4.1.1 Identifying applicable rules and regulations

Practical guidance – industrial robots

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Guidance on identifying applicable rules and regulations for robots for inspection and maintenance in the oil and gas industry

There are no European laws or regulations specifically addressing the use of robotics in the oil and gas industry. In June 2013, the European Commission passed Directive 2013/30/EU of the European Parliament and of the Council of 12 June 2013 on safety of offshore oil and gas operations and amending Directive 2004/35/EC [1]. While this directive does not explicitly address the issue of the use of robots in the oil and gas industry, it does contain provisions that operators must consider.

Owners or operators must submit documents before engaging in offshore oil and gas operations, which include accident prevention policies, reports on major hazards, internal emergency response plans, and other documents [2]. For robot operators, these documents should be prepared with the use of robotics technology in mind, so that risk assessments and responses could take its use into account.

In the UK, the Pipelines Safety Regulations 1996 governs the design, construction, and maintenance of pipelines, including those for oil and gas [3]. Section 13 states that '[t]he operator shall ensure that a pipeline is maintained in an efficient state, in efficient working order and in good repair' [4]. Nothing in the regulations specifies that the maintenance must be performed by humans, so the use of robots to ensure the integrity of the pipes would be lawful under existing regulations.

Oil & Gas UK, a trade association, released the Unmanned Aircraft Systems (UAS) Operations Management Standards and Guidelines in January 2017 for drones used in the oil and gas sector, which was reissued in 2019 as the Unmanned Aircraft Systems Operations for Offshore Installations Guidelines. In addition to meeting the basic requirements of operating drones, there is additional guidance on operating drones specifically in the oil and gas domain [5].

The risk assessment must take into consideration the special nature of the operations on the oil and gas installations [6]. The emergency response plan must also be tailored to the industry and should include, for example, procedures for 'containment of damaged batteries and specific handling instructions and equipment … for some composite materials when the integrity of the composite is compromised' [7].

The operator must have in place a safety management system [8]. The pilot must have specific oil and gas training and certification to deal with the specific conditions of the industry [9]. The training consists of three different parts: training content prior to onshore, training content prior to offshore and flight training. The complete training includes, for example, '[d]etailed systems training', '[h]azard awareness and risk management in complex industrial environments', '[d]ata collection techniques', '[a]dvanced flight skills – look-down scenarios, close to structures, all orientations', '[o]perations in areas with magnetic

interference', '[o]perations under deck and lookdown scenarios including GPS denied areas', '[o]perating in induced turbulence and rotor streaming areas', and '[f]light skills assessments in confined areas and close to structures' [10].

The aerial robot itself 'should ideally be capable of being operated safely in wind speeds of up to 25 knots in order to offer a practical operational envelope' due to the likely offshore conditions [11]. Additionally, several system requirements are set out that determine the airworthiness of the system, for example, whether the aircraft can 'operate in the typical wind speeds encountered offshore', is 'resistant to magnetic interference', and, along with associated systems, is 'intrinsically safe' [12].

RenewableUK, a trade association, has also provided high-level guidelines on incorporating the use of drones for projects on the UK Continental Shelf [13]. The factors that need to be considered are: 'Safety Management System', 'Operating Requirements and Procedures', 'Operating Safety Case', 'Training, Assessment and Currency', 'Aircraft Systems', 'Task Specific Risk Assessment', and 'Emergency Procedures' [14].

Gómez and Green propose a number of factors that need to be assessed when choosing drones to be used in monitoring in the oil and gas industry. Most importantly, the type of information needed, terrain conditions, flight distance, and the type of offshore platform are considerations that must be taken into account [15].

Summary of applicable guidance

- Directive 2013/30/EU does not contain specific rules that regulate robots in the oil and gas industry, but must still be considered.
- The Pipelines Safety Regulations 1996 does not exclude the use of robots in the oil and gas industry, particularly with regard to pipeline maintenance.
- Oil & Gas UK's Unmanned Aircraft Systems (UAS) Operations Management Standards and Guidelines, revised in 2019, provides more specific guidelines when it comes to the use of drones in the context of offshore installations.
- RenewableUK has published guidelines on incorporating the use of drones for projects on the UK Continental Shelf, with several factors that need to be taken into account.

References

[1] European Parliament and Council Directive 2013/30/EU of 12 June 2013 on safety of offshore oil and gas operations and amending Directive 2004/35/EC [2013] OJ L178/66.

[2] European Parliament and Council Directive 2013/30/EU of 12 June 2013 on safety of offshore oil and gas operations and amending Directive 2004/35/EC [2013] OJ L178/66, art 11(1).

[3] The Pipelines Safety Regulations 1996, SI 1996/825.

[4] The Pipelines Safety Regulations 1996, SI 1996/825, s 13.

[5] Oil & Gas UK, Unmanned Aircraft Systems Operations for Offshore Installations Guidelines (Oil & Gas UK 2019). With regard to the regulation of drones in this context, further reference is made to the Air Navigation Order 2016, SI 2009/3015.

[6] Oil & Gas UK, Unmanned Aircraft Systems Operations for Offshore Installations Guidelines (Oil & Gas UK 2019) para 3.8.

[7] Oil & Gas UK, *Unmanned Aircraft Systems Operations for Offshore Installations Guidelines* (Oil & Gas UK 2019) para 3.10.3.

[8] Oil & Gas UK, *Unmanned Aircraft Systems Operations for Offshore Installations Guidelines* (Oil & Gas UK 2019) para 3.3.

[9] Oil & Gas UK, *Unmanned Aircraft Systems Operations for Offshore Installations Guidelines* (Oil & Gas UK 2019) para 3.6.2.

[10] Oil & Gas UK, *Unmanned Aircraft Systems Operations for Offshore Installations Guidelines* (Oil & Gas UK 2019) para 3.6.4.

[11] Oil & Gas UK, *Unmanned Aircraft Systems Operations for Offshore Installations Guidelines* (Oil & Gas UK 2019) para 4.5.5.2.

[12] Oil & Gas UK, Unmanned Aircraft Systems Operations for Offshore Installations Guidelines (Oil & Gas UK 2019) para 3.7.

[13] RenewableUK, *Offshore Renewables Aviation Guidance (ORAG): Good Practice Guidelines for Offshore Renewable Energy Developments* (RenewableUK 2019).

[14] RenewableUK, *Offshore Renewables Aviation Guidance (ORAG): Good Practice Guidelines for Offshore Renewable Energy Developments* (RenewableUK 2019) 36.

[15] C Gómez and DR Green, 'Small unmanned airborne systems to support oil and gas pipeline monitoring and mapping' (2017) 10 Arabian Journal of Geosciences 202.