

Appendix F

Navy Crane Operating Experience

Navy Crane Data (1974-1977)

NUREG-0612, *Control of Heavy Loads at Nuclear Power Plants* (published in 1980) relied heavily on U.S. Navy crane operating experience. The Navy crane data included summaries of 466 crane events covering a period from February 1974 to October 1977. An exact accounting of the number of lifts per year made by each crane was not available from the Navy. Estimates were made of the number of lifts, and of the number of load drops due to changes in the number of facilities and vessels covered in the reporting system.

Navy Crane Data (1995-1999)

NUREG-1738, *Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants* (published in 2001) relied heavily on U.S. Navy crane operating experience. The Navy crane data included summaries of 66 crane events covering a period from December 1995 to May 1999. An exact accounting of the number of lifts per year made by each crane was not available from the Navy. Once again, estimates were made of the number of lifts, since this information was not available.

Table F1, *Reported Navy crane events (1995-1999)*, provides a listing of the 66 Navy crane events. Each crane event is listed by crane type, accident type, accident cause, responsible group, function being performed at the time of the event, and crane operating mode. A breakdown is also provided showing the end result of the crane event and its cause. Abbreviations used in Table F1 are shown on Table F2, *Navy crane data abbreviations*.

Caution should be taken when comparing the Navy crane data used in NUREG-0612 and the data used in NUREG-1738 because of (1) the potential for event reporting criteria changes since the mid-1970s, (2) changes in the number of active Naval cranes since the mid-1970s, and (3) the lack of data regarding the number of lifts performed for either set of crane data.

Table F1: Reported Navy crane events (1995-1999)

Report#	Date	Crane	Accident Type	Accident Cause	Responsible Group	Function	Operating Mode	Issue	Cause	Percent	# Reports
95001	5/9/95	BNS	DC	IR	R	H	OP	Damaged Crane			
95001	12/5/95	BNS	DROP	IR	R	H	OP		IO	50.0	9
95002	8/30/95	BNS	CC	TC	M	T	MAIN		IR	27.8	5
96001	2/8/96	ONS	DC	IO	UNK	H	OP		PROC	22.2	4
96002	7/1/96	ONS	PI	IR	SHOP	H	OP				
96002	9/9/96	BNS	CC	II	CONT	T	OP	Crane Collision	Cause	Percent	# Reports
96004	4/25/96	BS	PI	IR	R	NA	OP		IO	45.5	5
96005	7/13/96	BS	DL	IR	R	H	OP		PROC	18.2	2
96010	9/25/96	BS	DL	IR	R	H	OP		Others	36.4	4
96013	7/9/96	BS	DC	IR	R	H	OP				
96014	12/3/96	BS	UL	IO	O	L	ODCL	Load Collision	Cause	Percent	# Reports
96017	9/6/96	BS	DL	EQ	EC	H	OP		IO	55.6	5
96028	8/9/96	BS	DC	IO	O	HT	OP		IR	22.2	2
96041	11/8/96	BS	LC	IR	R	H	OP		PROC	11.1	1
97001	11/4/97	BNS	CC	IO	O	B	OP		VISI	11.1	1
97001	1/8/97	BS	PI	IR	R	IDLE	OP				
97001	2/5/97	BNS	OVER	IO	O	H	OP	Overload	Cause	Percent	# Reports
97001	2/10/97	BNS	PI	IO	O	H	OP		IO	25.0	2
97001	4/29/97	BNS	DROP	IR	R	H	OP		IR	37.5	3
97002	4/18/97	BNS	PI	PROC	WELD	H	OP		PROC	37.5	3
97003	10/30/97	BNS	SHOCK	IR	FWORK	H	OP				
97004	2/27/97	BS	LC	VISI	R	H	OP	Personnel Injury	Cause	Percent	# Reports
97008	10/1/97	BNS	CC	IO	O	T	OP		IO	20.0	1
97008	2/26/97	BS	CC	PROC	EC	T	OP		IR	60.0	3
97009	11/19/97	BNS	OVER	PROC	MG	H	OP		PROC	20.0	1
97010	10/1/97	BNS	CC	IO	UNK	B	OP				
97013	12/1/97	BS	DC	IO	O	UNK	OP	Dropped Load	Cause	Percent	# Reports
97014	6/2/97	BS	OVER	PROC	MG	H	OP		EQ	40.0	2
97016	4/30/97	BS	DROP	EQ	R	ROT	OP		IR	60.0	3
98001	4/28/98	BNS	DC	IO	O	TROL	OP				
98001	2/26/98	BNS	DC	PROC	MECH	L	MAIN	Two-Blocking	Cause	Percent	# Reports
98001	1/13/98	BNS	DC	IO	O	H	OP		IO	66.7	2
98001	11/4/98	BNS	DROP	EQ	R	H	OP		PROC	33.3	1
98001	1/6/98	BS	DROP	IR	R	L	OP				
98002	2/18/98	BS	DR	IR	R	H	OP	Damaged Load	Cause	Percent	# Reports
98002	3/13/98	GNS	DC	IO	MG	N/A	OP		EQ	33.3	1
98004	8/4/98	GNS	DC	PROC	ISP	H	OP		IR	66.7	2
98004	5/5/98	GNS	CC	IO	O	T	OP				
98004	2/2/98	BNS	DC	IO	O	B	MAIN	Damaged Rigging	Cause	Percent	# Reports
98004	11/18/98	BNS	DC	IR	R	H	OP		IR	1.0	1
98004	2/1/98	BNS	LC	IO	O	L	OP				
98005	1/8/98	BNS	TB	IO	CONT	H	UNK	Uncontrolled Lowering	Cause	Percent	# Reports
98006	12/9/98	GNS	CC	VISI	R	T	OP		IO	1.0	1
98006	4/10/98	BNS	DC	IR	R	L	OP				
98007	5/15/98	BS	LC	IO	R	B	OP	Shock	Cause	Percent	# Reports
98008	7/29/98	BNS	OVER	PROC	MG	H	OP		IR	1.0	1
98008	6/26/98	BS	TB	PROC	M	H	MAIN				
98009	7/21/98	BS	CC	IO	O	B	OP	Other	Cause	Percent	# Reports
98010	7/2/98	BS	LC	IO	O	L	OP		PROC	1.0	1
98010	12/22/98	BS	OVER	IO	R	H	OP				
98013	8/28/98	BS	OVER	IR	R	H	OP				
98017	11/6/98	BS	OTHER	PROC	CONT	T	OP				
98018	12/11/98	BS	OVER	IR	R	H	OP				
98029	12/14/98	BS	CC	PROC	O	T	OP				
99001	10/30/98	BNS	LC	IO	O	H	OP				
99001	3/30/99	BNS	LC	IO	R	H	OP				
99002	4/12/99	BNS	DC	IR	IR	H	OP				
99003	2/22/99	MONO	TB	IO	O	H	OP				
99003	4/13/99	BS	OVER	IR	R	H	OP	Summary by Cause	Cause	Percent	# Reports
99003	10/15/98	BNS	DC	IO	O	T	OP		IO	37.9	25
99004	10/15/98	BNS	DC	IO	O	H	OP		IR	30.3	20
99005	3/9/99	BS	LC	PROC	R	HOLD	TEST		PROC	19.7	13
99007	1/29/99	BNS	DC	PROC	M	T	MAIN		EQ	4.5	3
99008	3/30/99	BS	LC	IR	R	T	OP		Misc	7.6	5
99008	3/20/99	BNS	DC	PROC	MG	T	OP		Total	100.0	66
99013	5/8/99	BS	CC	COMM	ISP	TROL	ISP				

Table F1 abbreviations are shown in Table F2

Table F2: Navy crane data abbreviations

B	Bridge movement	M	Maintenance (personnel)
BS	Bridge crane	MAIN	Maintenance (mode of operation)
BNS	Bridge crane	MECH	Mechanic (personnel)
CC	Crane collision	MG	Management/supervision
COMM	Communication problem	MONO	Monorail crane
CONT	Contractor	O	Operator (personnel)
DC	Damaged crane	ODCL	Surveillance
DL	Damaged load	ONS	Overhead crane
DR	Damaged rigging	OP	Operation (mode of operation)
DROP	Load drop	OTHER	Not directly related to a crane
EC	Personnel other than shop personnel	PI	Personal injury
EQ	Equipment failure	PROC	Procedure failure
FWORK	Foundry worker	R	Rigger
GNS	Gantry crane	ROT	Load rotation
H	Hoisting	Shock	Shock load (similar to drop)
HOLD	Holding	T	Crane travel/movement
HT	Hoisting/travel	TB	Two-blocked
IDLE	Idle	TC	Track condition
II	Improper installation	TEST	Testing (mode of operation)
IO	Improper operation	TROL	Trolley/bridge movement
IR	Improper rigging	UL	Uncontrolled lowering
ISP	Inspection/maintenance (mode of operation)	UNK	Unknown
L	Lowering	VISI	Inadequate visibility
LC	Load collision	WELD	Welder (personnel)