Some Ergonomic Issues of DP Vessel Controls

Health and Safety Executive - Safety Alert	
Department Name:	Maritime Integrity Team
Bulletin No:	ED3 2016
Issue Date:	19 December 2016
Target Audience:	Dynamically positioned vessels and offshore installations, drilling rigs, flotels etc.
Key Issues:	Human factors - Ergonomics - protection against accidental change of mode of control - Adequate display of active control mode (DP or manual) .

Introduction

A semisubmersible DP drilling rig lost control of position for several minutes. During this time it was obliged to shear the drill pipe and disengage the lower marine riser package, LMRP. The initial loss of control was due to accidental disengagement of the DP system. The crew immediately noticed loss of position but did not appreciate that DP was disengaged. They initially believed there was a technical fault with the DP and it took 6 minutes before they realised the DP was disengaged.

Both the loss of position control and the inadequate initial crew response were due to poor ergonomic design of the control system. Firstly, the button for transfer from DP to manual control was not protected against accidental operation. Secondly, there was no clear indication at the DP desk that DP was no longer engaged, and that the vessel was then under manual control.

Cause

The Company's investigation found that the initiation of the incident was accidental, unknowing, operation of the button used to transfer control from DP to manual. (A dual push was required but this gave inadequate protection in this instance.)

The DP Operators thought that DP was still engaged and continued to operate at the DP control desk and tried to find a technical fault. There was no clear indication at the DP desk that control had passed from DP to manual lever mode. (The utility panel for selection of DP or manual mode was some distance away from the DP desk, and there was no clear indication on the DP screen.)

Two ergonomic factors contributed to this incident:

1. **Inadequate protection against accidental change of DP status – mode of control**

   Industry guidance is provided in Ref 1; Section 2 Controls 2.7 Prevention of Accidental Activation which states:

   Controls should be designed and located so they are not susceptible to accidental activation. Methods to reduce the likelihood of accidental activation include:

   i) Locating and orienting the control so that bumping is unlikely to cause activation
   ii) Providing sufficient control resistance to prevent unintentional movements
   iii) Requiring complex motions for control activation, such as an interlock or rotary motion
   iv) Restricting access to controls by isolating them or by providing a cover guard or physical barrier

Since the incident, a cover guard has been fitted to the button.

2. **Inadequate indication of Status or Mode of Control**

   There was no clear indication at the DP control desk that DP was disengaged and the vessel was now under manual control.

   Industry guidance in Ref 1, Section 3 2.4 Status Information states:

   - Visual displays should provide a positive indication of the state of the equipment such as: ready, running, not running, etc.

   Similarly ref 2, Section 3.4.1.3 states:

   - The active (control) mode should be clearly displayed.

Supporting concerns

Since the incident, tests were conducted on the onboard simulator of another DP drilling rig. Control was switched from DP to manual and it was found that no clear indication of the transfer was displayed on the DP desk screen.

Also, recently the Australian authorities have issued a Safety Alert, Ref 4, following a similar incident where DP was inadvertently disengaged.

Action required

Operators of dynamically positioned vessels and offshore installations should review the ergonomic aspects of their control system. In particular they should check

i. whether accidental change of system mode from automatic to manual is protected against
ii. that the status of the system, i.e. whether under DP or manual control, is clearly displayed at all relevant control stations.

Where weaknesses are found;
1. crews should be alerted to the situation, and
2 appropriate improvements should be made to the DP control system in line with references 1 & 2.

References

1. American Bureau of Shipping - ‘Guidance Notes on The Application of Ergonomics to Marine Systems’ 2013
2. International Maritime Organisation - Guidelines for Vessels with Dynamic Positioning Systems’ MSC Circular 645
3. UK Legislation - ‘The Provision and Use of Work Equipment Regulations 1998’ SI 2306 1998
   Regulation 4 - Suitability of work equipment
   Regulation 14 - Controls for starting or making a significant change in operating conditions
4. NOPSEMA (National Offshore Safety and Environmental Management Authority)
   Safety Alert 62 June 2016 ‘Vessel loss of position while diving in close proximity to a hydrocarbon facility’

Further information

Contact the HSE’s ED 4.3 Maritime Integrity team for further information

General note

This Safety Notice should be circulated to all relevant duty holders/employees that are involved in the design, selection and operation of dynamically positioned vessels in the offshore industry.