England
3 days EX Equipment Users and Commercial & Sales Management - 16th - 18th November 2015 Birmingham, England
Explosive Equipment FULL course – 16th - 20th November 2015, Birmingham, England

Please contact EASA on email - secretary@easa9.org for any further information.

Whats New?

UK engineering is 'facing a cliff edge'

UK engineering companies need 182,000 people with engineering skills to enter the market every year until 2022 but there is currently an annual shortfall of 55,000 – according to a new report from EngineeringUK, the independent organisation that promotes engineering in the UK. It says that if enough skilled people were available, engineering could generate an extra £27bn per year for the UK economy from 2022 –¬ the equivalent of building 1,800 schools or 110 hospitals.

The report – Engineering UK 2015: The State of Engineering – shows that engineering already accounts for almost a quarter (24.9%) of UK turnover. This is 9% higher than it was at the start of the recession. But the report calculates that the number of engineering apprentices and graduates entering the industry will need to double to meet projected employer demand.

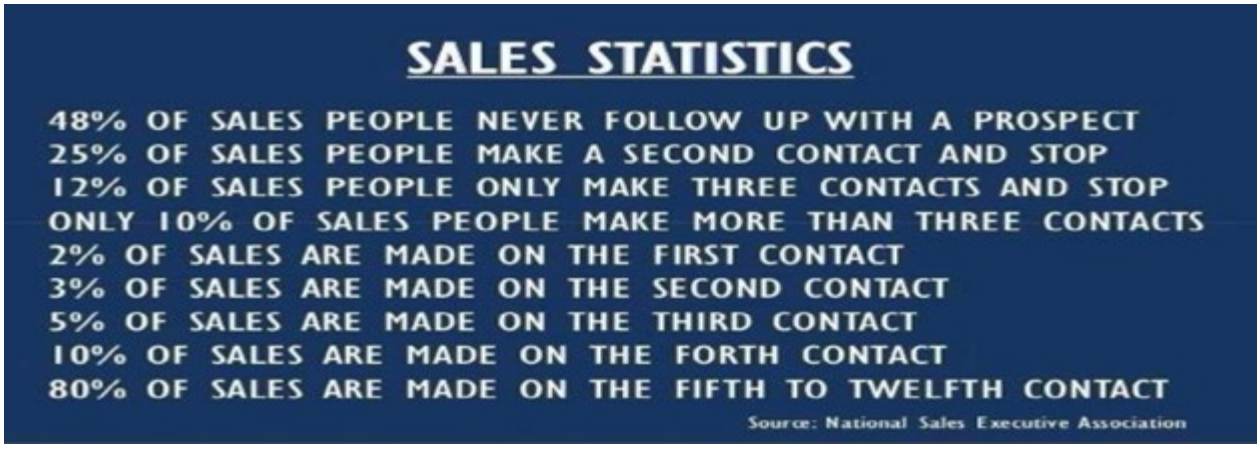
Read More at: http://www.drivesncontrols.com/news/fullstory.php/aid/4691/UK_engineering_is__91facing_a_cliff_edge_92.html

Global IE4 motors market heads towards $300m

The global market for IE4 "super-premium efficiency" motors is expanding at double-digit rates and will more than double in size between 2013, when it was worth $115m, and 2018, when it will generate more than $297m in revenues. This prediction is made in a new report from IHS which also suggests that the number of suppliers of IE4 machines will soar from just two when the market emerged in 2009, to as many as 30 by 2018.

Read More at: http://www.drivesncontrols.com/news/fullstory.php/aid/4695/Global_IE4_motors_market_heads_towards_$300m.html

Contentious Corner



Do you agree? Please let us have your views, your thoughts, your suggestions at secretary@easa9.org

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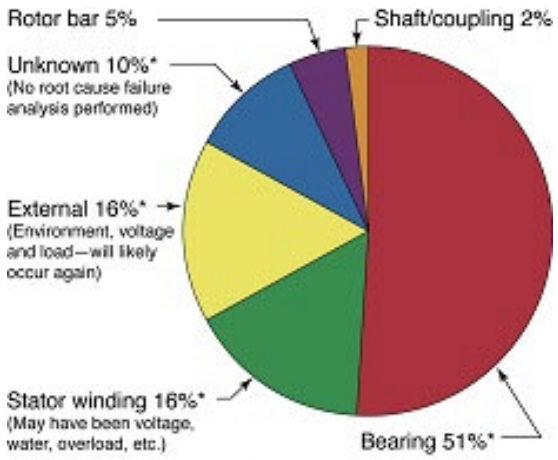
Technical Article - Why Motors Fail

WHY MOTORS FAIL By Austin Bonnett and Chuck Yung EASA, Electrical Apparatus Service Association

INTRODUCTION
The squirrel cage induction motor remains the workhorse of industry because of its versatility and ruggedness. It has its limitations, however, which, if exceeded, will cause the stator, rotor, bearings or shaft to fail. Numerous industry suveys document which parts fail and how, but very little data is available to explain why a given part fails. As industry's approach to maintenance and repair gradually evolves from reactive and preventive to diagnostic and predictive, it is important to pay more attention to root cause failure analysis. Neglecting to do so often will result in repeated failures and expenditure of valuable resources and time to get back online.

FAILURE SURVEYS
Most failure survey data for electric motors is influenced by the particular industry, the geographic location and the combination of the motors in use. Therefore, specific numbers may not always be relevant. Most failure surveys focus on the component that actually failed but do not address the root cause of that failure. As an example, a bearing failure is not the root cause; it is simply the component that failed. The root cause may be contamination, vibration, lack of lubrication, etc. The data provided by the Institute of Electrical and Electronics Engineers (IEEE) study shown in Figure 1 is helpful because it points to the most likely cause of motor failure by virtue of which component has failed. It is the responsibility of those analyzing the failure to search for the root cause that led to the failure of that particular component. The percentages in Figure 1 may vary for a specific industry or location.

FIGURE 1: DISTRIBUTION OF FAILED COMPONENTS



*For each component shown, appropriate measures to prevent or predict the failure could greatly reduce three-quarters of motor failures.

A Survey of Faults . . . IEEE Petroleum and Chemical Industry Paper No. PCIC-94-01, Olav Vaag Thorsen and Magnus Dalva.

FIGURE 1: DISTRIBUTION OF FAILED COMPONENTS
The real challenge lies in reducing the large category of "unknown" failures. It is these "unknown" failures that make analyzing the entire motor system so critical.

ROOT CAUSE METHODOLOGY
Root cause methodology is a step-by-step method for examining a failed motor and its system. It focuses on the stresses that acted upon the failed component. By better understanding these stresses, the service center is more likely to uncover the root cause of the failure.

The five key steps in root cause methodology are:
•Failure mode: The manifestation, form or arrangement of the failure (e.g., turn-to-turn, phase-to-phase, etc.). •Failure pattern: How the failure is configured (e.g., symmetrical or asymmetrical). •Appearance: Examination of the failed part, the entire motor and the system in which it operates. Care must be taken to inspect all motor parts for damage, contamination, moisture, cracks or other signs of stress. •Application: A close examination of the work performed by the motor and the characteristics of those types of loads •Maintenance history: An examination of the work performed to keep the motor and system in prop operating condition. In an ideal world, all relevant information pertaining to the application, appearance and maintenance history would be available prior to the actual inspection of the motor or failed component. In real life, however, the methodology usually unfolds by first inspecting the failed part, then the motor and finally acquiring information about the application, appearance of the system and the system's maintenance history. This sequence is usually driven by the urgency to return the motor to service as well as the availability of application and historical data.

The good news is that the root cause of failure is obvious in some cases. Such examples could be:
•A balancing weight comes loose and strikes the winding. •The winding is saturated with water. •The bearing lubricant is contaminated. In a case where the root cause must be known, however, it is imperative to complete each step of the methodology.

SUMMARY OF MOTOR STRESSES
Most electric motor failures are caused by a combination of various stresses acting upon the bearings, stator, rotor and shaft (see Table 1). If these stresses are kept within the design capabilities of the system, premature failure should not occur. However, if any combination of the stresses exceeds the design capacity, then the life of the system may be drastically reduced and catastrophic failure could occur. These stresses can be classified as follows:

Technical Article - Why Motors Fail Continued

These stresses can be classified as follows:

•Bearing stresses: Thermal, dynamic and static loading, vibration and shock, environmental, mechanical, electrical. •Stator stresses: Thermal, electrical, mechanical and environmental. •Rotor stresses: Thermal, dynamic, mechanical, environmental, magnetic, residual, miscellaneous. •Shaft stresses: Dynamic, mechanical, environmental, thermal, residual, electromagnetic.

For a more detailed summary of these stresses, see Table 2.

TABLE 1: MOTOR COMPONENTS AND STRESSES

Type of stress	Bearings	Stator	Rotor	Shaft	Frame
Thermal	X	X	X	X	X
Electric/ dielectric	X	X	X		
Mechanical	X	X	X	X	X
Dynamic	X	X	X	X	X
Residual			X	X	X
Electromagnetic	X	X	X	X	
Environmental	X	X	X	X	X

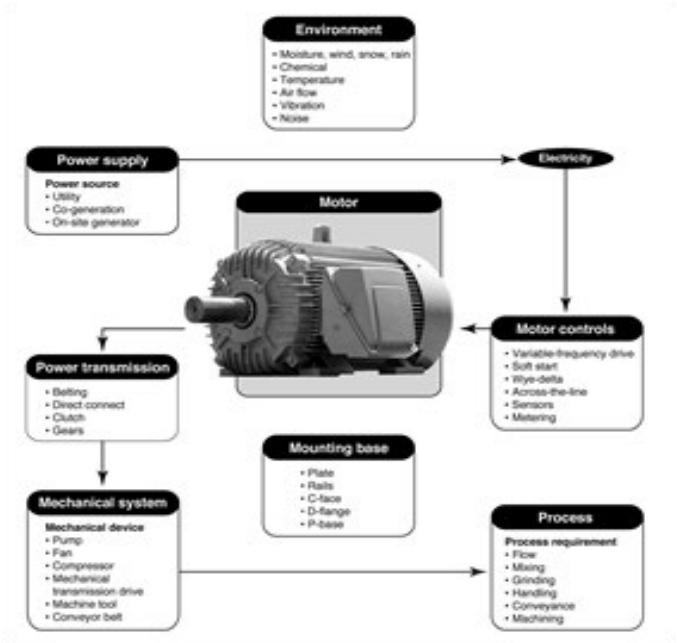
TABLE 2: DETAILED SUMMARY OF MOTOR STRESSES

Motor component	Stress type	Actual stress oe damag
Bearings	Thermal	Friction, lubricantt ambien
	Dynamic and static loading	Radial, axial, preload, misapplicatio
	Vibration and shock	Rotor, driven equipment, syste
	Environmental	Condensation, foreign materials, excessive ambient, poor ventilation
	Mechanical	Loss of clearances, misalignment, shaft and housing fits
	Electrical	Rotor dissymmetry, electrostatic coupling, static charges, variable-frequency drives
Stator	Thermal	Thermal aging, thermal overload, voltage variation, voltage unbalance, ambient, load cycling, starting and stalling, poor ventilation
	Electrical	Dielectric aging, transient voltages, partial discharge (corona), tracking
	Mechanical	Winding movement, damaged motor leads, improper rotor-to-stator geometry, defective rotor, flying objects
	Environmental	Moisture, chemical, abrasion, poor ventilation, excessive ambient
Rotor	Thermal	Thermal overload, thermal unbalance, excessive rotor losses, hot spots/sparking, incorrect direction of rotation, locked rotor
	Dynamic	Vibration, loose rotor bars, rotor rub, transient torque, centrifugal force/overspeed, cyclical stress
	Mechanical	Casting variations/voids, loose laminations and/or bars, incorrect shaft-to-core fit, fatigue or part breakage, improper rotor-to-stator geometry, material deviations, improper mounting, improper design or manufacturing practices
	Environmental	Corrosion, abrasion, foreign materials, poor ventilation, excessive ambient temperature, unusual external forces
	Magnetic	Rotor pullover, uneven magnetic pull, lamination saturation, noise, circulating currents, vibration, noise, electromagnetic effect
	Residual	Stress concentrations, uneven cage stres
	Miscellaneous	Misapplication, effects of poor design, manufacturing variations, inadequate maintenance, improper operation, improper mounting
Shaft	Dynamic	Cyclic loads, overload, shoc
	Mechanical	Overhung load and bending, torsional load, axial load
	Environmental	Corrosion, moisture, erosion, wea
	Thermal	Temperature gradients, rotor bowin
	Residual	Manufacturing processes, repair processe
	Electromagnetic	Excessive radial load, out-of-phase reclosing

Technical Article - Why Motors Fail Concluded

ANALYSIS OF THE MOTOR AND SYSTEM
Surrounding the motor is a system that consists of the power supply, mounting, coupling and driven equipment. The environment, including the ambient, acts as an umbrella covering all of the elements of the system. Even the end product or process can be considered part of this system (see Figure 2).

Many factors affecting the system will also affect the motor and may contribute to the motor failure and vice versa. Failure to consider each of these elements of the complete motor system could lead to an incorrect diagnosis of the root cause of failure. An effective tool for a systems approach is to conduct a failure mode effect analysis (FMEA) of the complete system. The idea is to determine what the possible failure modes are for a component and then determine how that failure can impact the system where the component resides. This will offer at least some of the possible scenarios that can lead to a motor failure. It is important to note that a number of failure mechanisms can lead to the same failed part with a common mode and pattern of failure.
As examples, improper voltage, too much load, blocked ventilation, excessive cycling and excessive ambient can all produce the same type of winding failure. It is not always possible to correctly identify the problem without considering the entire system. In many cases, arriving at the correct conclusion is a process of elimination driven by the collection of accurate data and facts associated with the system.
At the risk of stating the obvious, failure to eliminate the root cause will usually assure expensive downtime and repeated motor failures. A classic example is the repeated replacement of failed bearings without ever trying to determine why they failed.



ARRIVING AT THE CORRECT CONCLUSION
When analyzing a motor failure, it is important not to assume facts that may fill in the gaps in information supplied by the customer. The service center often does not know much about the motor application, much less the power supply and/or maintenance history. The customer dealing with the service center is probably not the person who removed the motor from service, and may not be the operator who is familiar with the motor or its application. Incorrect, incomplete or even misleading information is the norm. It may be impossible to draw the correct conclusion from the evidence provided. Never assume a piece of evidence exists just to force the "conclusion" to fit the "facts." When a conclusion is built around erroneous information mingled with "facts," the root cause of failure is seldom correct. The result is additional failures or assigning blame to the wrong parties.

EXAMPLE
A winding has failed, after a very short run time, with a turn-to-turn failure. The customer might believe the motor's short life indicates poor workmanship, whether the motor is new or rewound. The customer failed to advise (or the service center failed to ask) that the motor was operating on a pulse width modulated (PWM) drive with a 30 metre cable run. This would have been a valuable piece of information for the service center and, at the same time, it would have accurately described the motor's power supply. (PWM drives produce voltage transients that can harm windings unless they are wound using special inverter-duty magnet wire.) Unless informed that the motor is operating from a PWM drive, the service center "forces" the conclusion that the motor manufacturer damaged the winding, even though there was no such evidence. The manufacturer "must have damaged it in some not so obvious way." The wrong party is assigned responsibility for, and the cost of, repairing the failed motor. More importantly, the problem is not fixed and will likely occur again. The location of the failure is critical evidence that may explain the real reason for the winding failure. If the turn-to-turn failure is in a coil connected to a line lead, then a transient voltage could be the culprit. The location of this failure should alert the service center to find out more about the power supply and starting method. When a motor is operating from a PWM drive, especially with a long cable run (more than 20 metres), a turn-to-turn failure in the lead coil is a classic indication of high voltage spikes produced by that PWM drive and the long cable run.

The difference in knowledge will:
•Assign the responsibility and cost of the repair to the correct party. •Assure that the root cause of the failure is identified and corrected. •Ensure that the appropriate winding materials are used in the rewind.

ABOUT THE AUTHORS
Chuck Yung is a Senior Technical Support Specialist at the Electrical Apparatus Service Association (EASA). Austin Bonnett is EASA's Education and Technology Consultant. EASA is an international trade organization of more than 1900 in 62 countries that sell and service electrical, electronic and mechanical apparatus. For more information, go to www.easa.com.

Karsten Moholt Exceptional Achievement Award

The Karsten Moholt Exceptional Achievement Award is made annually in the memory of Karsten Moholt and Karsten Aleksander Moholt who are past Presidents and Regional Director of EASA European & World Chapter.

Their exceptional guidance and leadership of our Chapter is remembered by awarding young people, under the age of 30, within our industry who have demonstrated improvements within their company up and above expectations.

A financial contribution will be made by the Chapter to the winner of this award to visit other member's facilities within our Chapter in order to extend their understanding of the industry and learn new ideas, methods and cultures.

The rules of the scheme are as follows:

- **A nominee for the award must be employed by a Member firm**
- **Only a Member firm can make a nomination**
- **A Member can make more than 1 but not exceeding 3 nominations per year**
- **Nominations must include specific reasons why the nominee is thought to be worthy of the award**
- **All nominations must be accompanied by 2 corroborating letters of recommendation from other than the nominating firm**
- **All nominations must be submitted to the Secretary no later than 1st July each year**
- **A committee consisting of the current President, Immediate Past President and a member of the Moholt family will decide the winner**
- **The award will be presented at the annual AGM by a member of the Moholt family**

Do you know of an Exceptional Member Individual?

If so, nominate them for the Karsten Moholt Exceptional Achievement Award

Nominating Form

Nominee Name _____

Member Company _____

Address _____

Post Code _____

Phone: _____ Email: _____

I make this nomination for the following reasons (attached additional information if necessary)

_____

_____

*All nominations shall automatically be re-entered into the pool of nominees for a period of 3 years after the nomination is received

Name of person making the nomination _____

Company _____

Address _____

Post Code _____

Phone: _____ Email: _____

Website:_____

Forms Available at http://www.easa9.org/karsten-moholt-award/
All Form to be Returned by July 1st Please attach corroborating letters of recommendation

EASA 2015 Trade Show and Conventions

San Antonio Texas

June 14th - 16th 2015 Early Bird Education June 13th

Why You Should Attend the 2015 EASA Convention

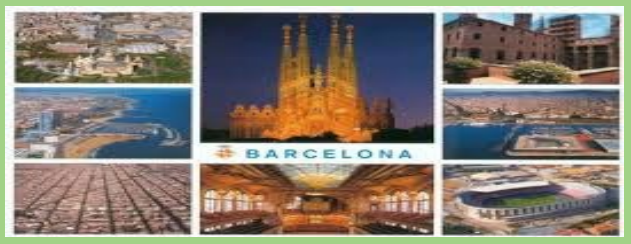
2,500 number of participants, 820 firms attending with 210 exhibitors
Don't miss out on the largest convention on Motor systems, repairs and maintenance in the world

Excellent Education Opportunities - Face-to-Face Networking - Meet New Vendors & Suppliers - Keep Current on Industry Trends & New Products - Have Fun at Great Social Events

To Register click below link

http://www.easa.com/convention

EASA European & World Chapter's AGM and Convention 2015



Save the Date
Location - Barcelona, Spain
24th - 26th September 2015

Booking Forms Available Soon

2015 Training Schedules & Information on Available Courses

Explosive Atmosphere Equipment Training - 1 Day Awareness:

Designed for organisations considering registering for the IECEx/EASA Scheme

Available to anybody who wanted awareness training in Ex Equipment and Overhaul, this is to enable Ex Equipment Users and Commercial & Sales Management & personnel to attend. There will be no pre-requirement of experience in equipment repair. A Certificate of attendance will be provided

Skill | Knowledge | Attitude | Training | Experience

Explosive Atmosphere Equipment Training - 3 days EX Equipment Users and Commercial & Sales Management:

For organisations requiring greater knowledge for using, managing EX Equipment Overhaul & Repair or selling the IECEx/EASA Scheme

Available to anybody who wanted awareness training in Ex Equipment Overhaul & Repair, to enable Ex Equipment Users and Commercial Managers who require greater knowledge of Ex Equipment Overhaul & Repair to attend. There will be no pre-requirement of experience in equipment repair but the number attending will be limited to 9. A certificate of attendance will be provided.

Skill | Knowledge | Attitude | Training | Experience

Explosive Atmosphere Equipment Training - Full Course:

Requirement for Competent Craftsmen Engineers and Authorised Persons

The full 5 day training and assessment program will be available to personnel with experience in equipment repair. Certificates of Assessed Training will be awarded by EASA for personnel who have demonstrated the skill, knowledge and understanding to the standard defined for Operatives and Responsible Person.

Skill | Knowledge | Attitude | Training | Experience

Explosive Atmosphere Equipment Training - 3 Year Refresher:

Follow on from the Initial 5 Day Training Senior Managers, Authorised Persons, Supervisors/Team Leaders

2 day refresher course every three years which will assess knowledge and understanding, practical skills will be verified by demonstration of practical skills.

Skill | Knowledge | Attitude | Training | Experience

Discounts available on 3 or more staff if registered 6 weeks in advance of the course date!

2015 Training Schedule Table

Course No:	Type:	Training Dura-tion (days)	Training Dates	Trainer	Venue	EASA Member Price	Non Member Price
	Assessing Impeller Damage		Wednesday, April 8, 2015 12:00pm to 1:00pm Central Time Zone	Webinar		$59 per site	$199 per site
	Explosive Atmosphere Equipment Training - 3 Year Refresher Managers & RPs Repair and Overhaul Ex. Atmosphere Equip.	2	14th & 15th April 2015	Bob Pearce Flexi Tech Training Ltd	Birmingham England	£650	£728
	Explosive Atmosphere Equipment Training - 1 Day Awareness of Ex. Atmosphere Equip.	1	27th April 2015	Bob Pearce Flexi Tech Training Ltd	Birmingham England	£215	£240
	Explosive Atmosphere Equipment Training - 3 days EX Equipment Users and Commercial & Sales Management	3	27th - 29th April 2015	Bob Pearce Flexi Tech Training Ltd	Birmingham England	£837	£937
	Explosive Atmosphere Equipment Training - Full Course Operatives & RPs Repair and Overhaul Ex. Atmosphere Equip.	5	27th April - 1st May 2015	Bob Pearce Flexi Tech Training Ltd	Birmingham England	£1395	£1562
	Troubleshooting AC Generators and Alternators		Wednesday, May 13, 2015 12:00pm to 1:00pm Central Time Zone	Webinar		$59 per site	$199 per site
	Explosive Atmosphere Equipment Training - 1 Day Awareness of Ex. Atmosphere Equip.	1	16th November 2015	Bob Pearce Flexi Tech Training Ltd	Birmingham England	£215	£240
	Explosive Atmosphere Equipment Training - 3 days EX Equipment Users and Commercial & Sales Management	3	16th - 18th November 2015	Bob Pearce Flexi Tech Training Ltd	Birmingham England	£837	£937
	Explosive Atmosphere Equipment Training - Full Course Operatives & RPs Repair and Overhaul Ex. Atmosphere Equip.	5	16th to 20th November 2015	Bob Pearce Flexi Tech Training Ltd	Birmingham England	£1395	£1562

Discounts available on 3 or more staff if registered 6 weeks in advance of the course date!

FREE Advertising