

Accident statistics for fixed offshore units on the UK Continental Shelf 1980-2005

Prepared by **Det Norske Veritas**
for the Health and Safety Executive 2007

Accident statistics for fixed offshore units on the UK Continental Shelf 1980-2005

Det Norske Veritas
Veritasveien 1
N-1322 Hovik
Norway

In 2000, a project was undertaken by Det Norske Veritas (DNV) on behalf of the UK Health & Safety Executive (HSE) with the purpose of obtaining accident statistics for offshore floating units on the UK Continental Shelf (UKCS). In this respect, four databases holding information about incidents having occurred on floating units on the UKCS were interrogated. The survey revealed that none of them had a complete recording of such incidents. Consequently, the event frequencies being obtained varied with the availability of sources.

There was no reason to believe that the situation and figures for fixed installations should be any different. Hence, it was proposed to initiate a series of projects, but addressing all types of risks to fixed units. It should be noted that fixed units in this project are defined as comprising all bottom-fixed structures, but excluding TLPs, FPSOs, FSUs and production jackups even though they are “fixed” during their production phase. The most recent project related to fixed units, Accident Statistics for Fixed Offshore Units on the UK Continental Shelf 1980 – 2003, was completed in 2005. This current project updates the data of the previous project by two further years, 2004 and 2005. This report supercedes Research Report RR349.

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

© Crown copyright 2007

First published 2007

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the copyright owner.

Applications for reproduction should be made in writing to:
Licensing Division, Her Majesty's Stationery Office,
St Clements House, 2-16 Colegate, Norwich NR3 1BQ
or by e-mail to hmsolicensing@cabinet-office.x.gsi.gov.uk

<i>Table of Content</i>		<i>Page</i>
1	EXECUTIVE SUMMARY	1
1.1	Background	1
1.2	Confidentiality	1
1.3	Objectives	1
1.4	Results	2
2	INTRODUCTION	5
3	OBJECTIVES AND SCOPE OF WORK.....	6
4	EXPOSURE DATA.....	7
5	OVERVIEW OF DATABASES	9
5.1	ORION	9
5.2	BLOWOUT	9
5.3	WOAD	10
6	EVENT CLASSIFICATION AND CODING PRINCIPLES.....	11
7	ACCIDENT STATISTICS	13
7.1	Accident frequencies, all databases combined	14
7.2	Occurrence frequencies, all databases combined	14
8	CONCLUSIONS	22
9	REFERENCES	23
Appendix A Detailed Statistics		

1 EXECUTIVE SUMMARY

1.1 Background

In 2000, a project was undertaken by Det Norske Veritas (DNV) on behalf of the UK Health & Safety Executive (HSE) with the purpose of obtaining accident statistics for offshore floating units on the UK Continental Shelf (UKCS). In this respect, four databases holding information about incidents having occurred on floating units on the UKCS were interrogated. The survey revealed that none of them had a complete recording of such incidents. Consequently, the event frequencies being obtained varied with the availability of sources.

There was no reason to believe that the situation and figures for fixed installations should be any different. Hence, it was proposed to initiate a series of projects, but addressing all types of risks to fixed units. It should be noted that fixed units in this project are defined as comprising all bottom-fixed structures, but excluding TLPs, FPSOs, FSUs and production jackups even though they are “fixed” during their production phase. The most recent project related to fixed units, *Accident Statistics for Fixed Offshore Units on the UK Continental Shelf 1980 – 2003*, was completed in 2005. This current project updates the data of the previous project by two further years, 2004 and 2005.

1.2 Confidentiality

In order to ensure that the final results of the project were accurate and in line with the Quality Control requirements of the DNV’s WOAD databank it was necessary to obtain "raw" data from each of the Databases interrogated. Raw data is defined as the data concerning a specific incident which identified the installation, operator, location, date and time. The data so obtained enabled quality checks to be undertaken on the different databases to prevent double counting of an incident or accident.

It is a condition of the contract between the HSE and DNV, the custodians of the WOAD databank, which any information so obtained will only be exported in a non attributable form to protect confidentiality and once the project is completed, the raw data will be destroyed. That is, any request for data obtained by WOAD as a result of this project will result in data being supplied which is non attributable and will not allow identification of the name of the installation, company, location, date or time of an incident. It will thus be impossible to pinpoint the installation or operator by any means.

1.3 Objectives

The main objective of the project is to obtain complete statistics for accidents and incidents having occurred on fixed units engaged in the oil and gas exploration and exploitation on the UKCS in the period 1980-2005, including number of accidents and incidents with corresponding frequencies per type of fixed unit. This is published both as a written report and an associated spreadsheet in the MS Excel format listing individually the coding and text for each incident.

Fixed units in this project are defined as comprising all bottom-fixed structures, but excluding TLPs, FPSOs, FSUs and production jackups even though they are “fixed” during their production phase and are classified as “fixed installations” by the HSE under the Safety Case

Regulations. Accident statistics for these excluded units may be found in the report and spreadsheet being published from the parallel project addressing floating installations, *Accident Statistics for Floating Offshore Units on the UK Continental Shelf 1980 – 2005*.

The results from this study will serve as a reference document for data to be used in future Risk Assessments of offshore Fixed units and furthermore, be a valuable reference document for UK Health & Safety Executive (HSE)/ Offshore Safety Division (OSD) when reviewing Safety Cases.

To fulfil this objective, relevant databases were interrogated with respect to both population and accident data thus forming a complete basis of data for obtaining comprehensive accident statistics for the type of units, geographical area and time period considered in this project. The following databases were selected for interrogation:

- ORION (the former *Sun Safety System*); UK HSE-Offshore Safety Division
- Offshore Blowout Database (SINTEF, Norway)
- Worldwide Offshore Accident Databank *WOAD*; DNV, Norway

It had been noted by the HSE that extensive reference was made to the *WOAD* database in many of the Safety Cases submitted to them by the offshore operators. Consequently the decision was made to utilise the *WOAD* incident definitions, codings and format in the new database.

Utilising the same methodology and format should enable the operators and owners of offshore installations to readily adapt to the use of the new database. DNV, as the custodians of the *WOAD* database was therefore selected as the contractor to undertake the work on behalf of the HSE. A major part of the work of DNV has thus been the redefining of each incident, in the various databases interrogated, to reflect the definitions, codings and format used in *WOAD*.

1.4 Results

The information being available for each incident has been reviewed and the chain of events has been obtained. The classification of events has been done according to the *WOAD* concept. One accident may comprise a chain of consecutive events (accident outcomes or occurrences), e.g. a blowout resulting in explosion, fire and oil spill. This means that one single accident or incident may give rise to several occurrences. The total number of occurrences will thus be much higher than the total number of accidents recorded. When giving frequencies per type of event, this is presented as number of occurrences per unit per year. However, when presenting frequencies irrespective of type of event, the figures are given as number of accidents per unit per year.

By combining and merging the results from the interrogation of the three databases, *ORION*, *WOAD* and *BLOWOUT*, the accident and occurrence frequencies for fixed units in the UKCS in the period 1980-2005 are estimated. In the following tables the accident (or occurrence) frequencies, i.e. number of accidents (or occurrences) per unit year, are given per type of installation, event (only occurrences) and the periods 1980-1989, 1990-2005 and 1980-2005. N denotes number of accidents (or occurrences) and F denotes *average* annual frequency per unit in the specific time period, i.e. number of accidents (or occurrences) per unit and year. The source *All databases combined* refers to the database obtained by pooling the three mentioned databases and removing the overlapping records.

Care should be taken when trying to compare statistics for the period 1980-1989 and 1990-2005, since the reporting requirements and systems changed dramatically in the UK around 1990 following the issuing of the Lord Cullen Report following the Piper Alpha accident in 1988.

Note that ‘-’ is applied where no accidents/occurrences have been recorded (and hence no frequencies calculated) or if the given event is not applicable/relevant for the given type of units.

The results, after having interrogated the databases and removed overlapping records are also detailed in the associated Excel spreadsheet. The spreadsheet, together with this report, may be downloaded by accessing the HSE web site www.hse.gov.uk. Within the spreadsheet, in addition to other fields each of the incidents is described in “free text”.

Table 1 All fixed units.
Number of accidents and accident frequencies (per unit-year). UKCS, 1980-2005.
Source: All databases combined

	Period					
	1980-1989		1990-2005		1980-2005	
Type of installation	N	F	N	F	N	F
Drilling	19	0.115	41	0.141	60	0.132
Production	995	1.631	5515	3.684	6510	3.090
Wellhead	13	0.086	338	0.308	351	0.281
Compression	8	0.116	62	0.360	70	0.290
Pumping	-	-	-	-	-	-
Injection/riser	1	0.022	9	0.064	10	0.054
Accommodation	7	0.171	10	0.065	17	0.088
Total fixed units	1043	0.9473	5975	1.766	7018	1.565

Table 2 All fixed units.**Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.****Source: All databases combined**

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	6	$5.4 \cdot 10^{-3}$	4	$1.2 \cdot 10^{-3}$	10	$2.2 \cdot 10^{-3}$
Capsize	-	-	-	-	-	-
Collision	2	$1.8 \cdot 10^{-3}$	28	$8.3 \cdot 10^{-3}$	30	$6.7 \cdot 10^{-3}$
Contact	80	0.073	108	0.032	188	0.042
Crane	422	0.383	1259	0.372	1681	0.375
Explosion	35	0.032	41	0.012	76	0.017
Falling object	468	0.425	1725	0.510	2193	0.489
Fire	228	0.207	717	0.212	945	0.211
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	7	$6.4 \cdot 10^{-3}$	6	$1.8 \cdot 10^{-3}$	13	$2.9 \cdot 10^{-3}$
Leakage	1	$9.1 \cdot 10^{-4}$	1	$3.0 \cdot 10^{-4}$	2	$4.5 \cdot 10^{-4}$
List	1	$9.1 \cdot 10^{-4}$	-	-	1	$2.2 \cdot 10^{-4}$
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	216	0.196	3108	0.919	3324	0.741
Structural	5	$4.5 \cdot 10^{-3}$	13	$3.8 \cdot 10^{-3}$	18	$4.0 \cdot 10^{-3}$
Towing/towline	-	-	-	-	-	-
Well problem	22	0.020	392	0.116	414	0.092
Other	6	$5.4 \cdot 10^{-3}$	105	0.031	111	0.025

2 INTRODUCTION

In 2000, a project was undertaken by Det Norske Veritas (DNV) on behalf of the UK Health & Safety Executive (HSE) with the purpose of obtaining accident statistics for offshore floating units on the UK Continental Shelf (UKCS). In this respect, five databases holding information about incidents having occurred on floating units on the UKCS were interrogated. The survey revealed that none of them had a complete recording of such incidents. Consequently, the event frequencies being obtained varied with the availability of sources. There was no reason to believe that the situation and figures for fixed installations should be any different. Hence, it was proposed to initiate a similar type of project, but addressing all types of risks to fixed units. It should be noted that fixed units in this project are defined as comprising all bottom-fixed structures, but excluding TLPs, FPSOs, FSUs and production jackups even though they are “fixed” during their production phase and are classified as “fixed installations” by the HSE under the Safety Case Regulations. Accident statistics for these excluded units may be found in the report and spreadsheet being published from the parallel project addressing floating installations, *Accident Statistics for Floating Offshore Units on the UK Continental Shelf 1980 – 2005*.

The recent project related to fixed units was completed in 2005 and showing statistics for the period 1980-2003, ref. /1/. This current project updates the data of the previous project by two further years, 2004 and 2005.

3 OBJECTIVES AND SCOPE OF WORK

The main objective of the project is to obtain complete statistics (i.e. accident frequencies) for accidents and incidents having occurred on fixed units engaged in the oil and gas exploration and exploitation activities on the UK Continental Shelf in the period 1980-2005, including number of accidents and incidents with corresponding frequencies per type of fixed unit. This is published both as a written report and an associated spreadsheet in the MS Excel format listing individually the coding and text for each incident.

Fixed units in this project are defined as comprising bottom-fixed installations (manned or unmanned) designed for drilling, accommodation, production, compression, pumping, and injection/riser purposes, or combinations of these. Regarding *production* installations, the study differentiates between the traditional (manned) production platforms, steel jackets or GBSs, and wellhead platforms (normally unmanned).

The classification of units is according to the following:

Category	Type of unit – description
Drilling	Drilling platforms whose sole purpose is to drill
Production	Traditional (manned) production platforms, steel jackets or GBSs. Included are also platforms with drilling, production, and accommodation facilities (i.e. large integrated platforms)
Wellhead	Wellhead platforms (normally unmanned) with no processing facilities, serving as “well support”. Often linked to the main production platforms.
Compression	Gas compression platforms
Pumping	Pumping platforms
Injection/riser	Water or gas injection and riser platforms
Accommodation	Accommodation platforms

The results from this study will serve as a reference document for data to be used in future Risk Assessments of offshore Fixed units and furthermore, be a valuable reference document for HSE/OSD when reviewing Safety Cases.

To fulfil this objective, relevant databases were interrogated with respect to both population and accident data thus forming a complete data basis for obtaining comprehensive accident statistics for the said type of units, geographical area and time period. The following databases were selected for interrogation:

- ORION*, UK HSE-Offshore Safety Division
- Offshore Blowout Database *BLOWOUT*, SINTEF, Norway
- Worldwide Offshore Accident Databank *WOAD*, Det Norske Veritas (DNV), Norway

*) *The former “Sun Safety System”*

4 EXPOSURE DATA

Exposure (population) data in this context relates to the number of unit- (or platform-) years for each type of installation. By interrogating relevant sources holding such information, the number of unit-years are obtained for each year and type of unit for the UKCS in the period 1980-2005.

From WOAD, the exposure data for fixed units on the UKCS are obtained. The data are given in two following tables. Abandoned or removed/scrapped installations have been accounted for.

Table 3 *Fixed Units (drilling, production, wellhead and compression).*
UKCS, 1980-2005. Number of unit-years

Year	Type of Installation			
	Drilling	Production	Wellhead	Compression
1980-1989	165	610	151	69
1990	18	76	39	8
1991	18	79	45	9
1992	18	81	48	9
1993	19	86	51	10
1994	19	92	56	10
1995	19	92	57	11
1996	17	93	65	9
1997	18	94	70	11
1998	18	97	72	11
1999	18	96	79	12
2000	18	98	84	12
2001	18	99	85	12
2002	18	101	86	12
2003	18	104	86	12
2004	18	104	86	12
2005	18	105	90	12
1990-2005	290	1497	1099	172
1980-2005	455	2107	1250	241

**Table 4 Fixed Units (pumping, injection, accommodation and total)).
UKCS. 1980-2005. Number of unit-years**

Year	Type of Installation			Total, fixed
	Pumping	Injection/riser	Accommodation	
1980-1989	20	45	41	1101
1990	2	5	6	154
1991	2	6	6	165
1992	2	6	7	171
1993	2	8	8	184
1994	2	9	9	197
1995	2	9	9	199
1996	2	9	10	205
1997	2	9	10	214
1998	2	9	11	220
1999	2	10	11	228
2000	2	10	11	235
2001	2	10	11	237
2002	2	10	11	240
2003	2	10	11	243
2004	2	10	11	243
2005	2	10	11	248
1990-2005	32	140	153	3383
1980-2005	52	185	194	4484

5 OVERVIEW OF DATABASES

This chapter gives a short presentation of the 3 databases being interrogated in this project.

5.1 ORION

The **R**eporting of **I**njuries, **D**iseases and **D**angerous **O**ccurrences **R**egulations 1995 (RIDDOR 95) arrangement came into force on 1 April 1996 and requires that all work-related accidents, diseases and dangerous occurrences in the UK and UK Continental Shelf are to be reported to the HSE. It applies to all work activities and to defined types of incidents. The incidents are to be reported using the OIR/9B and F2508A forms. These forms are to be completed and submitted to the HSE.

Prior to 1 April 1996 injuries and dangerous occurrences were reported on the OIR/9A form. This form was created under the Mineral Workings (Offshore Installations) Act 1971 and the Offshore Installations (Inspectors and Casualties) Regulations 1973.

The information submitted on the OIR/9A, OIR/9B and F2508A forms are recorded in a database, "ORION" (the former *Sun Safety System*), run by the HSE-OSD offices in Bootle, Liverpool.

The Sun Safety System (now ORION) was primarily developed to record incident data reported on the OIR/9A form. Other information is however recorded on the database, including details of inspections, investigations, prosecutions and the registration and location details of Offshore Installations. The OIR/9A form was first published in October 1990, and the Sun Safety System was implemented in 1st January 1991. The Sun Safety System does however contain some data on pre 1991 incidents (imported from previous systems maintained by the Safety Directorate of the Department of Energy), though not all fields on the OIR/9A form are available for this data. The Sun Safety System was decommissioned year 2000 and all data from 1991(incl.) was transferred to ORION.

Note that notification of hydrocarbon releases (voluntarily submitted on the OIR/12 form) are also recorded in a separate and specifically designed database which is maintained by the HSE-OSD offices in Bootle, Liverpool.

5.2 BLOWOUT

The SINTEF Offshore Blowout Database (BLOWOUT) is a comprehensive event database for blowout risk assessment. The database includes information on 552 (November 2006) offshore blowouts/well releases that have occurred worldwide since 1955.

The database includes blowout/well release descriptions worldwide and drilling and production exposure data for several areas with focus on the US Gulf of Mexico Outer Continental Shelf (US GoM OCS), Norwegian waters, and UK waters.

The blowouts/well releases are categorized in several parameters, emphasizing blowout causes. The database contains 51 different fields describing each blowout/well release. In addition, the database allows for attachment of any electronic file(s) to the blowout description. The various fields are grouped in six different groups:

- ☐ Category and location
- ☐ Well description
- ☐ Present operation
- ☐ Blowout causes
- ☐ Blowout Characteristics
- ☐ Other

ExproSoft has been contracted to operate the SINTEF Offshore Blowout Database from 1 May 2001 by SINTEF.

5.3 WOAD

One of the main sources for offshore accident information for public use is the *Worldwide Offshore Accident Databank* (WOAD) operated by Det Norske Veritas (DNV). WOAD contains some 5,200 events from the period 1970-2006, derived mainly from public-domain sources such as Lloyds Casualty Reports, newspapers and official publications. Most of the data is from the UK and Norwegian Sectors and the US Gulf of Mexico. Exposure data is also provided, allowing accident rates to be calculated for different accident types, , installation/rig/platform types, geographical locations, degrees of damage, etc.

6 EVENT CLASSIFICATION AND CODING PRINCIPLES

The WOAD concept of classifying events has been selected for the review work on the records received from the databases being interrogated in this project. Hence all events have been categorised, both within the Reports and Spreadsheets, according to the table below.

Table 5 Event classification, WOAD

Type of event	Code*	Explanation
Anchor failure	AN	Problems with anchor/anchor lines, mooring devices, winching equipment or fairleads (e.g. anchor dragging, breaking of mooring lines, loss of anchor(s), winch failures).
Blowout	BL	An uncontrolled flow of gas, oil or other fluids from the reservoir, i.e. loss of 1. barrier (i.e. hydrostatic head) or leak and loss of 2. barrier, i.e. BOP/DHSV.
Capsize	CA	Loss of stability resulting in overturn of unit, capsizing, or toppling of unit.
Collision	CL	Accidental contact between offshore unit and/or passing marine vessel when at least one of them is propelled or is under tow. Examples: tanker, cargo ship, fishing vessel. Also included are collisions with bridges, quays, etc., and vessels engaged in the oil and gas activity on other platforms than the platform affected, and between two offshore installations (to be coded as "Contact" only when intended for close location).
Contact	CN	Collisions/accidental contacts between vessels engaged in the oil and gas activity on the platform affected, e.g. support/supply/stand-by vessels, tugs or helicopters, and offshore installations (floating or fixed). Also are included collisions between two offshore installations only when these are intended for close location.
Crane	CR	Any event caused by or involving cranes, derrick and draw-works, or any other lifting equipment.
Explosion	EX	Explosion
Falling object	FA	Falling load/dropped objects from crane, drill derrick, or any other lifting equipment or platform. Crane fall and lifeboats accidentally to sea and man overboard are also included.
Fire	FI	Fire.
Foundering	FO	Loss of buoyancy or unit sinking.
Grounding	GR	Floating installation in contact with the sea bottom.
Helicopter	HE	Accident with helicopter either on helideck or in contact with the installation.
Leakage	LE	Leakage of water into the unit or filling of shaft or other compartments causing potential loss of buoyancy or stability problems.
List	LI	Uncontrolled inclination of unit.
Machinery failure	MA	Propulsion or thruster machinery failure (incl. control)
Off position	PO	Unit unintentionally out of its expected position or drifting out of control.
Spill/release	LG	"Loss of containment". Release of fluid or gas to the surroundings from unit's own equipment/vessels/tanks causing (potential) pollution and/or risk of explosion and/or fire.
Structural	ST	Breakage or fatigue failures (mostly failures caused by weather, but not necessarily) of structural support and direct structural failures. "Punch through" also included.
Towing/towline	TO	Towline failure or breakage
Well problem	WP	Accidental problem with the well, i.e. loss of one barrier (hydrostatic head) or other downhole problems.
Other	OT	Event other than specified above

** Codes for Chain of events (CH1-CH5) used in the associated spreadsheet.*

It should be noted that not all types of events apply to fixed units, like anchor failure, grounding, machinery failure, off position and towing/towline problems. This is mainly due to FPSO's, FSU's, and TLP's are classified as "floating installations" (and hence to included in this report) although they are classified as "fixed installations" by the HSE under the Safety Case Regulations.

The categorisation of the incidents has been performed according to principles outlined below.

- Events coded as *Falling load* involve loads and objects either rolling, leaning, tilting, falling, rotating, swinging, or sliding. Man over board is also included here.
- "Occupational Hazard" (OH) incidents, with personal injuries or not, are defined to be events which are not related to operations of equipment and events caused by obvious human errors during maintenance. Such events have only been counted, but are excluded from these statistics.
- Anchor handling involving supply boat which causes personal injuries to personnel being involved are coded as *Anchor failure* (and not OH).
- Maloperation of lifting equipment or technical failure leading to falling load is coded as *Crane failure + Falling load*.
- Problems with riser tensioners are coded as *Crane failure*
- Events involving equipment or part of equipment bursting or blowing out, are coded as *Spill/Release*
- Events involving problems with gangways/bridges between floating unit and other floating or fixed units, are coded as *Out of position + Falling load*.
- Incidents that occur during maintenance indicates lack of design have been coded accordingly (crane failure, falling load, anchor failure, etc.)

7 ACCIDENT STATISTICS

The information being available for each incident has been reviewed and the chain of events has been obtained. The classification of events has been done according to the WOAD concept. One accident may comprise a chain of consecutive events (accident outcomes or occurrences), e.g. a blowout resulting in explosion, fire and oil spill. This means that one single accident or incident may give rise to several occurrences. The total number of occurrences will thus be much higher than the total number of accidents recorded. When giving frequencies per type of event, this is presented as number of occurrences per unit per year. However, when presenting frequencies irrespective of type of event, the figures are given as number of accidents per unit per year.

By combining and merging the results from the interrogation of all 3 databases, the accident/occurrence frequencies for fixed units in the UKCS in the period 1980-2005 are estimated. All tables in this chapter present the number of accidents and occurrences with corresponding frequencies per type of unit, event (only occurrences) and time periods 1980-1989, 1990-2005 and 1980-2005. N denotes number of occurrences and F denotes average annual frequency, i.e. number of accidents or occurrences per unit year. Note that ‘-’ is applied where no accidents/occurrences have been recorded (and hence no frequencies calculated) or if the given event is not applicable/relevant for the given type of units.

The source *All databases combined* refers to the database obtained by pooling the databases ORION, BLOWOUT and WOAD and removing the overlapping records.

Care should be taken when trying to compare statistics for the period 1980-1989 and 1990-2005, since the reporting requirements and systems changed dramatically in the UK around 1990 following the issuing of the Lord Cullen Report following the Piper Alpha accident in 1988.

Note: More detailed statistics are given in appendix A where the number of accidents/occurrences and corresponding frequencies is given by type of unit and year in the period 1990-2005.

The results, after having interrogated the databases and removed overlapping records are also detailed in the associated Excel spreadsheet. The spreadsheet, together with this report, may be downloaded by accessing the HSE web site www.hse.gov.uk. Within the spreadsheet, in addition to other fields each of the incidents is described in “free text”.

7.1 Accident frequencies, all databases combined

In this section the accident frequencies for fixed units in the UKCS in the period 1980-2003 are presented. The following tables give the number of accidents and corresponding frequencies per type of unit.

Table 6 *All fixed units.*

Number of accidents and accident frequencies (per unit-year). UKCS, 1980-2005.

Source: All databases combined

	Period					
	1980-1989		1990-2005		1980-2005	
Type of installation	N	F	N	F	N	F
Drilling	19	0.115	41	0.141	60	0.132
Production	995	1.631	5515	3.684	6510	3.090
Wellhead	13	0.086	338	0.308	351	0.281
Compression	8	0.116	62	0.360	70	0.290
Pumping	-	-	-	-	-	-
Injection/riser	1	0.022	9	0.064	10	0.054
Accommodation	7	0.171	10	0.065	17	0.088
Total fixed units	1043	0.947	5975	1.766	7018	1.565

As can be seen from the table above, no accidents are recorded on fixed pumping platforms in either of the databases in the period 1980-2005.

7.2 Occurrence frequencies, all databases combined

In this section the occurrence frequencies for fixed units in the UKCS in the period 1980-2005 are presented. The following tables give the number of occurrences and corresponding frequencies per type of occurrence/event and type of unit.

Table 7 All fixed units.**Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.****Source: All databases combined**

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	6	$5.4 \cdot 10^{-3}$	4	$1.2 \cdot 10^{-3}$	10	$2.2 \cdot 10^{-3}$
Capsize	-	-	-	-	-	-
Collision	2	$1.8 \cdot 10^{-3}$	28	$8.3 \cdot 10^{-3}$	30	$6.7 \cdot 10^{-3}$
Contact	80	0.073	108	0.032	188	0.042
Crane	422	0.383	1259	0.372	1681	0.375
Explosion	35	0.032	41	0.012	76	0.017
Falling object	468	0.425	1725	0.510	2193	0.489
Fire	228	0.207	717	0.212	945	0.211
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	7	$6.4 \cdot 10^{-3}$	6	$1.8 \cdot 10^{-3}$	13	$2.9 \cdot 10^{-3}$
Leakage	1	$9.1 \cdot 10^{-4}$	1	$3.0 \cdot 10^{-4}$	2	$4.5 \cdot 10^{-4}$
List	1	$9.1 \cdot 10^{-4}$	-	-	1	$2.2 \cdot 10^{-4}$
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	216	0.196	3108	0.919	3324	0.741
Structural	5	$4.5 \cdot 10^{-3}$	13	$3.8 \cdot 10^{-3}$	18	$4.0 \cdot 10^{-3}$
Towing/towline	-	-	-	-	-	-
Well problem	22	0.020	392	0.116	414	0.092
Other	6	$5.4 \cdot 10^{-3}$	105	0.031	111	0.025

Table 8 *Drilling units.***Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.****Source: All databases combined**

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize	-	-	-	-	-	-
Collision	-	-	-	-	-	-
Contact	4	0.024	1	$3.4 \cdot 10^{-3}$	5	0.011
Crane	6	0.036	16	0.055	22	0.048
Explosion	1	$6.1 \cdot 10^{-3}$	-	-	1	$2.2 \cdot 10^{-3}$
Falling object	6	0.036	18	0.062	24	0.053
Fire	3	0.018	6	0.021	9	0.020
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	5	0.030	9	0.031	14	0.031
Structural	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-
Well problem	-	-	6	0.021	6	0.013
Other	-	-	-	-	-	-

Table 9 Production units.**Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.****Source: All databases combined**

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	5	$8.2 \cdot 10^{-3}$	4	$2.7 \cdot 10^{-3}$	9	$4.3 \cdot 10^{-3}$
Capsize	-	-	-	-	-	-
Collision	2	$3.3 \cdot 10^{-3}$	21	0.014	23	0.011
Contact	73	0.120	88	0.059	161	0.076
Crane	410	0.672	1198	0.800	1608	0.763
Explosion	34	0.056	40	0.027	74	0.035
Falling object	453	0.743	1659	1.108	2112	1.002
Fire	218	0.357	662	0.442	880	0.418
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	5	$8.2 \cdot 10^{-3}$	6	$4.0 \cdot 10^{-3}$	11	$5.2 \cdot 10^{-3}$
Leakage	1	$1.6 \cdot 10^{-3}$	1	$6.7 \cdot 10^{-4}$	2	$9.5 \cdot 10^{-4}$
List	1	$1.6 \cdot 10^{-3}$	-	-	1	$4.7 \cdot 10^{-4}$
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	205	0.336	2804	1.873	3009	1.428
Structural	4	$6.6 \cdot 10^{-3}$	13	$8.7 \cdot 10^{-3}$	17	$8.1 \cdot 10^{-3}$
Towing/towline	-	-	-	-	-	-
Well problem	21	0.034	379	0.253	400	0.190
Other	6	$9.8 \cdot 10^{-3}$	99	0.066	105	0.050

Table 10 Wellhead units.**Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.****Source: All databases combined**

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	1	$6.6 \cdot 10^{-3}$	-	-	1	$8.0 \cdot 10^{-4}$
Capsize	-	-	-	-	-	-
Collision	-	-	6	$5.5 \cdot 10^{-3}$	6	$4.8 \cdot 10^{-3}$
Contact	1	$6.6 \cdot 10^{-3}$	14	0.013	15	0.012
Crane	3	0.020	45	0.041	48	0.038
Explosion	-	-	-	-	-	-
Falling object	4	0.027	58	0.053	62	0.050
Fire	4	0.027	29	0.026	33	0.026
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	4	0.027	223	0.203	227	0.182
Structural	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-
Well problem	1	$6.6 \cdot 10^{-3}$	14	0.013	15	0.012
Other	-	-	-	-	-	-

Table 11 *Compression units.*

Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.

Source: All databases combined

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize	-	-	-	-	-	-
Collision	-	-	-	-	-	-
Contact	-	-	-	-	-	-
Crane	2	0.029	6	0.035	8	0.033
Explosion	-	-	-	-	-	-
Falling object	3	0.044	9	0.052	12	0.050
Fire	1	0.015	11	0.064	12	0.050
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	2	0.029	-	-	2	$8.3 \cdot 10^{-3}$
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	1	0.015	36	0.209	37	0.154
Structural	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-
Well problem	-	-	-	-	-	-
Other	-	-	-	-	-	-

Table 12 Injection/riser units.

Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.

Source: All databases combined

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize	-	-	-	-	-	-
Collision	-	-	-	-	-	-
Contact	-	-	1	$7.1 \cdot 10^{-3}$	1	$5.4 \cdot 10^{-3}$
Crane	-	-	-	-	-	-
Explosion	-	-	-	-	-	-
Falling object	1	0.022	2	0.014	3	0.016
Fire	1	0.022	4	0.029	5	0.027
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	-	-	-	-	-	-
Structural	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-
Well problem	-	-	-	-	-	-
Other	-	-	-	-	-	-

Table 13 Accommodation units.

Number of occurrences and occurrence frequencies (per unit year). UKCS, 1980-2005.

Source: All databases combined

	Period					
	1980-1989		1990-2005		1980-2005	
Type of event	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize	-	-	-	-	-	-
Collision	-	-	1	$6.5 \cdot 10^{-3}$	1	$5.2 \cdot 10^{-3}$
Contact	2	0.049	2	0.013	4	0.021
Crane	1	0.024	-	-	1	$5.2 \cdot 10^{-3}$
Explosion	-	-	-	-	-	-
Falling object	1	0.024	1	$6.5 \cdot 10^{-3}$	2	0.010
Fire	2	0.049	4	0.026	6	0.031
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	1	0.024	2	0.013	3	0.015
Structural	1	0.024	-	-	1	$5.2 \cdot 10^{-3}$
Towing/towline	-	-	-	-	-	-
Well problem	-	-	-	-	-	-
Other	-	-	-	-	-	-

8 CONCLUSIONS

The main source for accident and incident information available to the UKCS offshore industry should be this database as it, and the associated spreadsheet, together contain comprehensive UKCS data from the most relevant accident databases.

This database is understood to be the only UKCS accident and incident database which is both publicly and freely available to the offshore industry and others. It has been created in the WOAD format, with which the offshore industry is familiar and it is regularly updated with accident and incident information from relevant international databases. In addition the format of the spreadsheet, which contains a free text description of each incident, allows a sort capability to be utilised thus enabling specific data to be extracted from the database as and when required.

The results from this study would serve as a reference document for data to be used in future Risk Assessments of offshore fixed units and furthermore, be a valuable reference document for UK Health & Safety Executive (HSE)/ Offshore Safety Division (OSD) when reviewing Safety Cases for fixed installations.

To fulfil the objectives set out for this project, relevant UK and Norwegian databases were interrogated with respect to both population and accident data forming a complete data basis for obtaining comprehensive accident statistics for the listed type of units, geographical area and time period.

The result after having interrogated the identified databases and removing overlapping records shows a total of 7018 events comprising accidents, hazardous situations and near-misses on fixed units on the UKCS in the period 1980-2005.

9 REFERENCES

- /1/ *Accident statistics for fixed offshore units on the UK Continental Shelf 1980 – 2003.*
Det Norske Veritas/UK Health & Safety Executive. Research Report Series. Report No.
RR349. <http://www.hse.gov.uk/research/rrhtm/rr349.htm>

- o0o -

APPENDIX

A

DETAILED STATISTICS

A. 1 Introduction

The information being available for each incident has been reviewed and the chain of events has been obtained. The classification of events has been done according to the WOAD concept. One accident may comprise a chain of consecutive events (accident outcomes or occurrences), e.g. a blowout resulting in explosion, fire and oil spill. This means that one single accident or incident may give rise to several occurrences. The total number of occurrences will thus be much higher than the total number of accidents recorded. When giving frequencies per type of event, this is presented as number of occurrences per unit per year. However, when presenting frequencies irrespective of type of event, the figures are given as number of accidents per unit per year

A. 2 Accident statistics

By combining and merging the results from the interrogation of all 3 databases, the occurrence frequencies for fixed units in the UKCS in the period 1980-2005 are estimated. All tables in this appendix present the number of accidents and occurrences with corresponding frequencies per type of unit and event for the time periods 1980-1989, 1990-2005 and 1980-2005 and for each year in the period 1990-2005. **N** denotes number of accidents/occurrences and **F** denotes average annual frequency per unit, i.e. number of accidents/occurrences per unit year. Note that ‘-’ is applied where no accidents/occurrences have been recorded (and hence no frequencies calculated) or if the given event is not applicable/relevant for the given type of units.

The source *All databases combined* refers to the database obtained by pooling the databases ORION, BLOWOUT and WOAD and removing the overlapping records.

Care should be taken when trying to compare statistics for the period 1980-1989 and 1990-2005, since the reporting requirements and systems changed dramatically in the UK around 1990 following the issuing of the Lord Cullen Report following the Piper Alpha accident in 1988.

The results, after having interrogated the databases and removed overlapping records are also detailed in the associated Excel spreadsheet. The spreadsheet, together with this report, may be downloaded by accessing the HSE web site www.hse.gov.uk. Within the spreadsheet, in addition to other fields each of the incidents is described in “free text”.

An index of sections and tables in this appendix is shown below in order to ease retrieval of relevant data.

(Please observe that since no accidents are recorded on fixed pumping units (section A.2.7) in any of the databases in the period 1980-2005, no separate tables are provided for these units.)

Section and table number	Page No.
A.2.1 Accident frequencies – All Fixed Units	
Table 14 Fixed Units. UKCS, 1980-2005	A- 4
Table 15 Fixed Units (cont.). UKCS, 1980-2005	A- 5
A.2.2 Occurrence frequencies – All Fixed Units	
Table 16 Fixed Units. UKCS, 1980-2005	A- 6
Table 17 Fixed Units (cont). UKCS, 1980-2005	A- 7
Table 18 All Fixed Units. UKCS, 1980-1989, 1990-1992	A- 8
Table 19 All Fixed Units. UKCS, 1993-1996	A- 9
Table 20 All Fixed Units. UKCS, 1997-1999	A- 10
Table 21 All Fixed Units. UKCS, 2000-2003	A- 11
Table 22 All Fixed Units. UKCS, 2004-2005	A- 12
Table 23 All Fixed Units. UKCS, 1990-2005, 1980-2005	A- 13
A.2.3 Occurrence frequencies – Drilling Units	
Table 24 Drilling units. UKCS, 1980-2005	A- 14
A.2.4 Occurrence frequencies – Production Units	
Table 25 Production Units. UKCS, 1980-1989, 1990-1992	A- 15
Table 26 Production Units. UKCS, 1993-1996	A- 16
Table 27 Production Units. UKCS, 1997-1999	A- 17
Table 28 Production Units. UKCS, 2000-2003	A- 18
Table 29 Production Units. UKCS, 2004-2005	A- 19
Table 30 Production Units. UKCS, 1990-2005, 1980-2005	A- 20
A.2.5 Occurrence frequencies – Wellhead Units	
Table 31 Wellhead Units. UKCS, 1980-1989, 1990-1992	A- 21
Table 32 Wellhead Units. UKCS, 1993-1996	A- 22
Table 33 Wellhead Units. UKCS, 1997-1999	A- 23
Table 34 Wellhead Units. UKCS, 2000-2003	A- 24
Table 35 Wellhead Units. UKCS, 2004-2005	A- 25
Table 36 Wellhead Units. UKCS, 1990-2005, 1980-2005	A- 26
A.2.6 Occurrence frequencies – Compression Units	
Table 37 Compression Units. UKCS, 1980-1989, 1990-1992	A- 27
Table 38 Compression Units. UKCS, 1993-1996	A- 28
Table 39 Compression Units. UKCS, 1997-1999	A- 29
Table 40 Compression Units. UKCS, 2000-2003	A- 30
Table 41 Compression Units. UKCS, 2004-2005	A- 31
Table 42 Compression Units. UKCS, 1990-2005, 1980-2005	A- 32
A.2.8 Occurrence frequencies – Injection/riser Units	
Table 43 Injection/riser units. UKCS. 1980-2005	A- 33
A.2.9 Occurrence frequencies – Injection/riser Units	
Table 44 Accommodation Units. UKCS. 1980-2005	A- 34

A.2. 1 Accident frequencies – All fixed units

In this section the accident frequencies for fixed units in the UKCS in the period 1980-2005 are presented. The following tables give the number of accidents (**N**) and corresponding frequencies (**F**) per type of unit.

Table 14 *Fixed Units (drilling, production, wellhead and compression).*
UKCS, 1980-2005. No. of accidents and accident frequencies (per unit year).
Source: All databases combined

Year/period	Type of installation							
	Drilling		Production		Wellhead		Compression	
	N	F	N	F	N	F	N	F
1980-1989	19	0.115	995	1.631	13	0.086	8	0.116
1990	8	0.444	172	2.276	9	0.231	1	0.125
1991	3	0.167	199	2.519	7	0.156	2	0.222
1992	-	-	320	3.951	9	0.188	6	0.667
1993	1	0.053	407	4.733	17	0.333	3	0.300
1994	9	0.474	474	5.152	9	0.161	5	0.500
1995	-	-	350	3.804	21	0.368	13	1.182
1996	1	0.059	359	3.860	22	0.339	8	0.889
1997	3	0.167	368	3.915	37	0.529	4	0.364
1998	1	0.056	365	3.763	36	0.500	2	0.182
1999	1	0.056	319	3.323	41	0.519	5	0.417
2000	-	-	410	4.184	40	0.476	2	0.167
2001	-	-	411	4.152	24	0.282	-	-
2002	-	-	411	4.069	16	0.047	-	-
2003	-	-	323	3.106	23	0.267	-	-
2004	5	0.278	346	3.327	16	0.178	7	0.583
2005	9	0.500	283	2.695	11	0.122	4	0.333
1990-2005	41	0.141	5515	3.684	338	0.308	62	0.360
1980-2005	60	0.132	6510	3.090	351	0.281	70	0.290

**Table 15 Fixed Units (pumping, injection, accommodation and total).
UKCS, 1980-2005. No. of accidents and accident frequencies (per unit year).
Source: All databases combined**

Year/period	Type of installation							
	Pumping		Injection/riser		Accommodation		Total, fixed	
	N	F	N	F	N	F	N	F
1980-1989	-	-	1	0.022	7	0.171	1043	0.947
1990	-	-	1	0.200	-	-	191	1.246
1991	-	-	2	0.333	-	-	213	1.291
1992	-	-	2	0.333	1	0.167	338	1.977
1993	-	-	1	0.125	1	0.143	430	2.337
1994	-	-	-	-	2	0.250	499	2.533
1995	-	-	-	-	-	-	384	1.930
1996	-	-	-	-	1	0.111	391	1.907
1997	-	-	-	-	1	0.100	413	1.930
1998	-	-	-	-	1	0.100	405	1.841
1999	-	-	-	-	1	0.091	367	1.610
2000	-	-	-	-	1	0.091	453	1.928
2001	-	-	-	-	-	-	435	1.835
2002	-	-	-	-	-	-	427	1.779
2003	-	-	-	-	-	-	346	1.424
2004	-	-	2	0.200	-	-	376	1.516
2005	-	-	1	0.100	1	0.091	309	1.246
1990-2005	-	-	9	0.064	10	0.065	5975	1.766
1980-2005	-	-	10	0.054	17	0.088	7018	1.565

A.2. 2 Occurrence frequencies – All fixed units

In this section the occurrence frequencies for fixed units in the UKCS in the period 1980-2005 are presented.

In the following tables the number of occurrences (**N**) and corresponding frequencies (**F**) for all fixed units are given per year/period.

Table 16 *Fixed Units (drilling, production, wellhead and compression).*
UKCS, 1980-2005. No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Type of installation							
	Drilling		Production		Wellhead		Compression	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	9	4.3•10 ⁻³	1	8.0•10 ⁻⁴	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	23	0.011	6	4.8•10 ⁻³	-	-
Contact	5	0.011	161	0.076	15	0.012	-	-
Crane	22	0.048	1608	0.763	48	0.038	8	0.033
Explosion	1	0.002	74	0.035	-	-	-	-
Falling object	24	0.053	2112	1.002	62	0.050	12	0.050
Fire	9	0.020	880	0.418	33	0.026	12	0.050
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	5	2.4•10 ⁻³	-	-	2	8.3•10 ⁻³
Leakage	-	-	2	9.5•10 ⁻⁴	-	-	-	-
List	-	-	1	4.7•10 ⁻⁴	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	14	0.031	3009	1.428	227	0.182	37	0.154
Structural	-	-	17	8.1•10 ⁻³	-	-	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	6	0.013	400	0.190	15	0.012	-	-
Other	-	-	105	0.050	-	-	-	-

**Table 17 Fixed Units (pumping, injection, accommodation and total).
UKCS, 1980-2005. No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined**

Type of event	Type of installation							
	Pumping		Injection/riser		Accommodation		Total, fixed	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	-	-	-	-	10	$2.2 \cdot 10^{-3}$
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	-	-	1	$5.2 \cdot 10^{-3}$	30	$6.7 \cdot 10^{-3}$
Contact	-	-	1	$5.4 \cdot 10^{-3}$	4	0.021	188	0.042
Crane	-	-	-	-	1	$5.2 \cdot 10^{-3}$	1681	0.375
Explosion	-	-	-	-	-	-	76	0.017
Falling object	-	-	3	0.016	2	0.010	2193	0.489
Fire	-	-	5	0.027	6	0.031	945	0.211
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-	13	$2.9 \cdot 10^{-3}$
Leakage	-	-	-	-	-	-	2	$4.5 \cdot 10^{-4}$
List	-	-	-	-	-	-	1	$2.2 \cdot 10^{-4}$
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	-	-	-	-	3	0.015	3324	0.741
Structural	-	-	-	-	1	$5.2 \cdot 10^{-3}$	18	$4.0 \cdot 10^{-3}$
Towing/towline	-	-	-	-	-	-	-	-
Well problem	-	-	-	-	-	-	414	0.092
Other	-	-	-	-	-	-	111	0.025

Table 18 All Fixed Units. UKCS, 1980-1989, 1990, 1991, 1992.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year/period							
	1980-1989		1990		1991		1992	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	6	$5.4 \cdot 10^{-3}$	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	2	$1.8 \cdot 10^{-3}$	-	-	-	-	1	$5.4 \cdot 10^{-3}$
Contact	80	0.073	12	0.078	8	0.049	5	0.027
Crane	422	0.383	63	0.409	62	0.376	70	0.380
Explosion	35	0.032	4	0.026	6	0.036	6	0.033
Falling object	468	0.425	68	0.442	82	0.497	94	0.511
Fire	228	0.207	36	0.234	16	0.097	73	0.397
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	7	$6.4 \cdot 10^{-3}$	2	0.013	1	$6.1 \cdot 10^{-3}$	1	$5.4 \cdot 10^{-3}$
Leakage	1	$9.1 \cdot 10^{-4}$	-	-	-	-	-	-
List	1	$9.1 \cdot 10^{-4}$	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	216	0.196	71	0.461	75	0.455	247	1.342
Structural	5	$4.5 \cdot 10^{-3}$	-	-	1	$6.1 \cdot 10^{-3}$	4	0.023
Towing/towline	-	-	-	-	-	-	-	-
Well problem	22	0.020	2	0.013	2	0.012	9	0.049
Other	6	$5.4 \cdot 10^{-3}$	1	$6.5 \cdot 10^{-3}$	6	0.036	4	0.022

Table 19 All Fixed Units. UKCS, 1993, 1994, 1995, 1996.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year							
	1993		1994		1995		1996	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	1	$5.1 \cdot 10^{-3}$	1	$5.0 \cdot 10^{-3}$	1	$4.9 \cdot 10^{-3}$
Capsize	-	-	-	-	-	-	-	-
Collision	1	$5.8 \cdot 10^{-3}$	3	0.015	3	0.015	-	-
Contact	7	0.041	10	0.051	12	0.060	10	0.049
Crane	70	0.409	94	0.478	78	0.392	68	0.332
Explosion	1	$5.8 \cdot 10^{-3}$	3	0.015	1	$5.0 \cdot 10^{-3}$	1	$4.9 \cdot 10^{-3}$
Falling object	88	0.515	126	0.640	101	0.508	94	0.459
Fire	48	0.281	66	0.335	47	0.236	34	0.166
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	1	$5.0 \cdot 10^{-3}$	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	188	1.099	321	1.629	217	1.091	162	0.790
Structural	-	-	-	-	2	0.010	1	$4.9 \cdot 10^{-3}$
Towing/towline	-	-	-	-	-	-	-	-
Well problem	2	0.012	14	0.071	9	0.045	50	0.244
Other	4	0.023	7	0.036	8	0.040	3	0.015

Table 20 All Fixed Units. UKCS, 1997, 1998, 1999.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year					
	1997		1998		1999	
	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize	-	-	-	-	-	-
Collision	1	$4.7 \cdot 10^{-3}$	3	0.014	3	0.013
Contact	9	0.042	5	0.023	8	0.035
Crane	93	0.435	104	0.473	80	0.351
Explosion	7	0.033	1	$4.5 \cdot 10^{-3}$	2	$8.8 \cdot 10^{-3}$
Falling object	117	0.547	134	0.609	126	0.553
Fire	48	0.224	44	0.200	41	0.180
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	200	0.935	198	0.900	173	0.759
Structural	1	$4.7 \cdot 10^{-3}$	1	$4.5 \cdot 10^{-3}$		
Towing/towline	-	-	-	-	-	-
Well problem	43	0.201	44	0.200	38	0.167
Other	3	0.014	5	0.023	5	0.022

Table 21 All Fixed Units. UKCS, 2000, 2001, 2002, 2003.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year							
	2000		2001		2002		2003	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	1	$4.2 \cdot 10^{-3}$	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	5	0.021	-	-	7	0.029	-	-
Contact	8	0.034	3	0.013	-	-	3	0.012
Crane	90	0.383	100	0.422	112	0.467	54	0.222
Explosion	3	0.013	-	-	3	0.013	1	$4.2 \cdot 10^{-3}$
Falling object	137	0.583	145	0.612	155	0.646	96	0.395
Fire	50	0.213	52	0.219	35	0.146	28	0.115
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	1	$4.2 \cdot 10^{-3}$	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	217	0.923	220	0.928	196	0.817	201	0.827
Structural	2	$8.5 \cdot 10^{-3}$	-	-	1	$4.2 \cdot 10^{-3}$	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	35	0.149	35	0.148	38	0.158	25	0.103
Other	15	0.064	5	0.021	13	0.054	6	0.025

Table 22 All Fixed Units. UKCS, 2004, 2005.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

	Period			
	2004		2005	
Type of event	N	F	N	F
Anchor failure	-	-	-	-
Blowout	-	-	-	-
Capsize	-	-	-	-
Collision	1	$4.1 \cdot 10^{-3}$	1	$4.0 \cdot 10^{-3}$
Contact	3	0.012	3	0.012
Crane	63	0.259	63	0.254
Explosion	1	$4.1 \cdot 10^{-3}$	-	-
Falling object	99	0.407	85	0.343
Fire	43	0.177	25	0.101
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	-	-	-	-
Leakage	1	$4.1 \cdot 10^{-3}$	-	-
List	-	-	-	-
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	216	0.889	172	0.694
Structural	-	-	-	-
Towing/towline	-	-	-	-
Well problem	24	0.099	29	0.117
Other	9	0.037	9	0.036

Table 23 All Fixed Units. UKCS, 1990-2005, 1980-2005.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

	Period			
	1990-2005		1980-2005	
Type of event	N	F	N	F
Anchor failure	-	-	-	-
Blowout	4	$1.2 \cdot 10^{-3}$	10	$2.2 \cdot 10^{-3}$
Capsize	-	-	-	-
Collision	28	$8.3 \cdot 10^{-3}$	30	$6.7 \cdot 10^{-3}$
Contact	108	0.032	188	0.042
Crane	1259	0.372	1681	0.375
Explosion	41	0.012	76	0.017
Falling object	1725	0.510	2193	0.489
Fire	717	0.212	945	0.211
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	6	$1.8 \cdot 10^{-3}$	13	$2.9 \cdot 10^{-3}$
Leakage	1	$3.0 \cdot 10^{-4}$	2	$4.5 \cdot 10^{-4}$
List	-	-	1	$2.2 \cdot 10^{-4}$
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	3108	0.919	3324	0.741
Structural	13	$3.8 \cdot 10^{-3}$	18	$4.0 \cdot 10^{-3}$
Towing/towline	-	-	-	-
Well problem	392	0.116	414	0.092
Other	105	0.031	111	0.025

A.2. 3 Occurrence frequencies – Drilling units

The recorded number and type of occurrences (**N**) and the corresponding frequencies (**F**) are given for fixed drilling units in the following table.

Table 24 Drilling Units. UKCS, 1980-2005.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Year	Type of event	N	F
Average 1980-1989	Contact	4	0.024
	Crane	6	0.036
	Explosion	1	$6.1 \cdot 10^{-3}$
	Falling object	6	0.036
	Fire	3	0.018
	Spill/release	5	0.030
1990	Crane	5	0.278
	Falling object	3	0.167
	Fire	1	0.056
	Spill/release	2	0.111
1991	Contact	1	0.056
	Crane	1	0.056
	Spill/release	1	0.056
1993	Spill/release	1	0.053
1994	Crane	1	0.053
	Falling object	1	0.053
	Fire	3	0.158
	Spill/release	4	0.211
	Well problem	1	0.053
1996	Falling object	1	0.059
1997	Crane	1	0.056
	Falling object	3	0.167
1998	Crane	1	0.056
	Falling object	1	0.056
	Well problem	1	0.056
1999	Crane	1	0.056
	Falling object	1	0.056

Year	Type of event	N	F
2004	Crane	3	0.167
	Falling object	4	0.222
	Fire	1	0.056
2005	Crane	3	0.167
	Falling object	4	0.222
	Fire	1	0.056
	Spill/release	1	0.056
	Well problem	4	0.222
Average 1990-2005	Contact	1	$3.4 \cdot 10^{-3}$
	Crane	16	0.055
	Falling object	18	0.062
	Fire	6	0.021
	Spill/release	9	0.031
	Well problem	6	0.021
Average 1980-2005	Contact	5	0.011
	Crane	22	0.048
	Explosion	1	$2.2 \cdot 10^{-3}$
	Falling object	24	0.053
	Fire	9	0.020
	Spill/release	14	0.031
	Well problem	6	0.013

A.2. 4 Occurrence frequencies – Production units

In the following tables the number of occurrences (N) and corresponding frequencies (F) for fixed production units are given per year/period.

Table 25 *Production Units. UKCS, 1980-1989, 1990, 1991, 1992.*

No. of occurrences and occurrence frequencies (per unit year).

Source: All databases combined

Type of event	Year/period							
	1980-1989		1990		1991		1992	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	5	8.2•10 ⁻³	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	2	3.3•10 ⁻³	-	-	-	-	1	0.012
Contact	73	0.120	11	0.145	8	0.101	4	0.049
Crane	410	0.672	53	0.697	59	0.747	68	0.840
Explosion	34	0.056	4	0.053	6	0.076	1	0.012
Falling object	453	0.743	57	0.750	78	0.987	86	1.062
Fire	218	0.357	34	0.447	14	0.177	47	0.580
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	5	8.2•10 ⁻³	2	0.026	1	0.013	-	-
Leakage	1	1.6•10 ⁻³	-	-	-	-	-	-
List	1	1.6•10 ⁻³	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	205	0.336	66	0.868	69	0.873	176	2.173
Structural	4	6.6•10 ⁻³	-	-	1	0.013	4	0.049
Towing/towline	-	-	-	-	-	-	-	-
Well problem	21	0.034	2	0.026	2	0.025	3	0.035
Other	6	9.8•10 ⁻³	1	0.013	6	0.076	4	0.049

Table 26 Production Units. UKCS, 1993, 1994, 1995, 1996.
No. of occurrences and occurrence frequencies (per unit year).

Source: All databases combined

	Year							
	1993		1994		1995		1996	
Type of event	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	1	0.011	1	0.011	1	0.011
Capsize	-	-	-	-	-	-	-	-
Collision	1	0.012	2	0.022	2	0.022	-	-
Contact	4	0.047	8	0.087	11	0.120	8	0.086
Crane	67	0.779	92	1.000	76	0.826	65	0.699
Explosion	6	0.070	3	0.033	1	0.011	1	0.011
Falling object	91	1.058	124	1.348	98	1.065	88	0.946
Fire	70	0.814	60	0.652	38	0.413	34	0.366
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	1	0.011	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	231	2.686	305	3.315	197	2.141	147	1.581
Structural	-	-	-	-	2	0.022	1	0.011
Towing/towline	-	-	-	-	-	-	-	-
Well problem	9	0.105	13	0.141	7	0.076	50	0.538
Other	4	0.047	7	0.076	7	0.076	3	0.032

Table 27 Production Units. UKCS, 1997, 1998, 1999.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year					
	1997		1998		1999	
	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize-	-	-	-	-	-	-
Collision	1	0.011	2	0.021	2	0.021
Contact	8	0.085	5	0.052	5	0.052
Crane	86	0.915	100	1.031	76	0.792
Explosion	7	0.075	1	0.010	2	0.021
Falling object	107	1.138	130	1.340	119	1.240
Fire	44	0.468	41	0.423	35	0.365
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	173	1.840	169	1.742	142	1.479
Structural	1	0.011	1	0.010	-	-
Towing/towline	-	-	-	-	-	-
Well problem	43	0.457	40	0.412	37	0.385
Other	3	0.032	4	0.041	3	0.031

Table 28 Production units. UKCS, 2000, 2001, 2002, 2003.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year							
	2000		2001		2002		2003	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	1	0.010	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	4	0.041	-	-	5	0.050	-	-
Contact	6	0.061	2	0.020	-	-	2	0.019
Crane	89	0.908	98	0.990	108	1.069	49	0.471
Explosion	3	0.031	-	-	3	0.030	1	9.6•10 ⁻³
Falling object	136	1.388	143	1.444	151	1.495	89	0.856
Fire	49	0.500	45	0.455	33	0.327	27	0.260
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	1	0.010	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	181	1.847	207	2.091	187	1.851	189	1.817
Structural	2	0.020	-	-	1	9.9•10 ⁻³	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	33	0.337	32	0.323	37	0.366	24	0.231
Other	13	0.133	5	0.051	13	0.129	5	0.048

Table 29 Production units. UKCS, 2004, 2005.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

	Period			
	2004		2005	
Type of event	N	F	N	F
Anchor failure	-	-	-	-
Blowout	-	-	-	-
Capsize	-	-	-	-
Collision	1	$9.6 \cdot 10^{-3}$	-	-
Contact	3	0.029	3	0.029
Crane	54	0.519	58	0.552
Explosion	1	$9.6 \cdot 10^{-3}$	-	-
Falling object	84	0.808	78	0.743
Fire	41	0.394	22	0.210
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	-	-	-	-
Leakage	1	$9.6 \cdot 10^{-3}$	-	-
List	-	-	-	-
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	205	1.971	160	1.524
Structural	-	-	-	-
Towing/towline	-	-	-	-
Well problem	22	0.212	24	0.229
Other	9	0.087	9	0.086

**Table 30 *Production units*. UKCS, 1990-2005, 1980-2005.
 No. of occurrences and occurrence frequencies (per unit year).
 Source: All databases combined**

	Period			
	1990-2005		1980-2005	
Type of event	N	F	N	F
Anchor failure	-	-	-	-
Blowout	4	$2.7 \cdot 10^{-3}$	9	$4.3 \cdot 10^{-3}$
Capsize	-	-	-	-
Collision	21	0.014	23	0.011
Contact	88	0.059	161	0.076
Crane	1198	0.800	1608	0.763
Explosion	40	0.027	74	0.035
Falling object	1659	1.108	2112	1.002
Fire	662	0.442	880	0.418
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	6	$4.0 \cdot 10^{-3}$	11	$5.2 \cdot 10^{-3}$
Leakage	1	$6.7 \cdot 10^{-4}$	2	$9.5 \cdot 10^{-4}$
List	-	-	1	$4.7 \cdot 10^{-4}$
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	2804	1.873	3009	1.428
Structural	13	$8.7 \cdot 10^{-3}$	17	$8.1 \cdot 10^{-3}$
Towing/towline	-	-	-	-
Well problem	379	0.253	400	0.190
Other	99	0.066	105	0.050

A.2. 5 Occurrence frequencies – Wellhead units

In the following tables the number of occurrences (**N**) and corresponding frequencies (**F**) for fixed wellhead (production) units are given per year/period.

Table 31 Wellhead Units. UKCS, 1980-1989, 1990, 1991, 1992.

No. of occurrences and occurrence frequencies (per unit year).

Source: All databases combined

	Year/period							
	1980-1989		1990		1991		1992	
Type of event	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	1	$6.6 \cdot 10^{-3}$	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	-	-	-	-	-	-
Contact	1	$6.6 \cdot 10^{-3}$	1	0.026	-	-	1	0.021
Crane	3	0.012	5	0.128	2	0.044	1	0.021
Explosion	-	-	3	$3.4 \cdot 10^{-3}$	8	$5.3 \cdot 10^{-3}$	-	-
Falling object	4	0.027	7	0.180	3	0.067	1	0.021
Fire	4	0.027	-	-	-	-	-	-
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	4	0.027	3	0.077	5	0.111	7	0.146
Structural	-	-	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	1	$6.6 \cdot 10^{-3}$	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-

Table 32 Wellhead Units. UKCS, 1993, 1994, 1995, 1996.
No. of occurrences and occurrence frequencies (per unit year).

Source: All databases combined

	Year							
	1993		1994		1995		1996	
Type of event	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	-	-	1	0.018	-	-
Contact			1	0.018	1	0.018	2	0.031
Crane	3	0.059	1	0.018	1	0.018	3	0.046
Explosion	-	-	-	-	-	-	-	-
Falling object	3	0.059	1	0.018	1	0.018	5	0.077
Fire	1	0.020	2	0.036	3	0.053	-	-
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	13	0.255	7	0.125	14	0.246	15	0.231
Structural	-	-	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	-	-	-	-	-	-	-	-
Other	-	-	-	-	1	0.018	-	-

Table 33 Wellhead Units. UKCS, 1997, 1998, 1999.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year					
	1997		1998		1999	
	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize	-	-	-	-	-	-
Collision	-	-	1	0.014	1	0.013
Contact	1	0.014	-	-	3	0.038
Crane	6	0.086	3	0.042	3	0.038
Explosion	-	-	-	-	-	-
Falling object	6	0.086	3	0.042	5	0.063
Fire	3	0.043	3	0.042	4	0.051
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	25	0.357	26	0.361	26	0.329
Structural	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-
Well problem	-	-	3	0.042	1	0.013
Other	-	-	1	0.014	2	0.025

Table 34 Wellhead units. UKCS, 2000, 2001, 2002, 2003.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year							
	2000		2001		2002		2003	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	-	-	2	0.023	-	-
Contact	2	0.024	1	0.012	-	-	1	0.012
Crane	1	0.012	2	0.024	4	0.047	5	0.058
Explosion	-	-	-	-	-	-	-	-
Falling object	1	0.012	2	0.024	4	0.047	7	0.081
Fire	1	0.012	7	0.082	2	0.023	1	0.012
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	34	0.405	13	0.153	9	0.105	12	0.140
Structural	-	-	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	2	0.024	3	0.035	1	0.012	1	0.012
Other	2	0.024	-	-	-	-	-	-

Table 35 Wellhead units. UKCS, 2004, 2005.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Period			
	2004		2005	
	N	F	N	F
Anchor failure	-	-	-	-
Blowout	-	-	-	-
Capsize	-	-	-	-
Collision	-	-	1	0.011
Contact	-	-	-	-
Crane	4	0.047	1	0.011
Explosion	-	-	-	-
Falling object	7	0.081	2	0.022
Fire	1	0.012	-	-
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	-	-	-	-
Leakage	-	-	-	-
List	-	-	-	-
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	6	0.070	8	0.089
Structural	-	-	-	-
Towing/towline	-	-	-	-
Well problem	2	0.023	1	0.011
Other	-	-	-	-

Table 36 Wellhead units. UKCS, 1990-2005, 1980-2005.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

	Period			
	1990-2005		1980-2005	
Type of event	N	F	N	F
Anchor failure	-	-	-	-
Blowout	-	-	1	$8.0 \cdot 10^{-4}$
Capsize	-	-	-	-
Collision	6	$5.5 \cdot 10^{-3}$	6	$4.8 \cdot 10^{-3}$
Contact	14	0.013	15	0.012
Crane	45	0.041	48	0.038
Explosion	-	-	-	-
Falling object	58	0.053	62	0.050
Fire	29	0.026	33	0.026
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	-	-	-	-
Leakage	-	-	-	-
List	-	-	-	-
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	223	0.203	227	0.182
Structural	-	-	-	-
Towing/towline	-	-	-	-
Well problem	14	0.013	15	0.012
Other	-	-	-	-

A.2. 6 Occurrence frequencies – Compression units

In the following tables the number of occurrences (**N**) and corresponding frequencies (**F**) for fixed compression units are given per year/period.

Table 37 *Compression Units. UKCS, 1980-1989, 1990, 1991, 1992.*

No. of occurrences and occurrence frequencies (per unit year).

Source: All databases combined

	Year/period							
	1980-1989		1990		1991		1992	
Type of event	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	-	-	-	-	-	-
Contact	-	-	-	-	-	-	-	-
Crane	2	0.029	-	-	1	0.111	-	-
Explosion	-	-	-	-	-	-	-	-
Falling object	3	0.044	1	0.125	1	0.111	-	-
Fire	1	0.015	-	-	-	-	1	0.111
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	2	0.029	-	-	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	1	0.015	-	-	1	0.111	2	0.222
Structural	-	-	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-

**Table 38 Compression Units. UKCS, 1993, 1994, 1995, 1996.
No. of occurrences and occurrence frequencies (per unit year).**

Source: All databases combined

	Year							
	1993		1994		1995		1996	
Type of event	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	-	-	-	-	-	-
Contact	-	-	-	-	-	-	-	-
Crane	1	0.100	-	-	1	0.091	-	-
Explosion	-	-	-	-	-	-	-	-
Falling object	1	0.100	-	-	2	0.182	-	-
Fire	-	-	1	0.100	6	0.546	-	-
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	5	0.500	4	0.400	6	0.546	-	-
Structural	-	-	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-

Table 39 Compression Units. UKCS, 1997, 1998, 1999.
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year					
	1997		1998		1999	
	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-
Blowout	-	-	-	-	-	-
Capsize	-	-	-	-	-	-
Collision	-	-	-	-	-	-
Contact	-	-	-	-	-	-
Crane	-	-	-	-	-	-
Explosion	-	-	-	-	-	-
Falling object	1	0.091	-	-	-	-
Fire	-	-	-	-	1	0.083
Foundering	-	-	-	-	-	-
Grounding	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-
Leakage	-	-	-	-	-	-
List	-	-	-	-	-	-
Machinery	-	-	-	-	-	-
Off position	-	-	-	-	-	-
Spill/release	2	0.182	2	0.182	4	0.333
Structural	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-
Well problem	-	-	-	-	-	-
Other	-	-	-	-	-	-

Table 40 *Compression units. UKCS, 2000, 2001, 2002, 2003.*
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Year							
	2000		2001		2002		2003	
	N	F	N	F	N	F	N	F
Anchor failure	-	-	-	-	-	-	-	-
Blowout	-	-	-	-	-	-	-	-
Capsize	-	-	-	-	-	-	-	-
Collision	-	-	-	-	-	-	-	-
Contact	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-
Explosion	-	-	-	-	-	-	-	-
Falling object	-	-	-	-	-	-	-	-
Fire	-	-	-	-	-	-	-	-
Foundering	-	-	-	-	-	-	-	-
Grounding	-	-	-	-	-	-	-	-
Helicopter	-	-	-	-	-	-	-	-
Leakage	-	-	-	-	-	-	-	-
List	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Off position	-	-	-	-	-	-	-	-
Spill/release	2	0.167	-	-	-	-	-	-
Structural	-	-	-	-	-	-	-	-
Towing/towline	-	-	-	-	-	-	-	-
Well problem	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-

Table 41 *Compression units. UKCS, 2004, 2005.*
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

Type of event	Period			
	2004		2005	
	N	F	N	F
Anchor failure	-	-	-	-
Blowout	-	-	-	-
Capsize	-	-	-	-
Collision	-	-	-	-
Contact	-	-	-	-
Crane	2	0.167	1	0.083
Explosion	-	-	-	-
Falling object	2	0.167	1	0.083
Fire	-	-	-	-
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	-	-	-	-
Leakage	-	-	-	-
List	-	-	-	-
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	5	0.417	3	0.250
Structural	-	-	-	-
Towing/towline	-	-	-	-
Well problem	-	-	-	-
Other	-	-	-	-

Table 42 *Compression units. UKCS, 1990-2005, 1980-2005.*
No. of occurrences and occurrence frequencies (per unit year).
Source: All databases combined

	Period			
	1990-2005		1980-2005	
Type of event	N	F	N	F
Anchor failure	-	-	-	-
Blowout	-	-	-	-
Capsize	-	-	-	-
Collision	-	-	-	-
Contact	-	-	-	-
Crane	6	0.035	8	0.033
Explosion	-	-	-	-
Falling object	9	0.052	12	0.050
Fire	11	0.064	12	0.050
Foundering	-	-	-	-
Grounding	-	-	-	-
Helicopter	-	-	2	$8.3 \cdot 10^{-3}$
Leakage	-	-	-	-
List	-	-	-	-
Machinery	-	-	-	-
Off position	-	-	-	-
Spill/release	36	0.209	37	0.154
Structural	-	-	-	-
Towing/towline	-	-	-	-
Well problem	-	-	-	-
Other	-	-	-	-

A.2. 7 Occurrence frequencies – Pumping Units

No accidents are recorded on fixed pumping platforms in either of the databases in the period 1980-2005, and hence the overall calculated occurrence frequency is 0.

A.2. 8 Occurrence frequencies – Injection/riser Units

The recorded number (N) and type of occurrences and the corresponding frequencies (F) are given in the following table.

Table 43 *Injection/riser units. UKCS. 1980-2005.*

No. of occurrences per unit year.

Source: All databases combined

Year	Type of event	N	F
Average 1980- 1989	Falling object	1	0.022
	Fire	1	0.022
1990	Fire	1	0.200
1991	Fire	2	0.333
1993	Contact	1	0.125
2004	Falling object	2	0.200
2005	Fire	1	0.100
Average 1990- 2005	Contact	1	$7.1 \cdot 10^{-3}$
	Falling object	2	0.014
	Fire	4	0.029
Average 1980- 2005	Contact	1	$5.4 \cdot 10^{-3}$
	Falling object	3	0.016
	Fire	5	0.027

A.2.9 Occurrence frequencies – Accommodation units

The recorded number (N) and type of occurrences and the corresponding frequencies (F) are given in the following table.

Table 44 Accommodation units. UKCS. 1980-2005.
No. of occurrences per unit year. Source: All databases combined

Year	Type of event	N	F
Average 1980- 1989	Contact	2	0.049
	Crane	1	0.024
	Falling object	1	0.024
	Fire	2	0.049
	Spill/release	1	0.024
	Structural	1	0.024
1992	Contact	1	0.143
1993	Fire	1	0.125
1994	Contact	1	0.111
	Spill/release	1	0.111
1996	Fire	1	0.100
1997	Fire	1	0.100
1998	Spill/release	1	0.091
1999	Falling object	1	0.091
2000	Collision	1	0.091
2005	Fire	1	0.091
Average 1990- 2005	Collision	1	$6.5 \cdot 10^{-3}$
	Contact	2	0.013
	Falling object	1	$6.5 \cdot 10^{-3}$
	Fire	4	0.026
	Spill/release	2	0.013
Average 1980- 2005	Collision	1	$5.2 \cdot 10^{-3}$
	Contact	4	0.021
	Crane	1	$5.2 \cdot 10^{-3}$
	Falling object	2	0.010
	Fire	5	0.026
	Spill/release	3	0.015
	Structural	1	$5.2 \cdot 10^{-3}$

Accident statistics for fixed offshore units on the UK Continental Shelf 1980-2005

In 2000, a project was undertaken by Det Norske Veritas (DNV) on behalf of the UK Health & Safety Executive (HSE) with the purpose of obtaining accident statistics for offshore floating units on the UK Continental Shelf (UKCS). In this respect, four databases holding information about incidents having occurred on floating units on the UKCS were interrogated. The survey revealed that that none of them had a complete recording of such incidents. Consequently, the event frequencies being obtained varied with the availability of sources.

There was no reason to believe that the situation and figures for fixed installations should be any different. Hence, it was proposed to initiate a series of projects, but addressing all types of risks to fixed units. It should be noted that fixed units in this project are defined as comprising all bottom-fixed structures, but excluding TLPs, FPSOs, FSUs and production jackups even though they are “fixed” during their production phase. The most recent project related to fixed units, Accident Statistics for Fixed Offshore Units on the UK Continental Shelf 1980 – 2003, was completed in 2005. This current project updates the data of the previous project by two further years, 2004 and 2005. This report supercedes Research Report RR349.

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.