

Overboard Scaffolding Operations and their Effect on Diving Safety



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- ◆ Safety, Environment & Legislation

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1 Introduction

Outboard activities on offshore installations including movement of tubulars, scaffolding erection and dismantling etc., present an inherent danger of falling debris which creates an obvious hazard for diving support activities taking place underneath, in the immediate vicinity and for divers in the water. Whilst debris accidentally dropped into the sea can have many different shapes and forms which will affect its trajectory and speed in the water, tubulars and scaffolding poles are the most likely causes of potential hazard due to their frequency of use.

Many divers have reported scaffolding poles lodged in a vertical position in the seabed around offshore installations. This obviously places divers at risk from 'spearing'. In addition, scaffolding poles (as well as other objects) have demonstrated that they can glide in water a considerable distance away from the vertical before reaching the seabed.

2 Scope

- 2.1 This guidance *primarily* addresses the implications of dropped scaffolding poles on diving safety. It assumes that these are straight, without clamps or other devices attached and will therefore travel through the water with the minimum of drag.
- 2.2 Whilst there is no known scientific evidence available at the present time applicable to other cylindrically shaped objects such as tubulars, casings etc., these will behave according to the same principles as scaffolding poles and it may be considered appropriate to extrapolate the guidance given here to such operations. However, it should be borne in mind that the additional weight and dimensions of such items will have an effect on trajectory and this should be suitably evaluated.
- 2.3 Consideration should be given to extrapolating the guidance given here to any other type of overboard activity which could result in divers being placed at risk through the dropping of objects which are likely to plane in their passage through the water, e.g. cargo containers, sheet metal etc.

3 Objectives

The objectives are to highlight the dangers of scaffolding activities and to provide more definitive guidance than has hitherto been available on the horizontal separation required between diving and simultaneous topside operations as defined in 2 above in order to minimise the risk of injury to divers and damage to equipment.

4 Application

The guidance is applicable in any geographic area in addition to national regulations which must always be adhered to.

5 Background

- 5.1 Establishing a safe horizontal separation between divers and the above activities is fraught with difficulty due to many factors the most important of which are: the scarcity of reliable data; the partial scope of existing studies; incomplete knowledge of the effect of current on water-borne debris; and the difficulties encountered offshore in estimating distance. A scientific study carried out on trajectories of scaffolding poles dropped into the water identified the following factors which have a major effect on such movement:
 - a) The angle of inclination e.g.:
 - ◆ Poles falling at an inclination exceeding 45° from the horizontal are more likely to maintain their angle of inclination all the way to the bottom
 - ◆ Poles falling at an inclination less than 45° from the horizontal are less likely to maintain their angle of inclination and may travel more slowly and in a 'dead leaf' fashion;
 - b) orientation relative to wave and current direction;
 - c) current speed;

- d) wave height and period;
- e) time relative to wave crest;
- f) aerial drag coefficient.

The results of this study indicated that a factor of distance equal to the depth of the diver's intervention should be applied to provide safe horizontal separation. However, there are many factors which affect the action of dropped scaffolding poles through water in a practical situation and industry experience over the years, before and after the study, has shown that this can be unpredictable. There have been many instances, for example, when poles have been found further away than should have been expected according to available data. Historically, therefore, in order to protect the diver, industry practice has been to apply safety margins ranging from 10-30% according to individual company policy and conditions at the work site. It is now considered that more definitive guidance is required.

6 Recommendations

Based on the foregoing, the following guidance is recommended.

- 6.1 Diving operations must not be conducted directly underneath activities such as scaffolding or overboard movement of tubulars or any other construction work.
- 6.2 Between scaffolding activities and diving operations as defined in the Scope, a minimum horizontal distance should be applied of 1.3 times the depth at which the diver is working, i.e. a minimum safety margin of 30%.