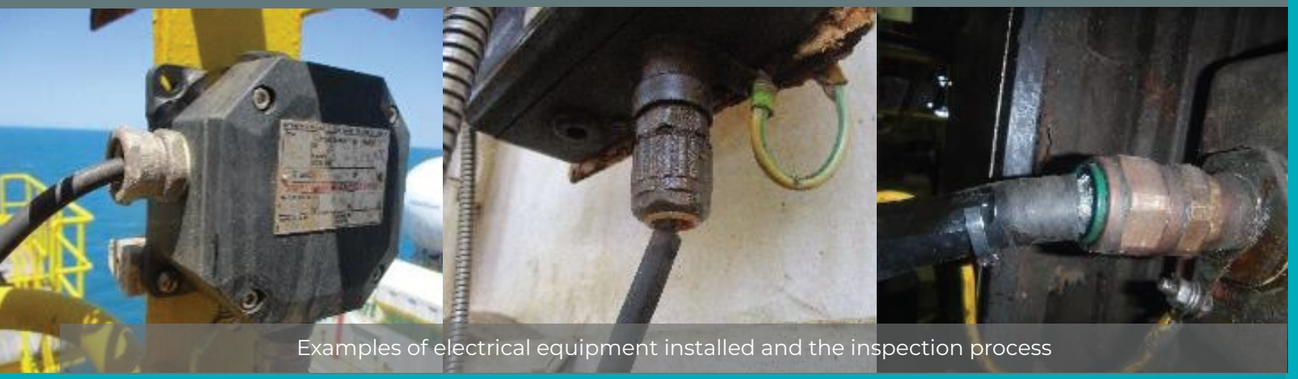
OES | ASSET INTEGRITY MANAGEMENT
A JOULON COMPANY

INTRODUCTION TO AN EX [EXPLOSION] PROOF PROTECTION SYSTEMS SURVEY

OES are the leaders in EX inspections throughout the globe, performing these inspections and remedial repairs on offshore and onshore drilling rigs. OES have an extensive track record over the course of three decades.



Examples of electrical equipment installed and the inspection process

WHAT IS AN EX-SURVEY?

In the upstream oil and gas industry, it is a fact that gases, vapours, and mists can potentially escape during the production, processing, transportation, and storage of flammable substances. These flammable gases, vapours, and mists, form an explosive atmosphere with the oxygen in the air. If this atmosphere is ignited, an explosion could potentially take place, which could result in severe harm to human life, the environment and equipment damage. To avoid the danger of explosions, protective specifications in the form of laws, regulations, and standards have been developed worldwide. The aims of these procedures are to provide an overview of the field of explosion protection, in conjunction with electrical apparatus and installations of this equipment in areas that are defined as hazardous.

Ex inspections are driven by the International Electrotechnical Commission [IEC] series of standards. These standards require that electrical apparatus and equipment located in a hazardous area are of an approved design and then inspected prior to use (initial inspection) to ensure it is safe to energise in a hazardous area and that the explosion protection integrity has not been compromised, and also on a regular basis (periodic inspections) to ensure that the equipment has not been damaged, and that its Ex properties have not been compromised by corrosion, decay, wear and tear, etc.

ARE THERE DIFFERENT TYPES OF EX-SURVEYS, AND WHAT ARE THESE?

There are four ‘grades’ of Ex inspection applicable to certified electrical equipment installations: initial, Visual, Close, and detailed; The ‘grade’ of inspection relates to the amount of detail involved in the inspection. These are explained below

INITIAL DETAILED INSPECTION

To ensure the installation quality and integrity of Ex-rated equipment post installation an intrusive inspection by a competent person should be carried out. This is described within the requirements of IEC 60079-17 as an ‘Initial Detailed Inspection’. If carried out correctly, such an inspection will ensure that the equipment, including its internal and external components, are fit for purpose and installed correctly.

VISUAL INSPECTION

This grade of inspection is usually carried out on a regular (periodic) basis, to confirm equipment has not been damaged or tampered with, and / or as part of an overall assessment of the equipment and systems at a facility. This will identify any external damage or changes leading to non-conformances, with equipment that has already previously been surveyed to a more stringent level. A visual inspection identifies those defects that are apparent to the eye without access to the equipment (eg. missing bolts, and unplugged cable entries).

CLOSE INSPECTION

A close inspection covers all the aspects covered by a visual inspection, and in addition, identifies those defects that are only apparent when the equipment can be accessed (eg. loose bolts or glands, IP washers not fitted, etc.) In addition, certification plate details, including checks for conditions of use, can be actioned during a close inspection. Ex equipment should be installed where it is accessible for maintenance and inspection, therefore, most of the Ex-equipment can easily be inspected at a close category.

Note: This is the minimum level of a survey required to produce a hazardous area equipment register.

DETAILED INSPECTION

This grade of inspection is usually carried out for initial inspections and/or as part of a thorough assessment of the equipment and systems at a facility. This will identify all non-conformances and is the most comprehensive of all the survey grades. To carry out this level of survey equipment will need to be opened to access internal parts, and in most cases isolated. Due to the meticulous inspections and tests required for this grade of inspection, the time factor to complete this survey is much higher than the other two levels of inspection.

Note: This is the recommended survey to have carried out to ensure all equipment conforms to international standards for use in hazardous areas.

HOW OFTEN SHOULD EX-SURVEYS BE COMPLETED?

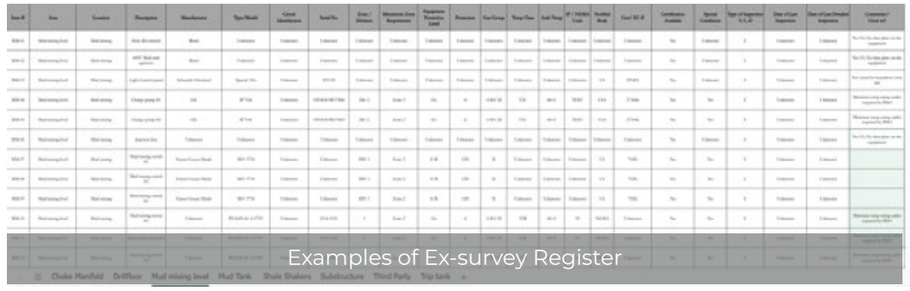
Many drilling contractors take a periodical approach to their Ex-survey inspection, which as described in this document being a visual, close, or detailed survey spread over a period of not less than 3-5 years. There is a requirement laid out in IEC that these should be completed every three years. Some other countries may have more stringent requirements such as Australia and New Zealand requires this completed annually.

A Risk Based Inspection [RBI] approach is often completed and a percentage of equipment is selected to assess whereby it may be decided a 100% visual and 75% detailed inspection may be selected. This strategy takes into consideration the risk of ignition and the particular areas of the unit, which serves as a more positive approach for completing the Ex-survey. Other options are to complete a detailed survey annually of 25% of the equipment, and over 4 years, this would be a fully detailed survey. If the drilling contractor is unsure of how best to manage this, OES can perform an initial survey and then set up the best strategy that will suit the facility.

IS THERE ANY REGULATION OR STANDARDS THAT ARE GOVERNING ELECTRICAL EQUIPMENT LOCATED IN A HAZARDOUS AREA?

Yes, this risk-based inspection process is governed and regulated in accordance with International Electrotechnical Commission [IEC] 60079-17 © IEC:2013. This standard states: Before plant or equipment is brought into service, it shall be given an initial inspection. As part of the plant commissioning and start up procedures, initial inspection and other additional requirements are provided in IEC 60079-14. To ensure that the installations are maintained in a satisfactory condition for continued use within a hazardous area, either.
a) regular periodic inspections, or
b) continuous supervision by skilled personnel, and, where necessary, maintenance shall be carried out.

Electrical equipment that will be installed in a hazardous area must be built, tested, and certified by internationally recognized authorities: ATEX, IECEx, Factory Mutual, or Underwriters Laboratories (UL). Suitability of this equipment for service in hazardous areas is signified by special markings on the nameplate.

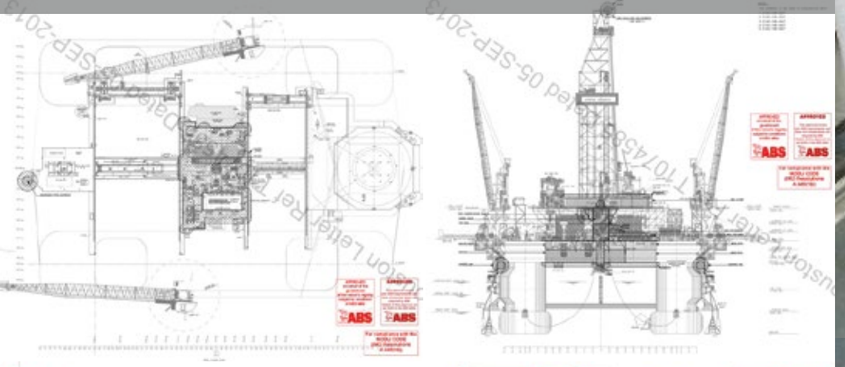


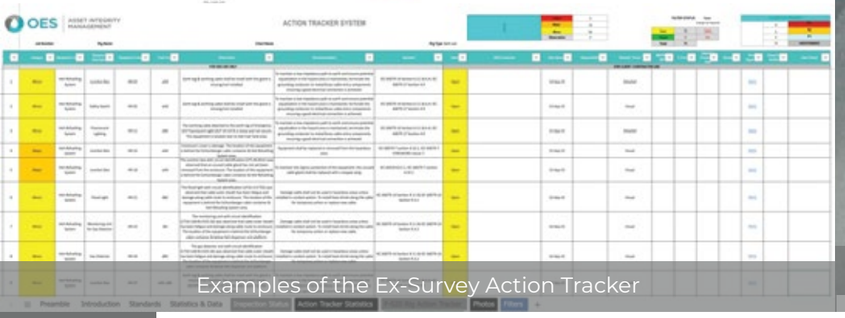
Examples of Ex-survey Register

CAN THESE SURVEYS BE COMPLETED WHILST THE RIGS, VESSELS OR OTHER ASSETS ARE IN OPERATION?

Yes, Ex inspections can be performed whilst in operation and all equipment inspected as per the requirements laid out.

Hazardous area drawings referenced and followed during an Ex-Survey





Examples of the Ex-Survey Action Tracker

Examples of electrical equipment installed and the inspection process

WHAT WILL THE EX-SURVEY DETERMINE?

This survey will establish that all equipment where electrical installations are concerned, are installed in a manner that is correct as per the International Electrotechnical Commission IEC 60079-17 and identify any equipment that does not meet this standard, with a recommendation initiated to repair, replace, or remove the said electrical equipment.

ARE OES PERSONNEL TRAINED TO PERFORM THESE EX-SURVEYS?

Any person involved in performing electrical equipment inspections must be trained by an approved industry provider to ensure that they are trained to the specification, design, installation, inspection, or maintenance of Ex electrical equipment. Our clients can rest assured , all our teams are qualified in both electrical and mechanical Ex inspection and our surveyors are certified to CompEx EX01-06, EX11, EX12 and EX14 dependent on the scope at hand.

WHAT ARE THE CONSEQUENCES, IF WE DO NOT PERFORM EX-SURVEYS?

The survey will further determine and ensure that electrical equipment in a hazardous area is maintained in a satisfactory condition for continued use; Regular periodic inspections, and continuous supervision by skilled personnel should be carried out. If this is not completed, factors affecting equipment condition could include mechanical damage, unauthorized modifications, damage from corrosion or exposure to chemicals, damage due to water / dust ingress, lack of correct maintenance, excessive ambient temperature, vibration and alignment and training and experience of personnel.

Employing competent, impartial, and independent Ex inspectors to inspect installations and carry out regular periodic inspections, is a key element to detecting and rectifying problems early. Furthermore, engaging a competent inspector to monitor any new installation, offer advice and potentially mentor as the installation progresses is an area that is often overlooked. However, by doing so there is significant potential to minimise or eliminate the need for rework after inspection.

ARE OES ABLE TO CARRY OUT REMEDIAL REPAIRS POST THE EX-SURVEY?

Yes, OES have a team of qualified personnel who are also trained and competent in the design, selection, installation, repair of electrical apparatus that will be installed in a hazardous area location.

For further information on EX CompEX Surveys and benefits to your company's assets, please contact our specialist team at **info@oesgroup.com**

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