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NASA

National Aeronautics and
Space Administration

1978 Mishap and Injury Data

SAFETY AND ENVIRONMENTAL HEALTH DIVISION
Office of the Chief Engineer
Washington, D.C. 20546

FOREWORD

This report contains statistical and narrative data concerning NASA/NASA Contractor mishap and injury experience for calendar year 1978. Injury data are reported for all full-time NASA civil servants and injury summaries are included for contractors at six installations. Frequency and severity information is not available for the contractors. One contractor fatality from a heart attack occurred at one installation.

The number of fire incidents were at an all time low. The controls and attentiveness exercised in this area are outstanding, and we urge continued vigilance. Our aviation experience continued good with no major losses. There was one NASA Type "B" aviation related accident and seven incidents. There was also an engine failure in-flight on a Shuttle Training Aircraft which is included as a Type "A" Test Operations loss. The automotive accident frequency rate and costs increased in 1978. Management should carefully evaluate and take action to reduce the automotive losses.

Our lost time injury/illness frequency rate for the first time since 1969 decreased (from 0.82 to 0.81), but the chargeback billing which the Office of Workmen's Compensation imposes on NASA for reimbursement was up to more than three million dollars. Each installation should examine the administration of the Continuation of Pay program (CoP) and lost time charged to Workmen's Compensation without limiting justifiable claims. (NMI 3810.1A, Processing Claims Under The Federal Employees' Compensation Act, dated May 8, 1979, and Dr. Frosch's June 28, 1979, memorandum to the Installation Directors relate to this responsibility.) Top management attention can, and has at some installations, dramatically reduced the NASA loss. Six installations had decreases in their lost time injury/illness frequency rates and seven had decreases in total reportable rates.

Supervisory personnel should continue to oversee potentially hazardous operations to preclude employees from taking shortcuts and perhaps injuring themselves. If more managers take personal interest in the safety of operations, I am convinced our accident and injury rates will continue to be reduced. Our most hazardous operations tend to have the fewest injuries. Although our lost time accident and injury rate decreased slightly in 1978, it still requires special attention by management and supervisory personnel, especially at those installations where the rate is increasing. As a point to consider, if those installations having increased lost time injury/illness rates in 1978 had maintained the same number of injuries/illnesses in 1978 that they had in 1977, our overall rate would have decreased to 0.71 instead of 0.81. If those installations having increased rates of total reportable injuries/illnesses had maintained their 1977 numbers of incidents and others achieved their 1978 performance, our total incident frequency rate would have been 1.64 instead of 1.75.

The statistical information presented in this report is designed to assist each NASA employee in evaluating how his work environment historically stacks up against the rest of NASA for his safety and health. In the future, please use these lessons from the past to avoid more loss and grief.

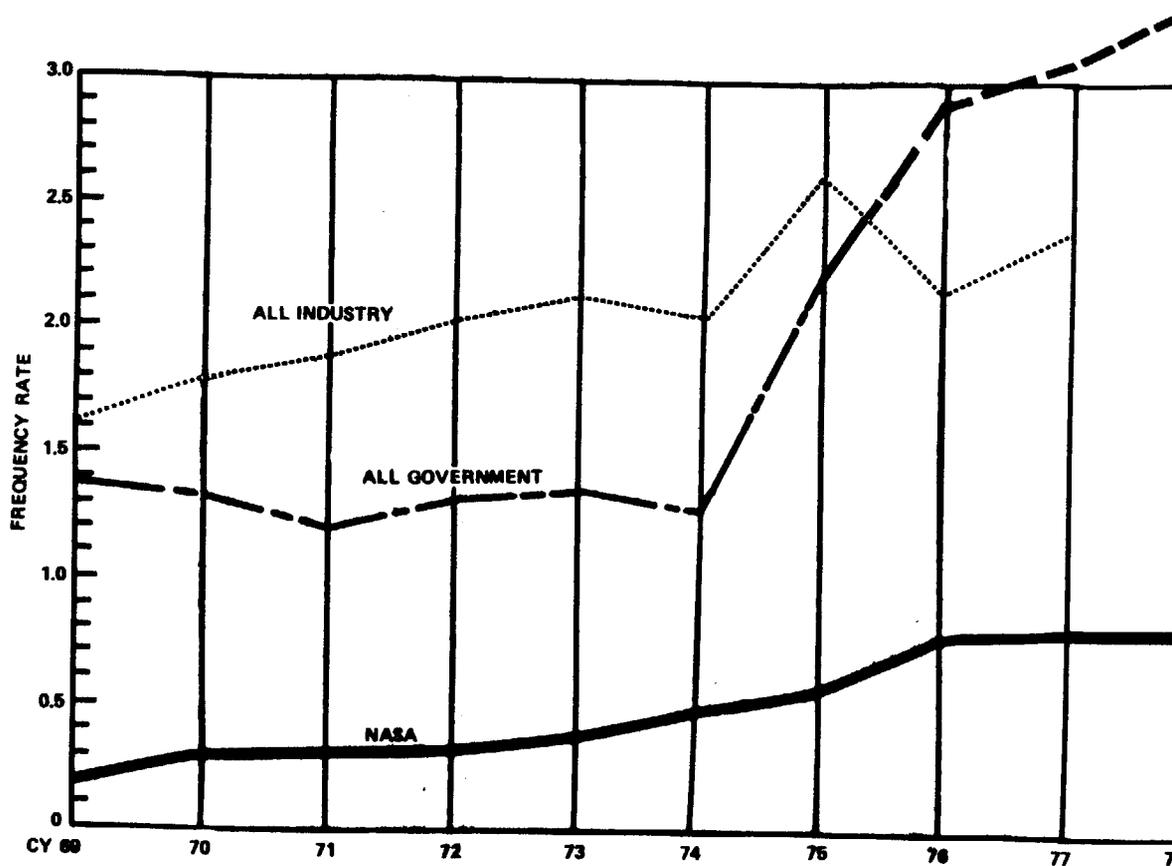


Reuben P. Prichard
Director, Safety and
Environmental Health Division

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**NASA
INJURY
EXPERIENCE
1969
THROUGH
1978**



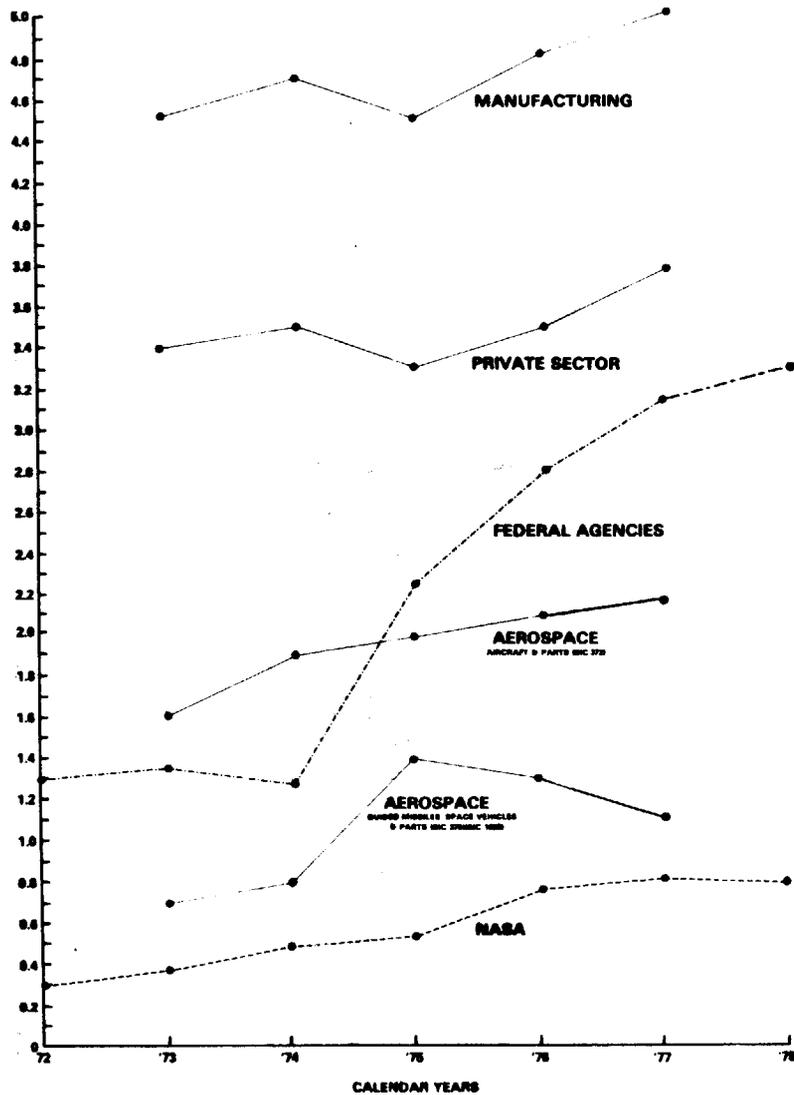
	CY 69	70	71	72	73	74	75	76	77	78
FREQUENCY RATE - NASA	.20	.29	.30	.30	.37	.40	.54	.77	.82	.81
* FREQUENCY RATE - ALL GOVERNMENT	1.38	1.32	1.20	1.30	1.38	1.28	2.25	2.91	3.14	3.30
† FREQUENCY RATE - ALL INDUSTRY	1.62	1.77	1.87	2.03	2.11	2.04	2.62	2.17	2.48	N/A
AVERAGE NUMBER OF NASA EMPLOYEES	32,800	31,200	29,100	28,300	27,800	26,700	26,023	25,794	25,015	24,278
LOST TIME INJURIES - NASA	63	85	83	79	93	116	127	175	190	184

FREQUENCY RATE IS DEFINED BY OSHA AS THE NUMBER OF LOST TIME INJURIES PER 200,000 MAN-HOURS WORKED.

* SOURCE : OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION, DEPT. OF LABOR

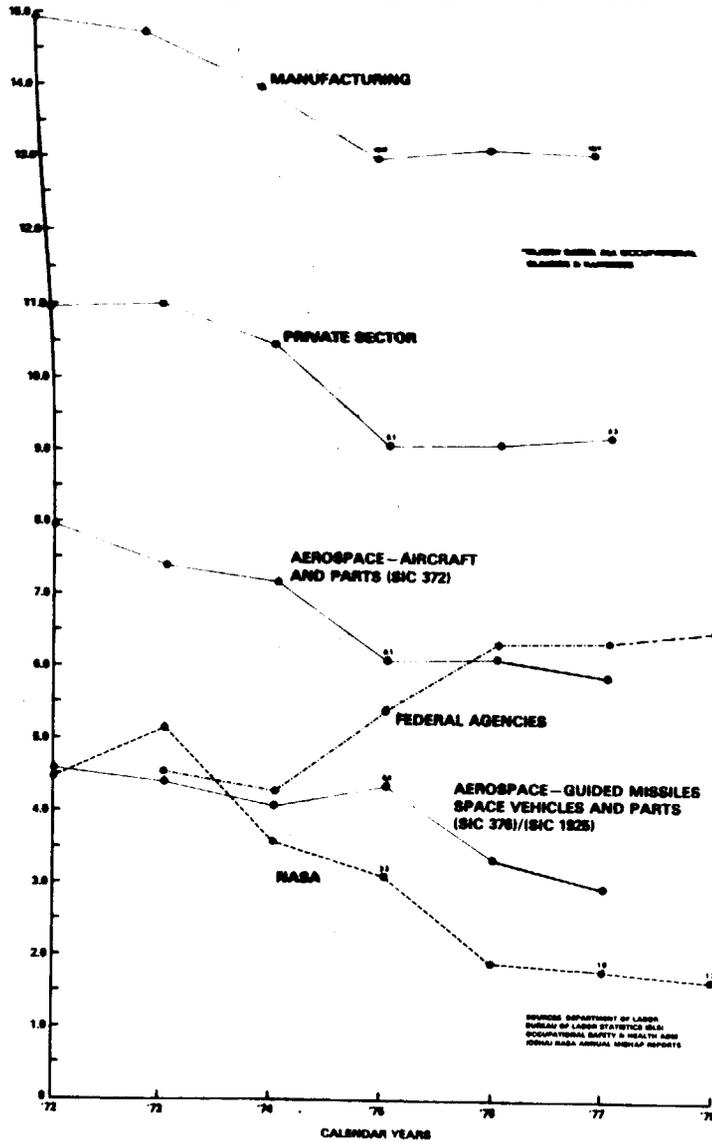
† SOURCE : NATIONAL SAFETY COUNCIL

LOST-TIME INJURY RATES—NASA—FEDERAL AGENCIES & INDUSTRY



2

INJURY RATES: PRIVATE SECTOR—FEDERAL GOVT—NASA—SELECTED INDUSTRY

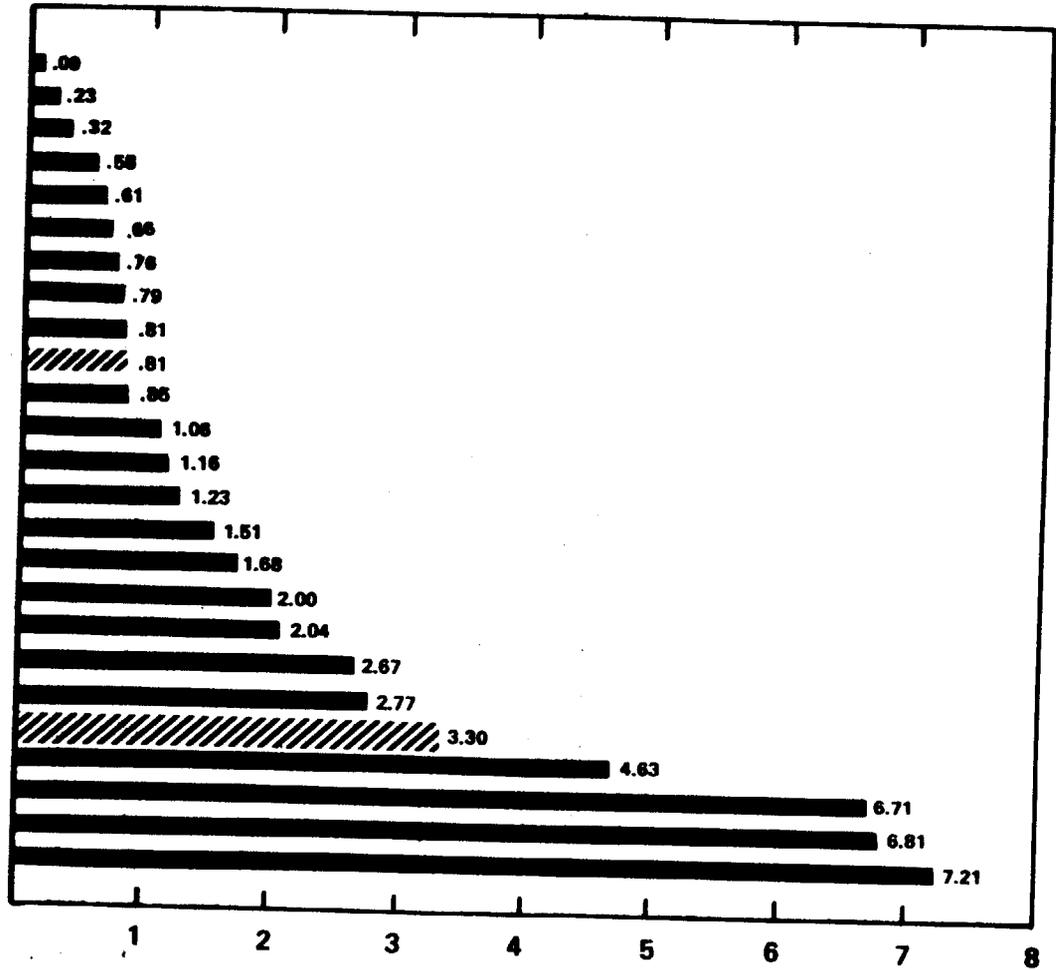


3

LOST WORK DAY CASES IN FEDERAL AGENCIES - 1978 OCCUPATIONAL INJURY RATES FOR CIVILIAN PERSONNEL PER 200,000 MAN-HOURS

4

DEPARTMENT OF STATE
 FEDERAL COMMUNICATION COMMISSION
 GENERAL ACCOUNTING OFFICE
 CIVIL SERVICE COMMISSION
 NATIONAL LABOR RELATIONS BOARD
 HOUSING AND URBAN DEVELOPMENT
 ENVIRONMENTAL PROTECTION AGENCY
 HEALTH EDUCATION AND WELFARE
 DEPARTMENT OF COMMERCE
 NATIONAL AERONAUTICS AND SPACE ADMIN.
 DEPARTMENT OF ENERGY
 DEPARTMENT OF LABOR
 DEPARTMENT OF TRANSPORTATION
 DEPARTMENT OF TREASURY
 DEPARTMENT OF AGRICULTURE
 SMITHSONIAN INSTITUTION
 DEPARTMENT OF INTERIOR
 DEPARTMENT OF JUSTICE
 GENERAL SERVICES ADMINISTRATION
 DEPARTMENT OF DEFENSE
ALL GOVERNMENT
 VETERANS ADMINISTRATION
 U. S. POSTAL AUTHORITY
 GOVERNMENT PRINTING OFFICE
 TENNESSEE VALLEY AUTHORITY



SOURCE: Occupational Safety and Health Administration, U. S. Department of Labor

NASA HQ YZ76-3082 (1)
Rev. 7-9-79

COST OF CY 1978 NASA ACCIDENT/INCIDENT/INJURIES

MANPOWER LOSS		0	FATALITIES
		212	NON-LOST TIME INJURIES
		184	LOST TIME INJURIES
		2,469	WORK DAYS LOST = 9.5 MAN-YEARS EFFORT
MONEY LOSS	WAGES	\$ 182,548	
	(COP RELATED COSTS)		
	CHARGE BACK BILLING		
	TO FEDERAL EMPLOYEES		
	COMPENSATION FUND		
	(1978)	\$3,166,435	
MATERIAL LOSS	AIRCRAFT	28,650	<u>No. OF MISHAPS</u>
	VEHICLES	79,910	8
	FIRE	189,710	80
	OTHER PROPERTY	65,000	15
			16
TOTAL LOSS		\$3,712,253	115

DOES NOT INCLUDE CONTRACTOR DATA

DOES NOT INCLUDE FUTURE COSTS FOR THE INJURIES; SINCE
THEY WILL BE PART OF THE ANNUAL CHARGEBACK BILLING

DOES NOT INCLUDE MISSION FAILURES

DOES NOT INCLUDE TEST OPERATIONS FAILURES

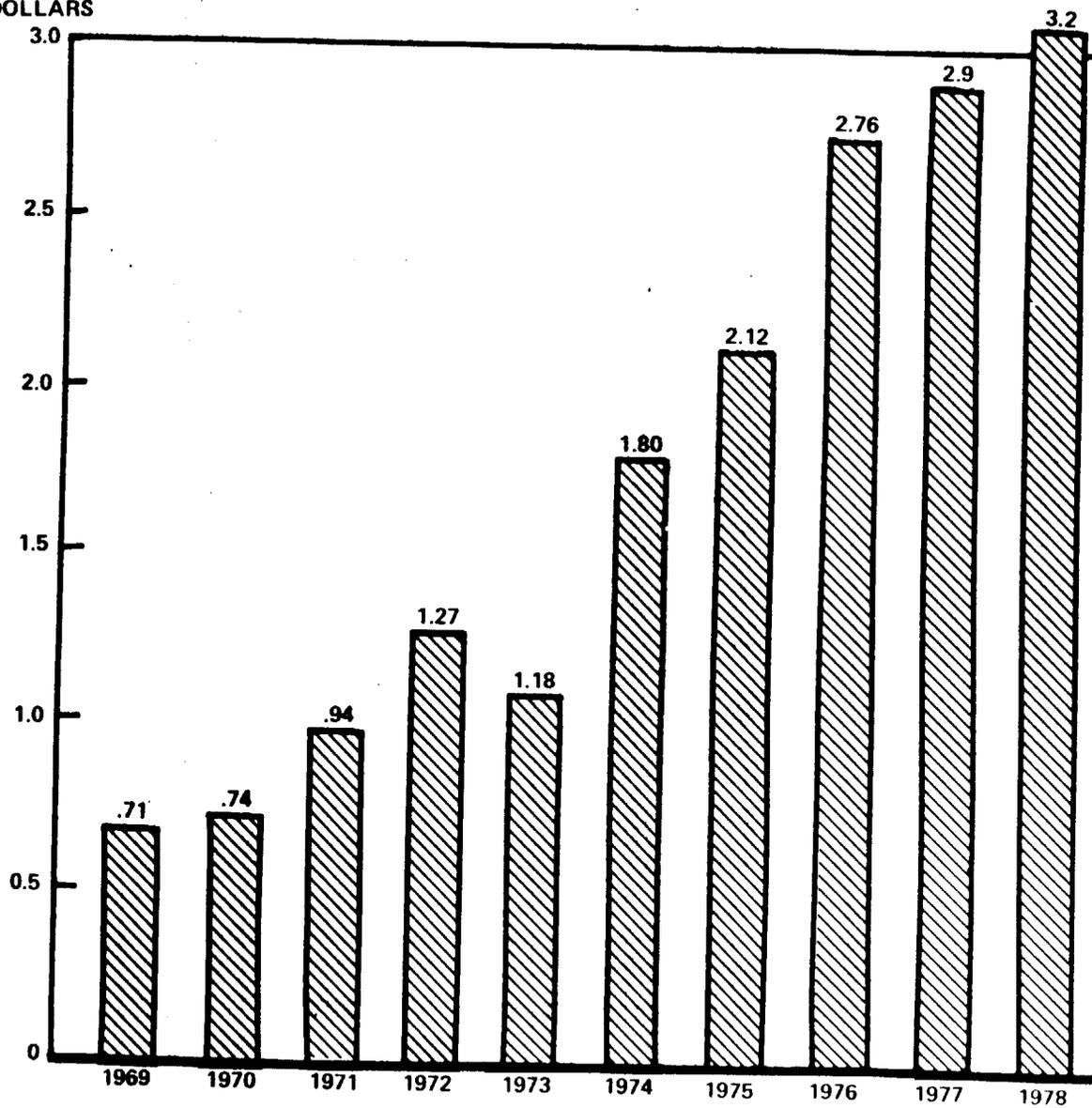
COSTS NASA PAID TO FEDERAL EMPLOYEES COMPENSATION FUND (BY FISCAL YEARS)

9

THESE COSTS ARE CHARGED TO NASA AS REIMBURSEMENT TO THE FEDERAL EMPLOYEES COMPENSATION FUND FOR PAYMENTS MADE BECAUSE OF INJURY OR DEATH OF NASA EMPLOYEES OR PERSONS UNDER THE JURISDICTION OF NASA.

NASA HQ DS78-2245 (1)

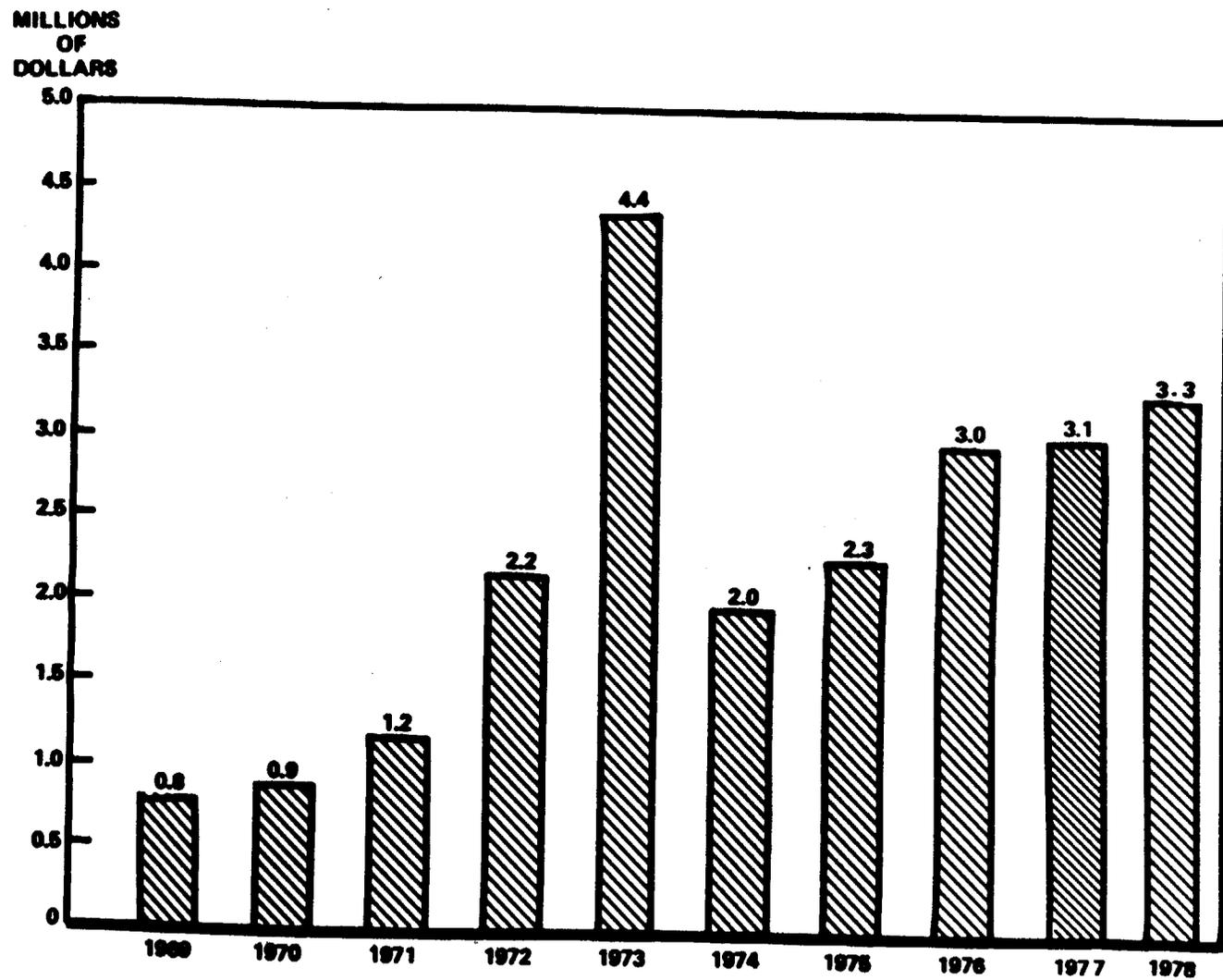
MILLIONS
OF
DOLLARS
3.0



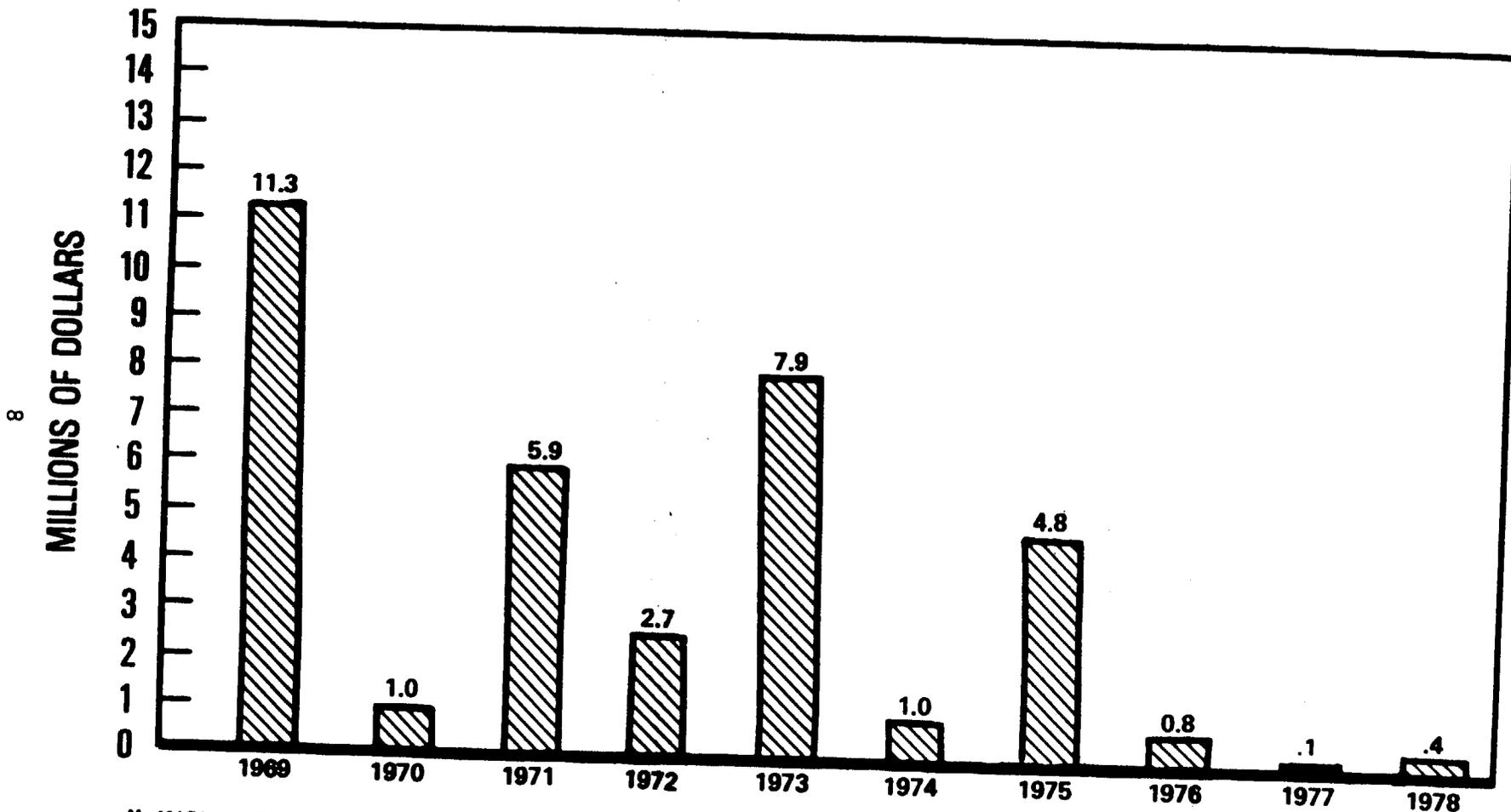
NASA MONEY * LOSSES DUE TO MISHAPS

7

* INCLUDES LOST WAGES AND
CHARGE BACK BILLING TO THE
FEDERAL EMPLOYEES
COMPENSATION FUND, BUT DOES
NOT INCLUDE CONTRATOR
LOSSES.

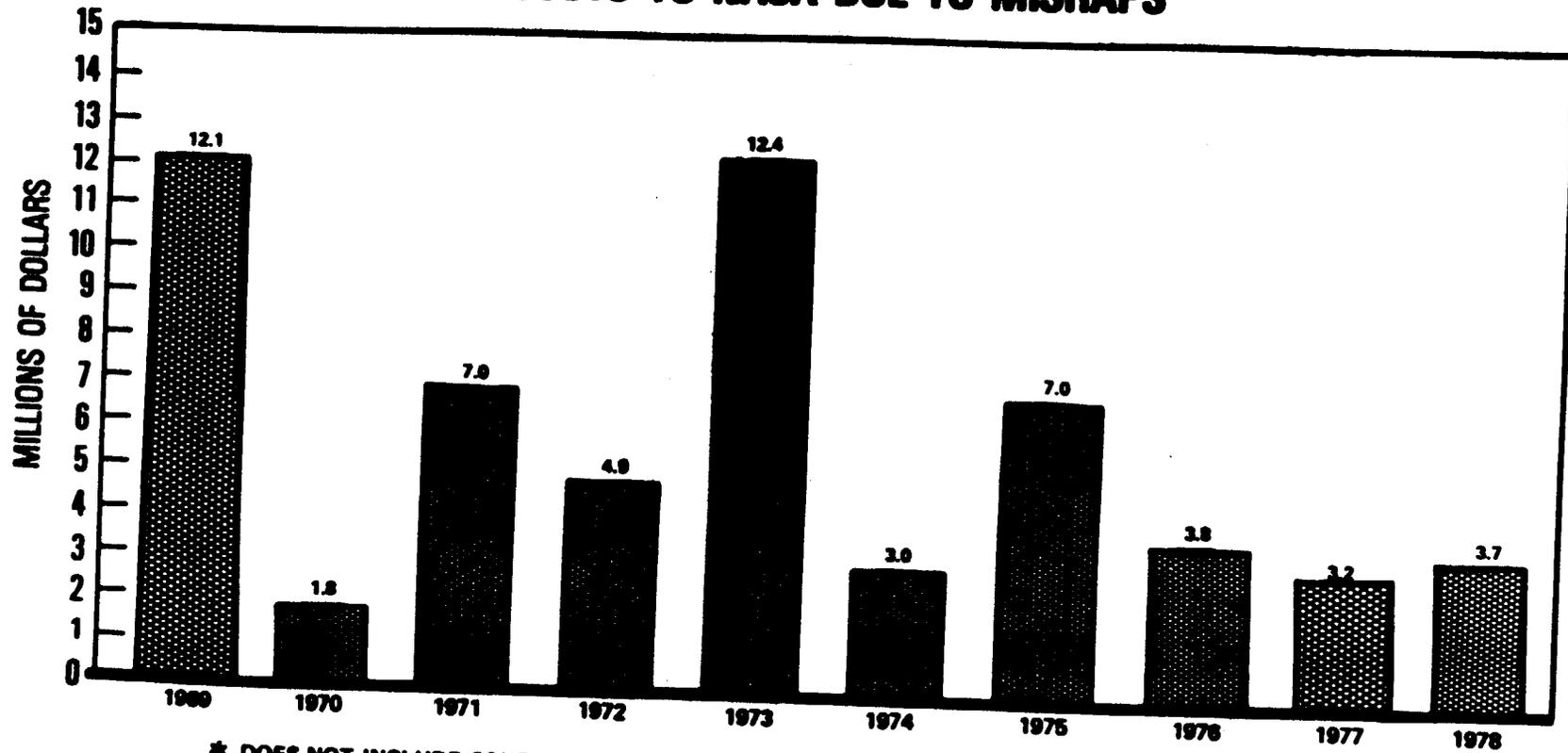


NASA MATERIAL LOSSES DUE TO MISHAPS *



* INCLUDES AIRCRAFT, VEHICLE, AND FIRE MISHAPS
AND LOSSES OF OTHER PROPERTY.
DOES NOT INCLUDE CONTRACTOR LOSSES.
DOES NOT INCLUDE MISSION FAILURES.
DOES NOT INCLUDE TEST OPERATIONS LOSSES.

TOTAL COSTS TO NASA DUE TO MISHAPS*



- * DOES NOT INCLUDE CONTRACTOR LOSSES.
- * DOES NOT INCLUDE MISSION FAILURES.
- * DOES NOT INCLUDE TEST OPERATIONS LOSSES.

NASA HQ D676-2888 (11)

NASA RELATED ACCIDENT/INCIDENT EXPERIENCE IN 1978

DEFINITIONS:

1. Type A Accident - A mishap causing death, disabling injury to five or more persons, damage to equipment or property exceeding \$100,000, or destruction of an aircraft.
2. Type B Accident - A mishap causing disabling injury to four or fewer persons or damage to equipment or property exceeding \$10,000, but under that of a Type A accident.
3. Incident - A mishap of less than accident severity to persons or property, causing less than \$10,000 in damages, but exceeding \$100, or a non-serious injury (Number not included in this report).
4. Mission Failure - Any event which jeopardized a mission, prevents accomplishment of major mission objectives, or causes premature mission termination (Not included in this report).
5. Costs - Direct costs of repair, replacement, or recovery; including man-hours, material, and contract costs, but excluding indirect costs of clean-up, investigation, injury, and normal operational delay.

SIGNIFICANT MISHAPS

The significant mishaps shown on the following charts are only those reported by the NASA Field Installations and contractors as having significance beyond the minor dollars loss or injury incident categories.

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
FATAL ACCIDENTS	4	2	2	3	2	2	3*	1*	6*	1*
TYPE A ACCIDENTS	12	7	14	15	4	6	10	3	10	4
TYPE B ACCIDENTS	6	11	11	6	6	11	12	16	7	4
ALL MISHAPS	18	18	25	21	10	17	22	19	17	8

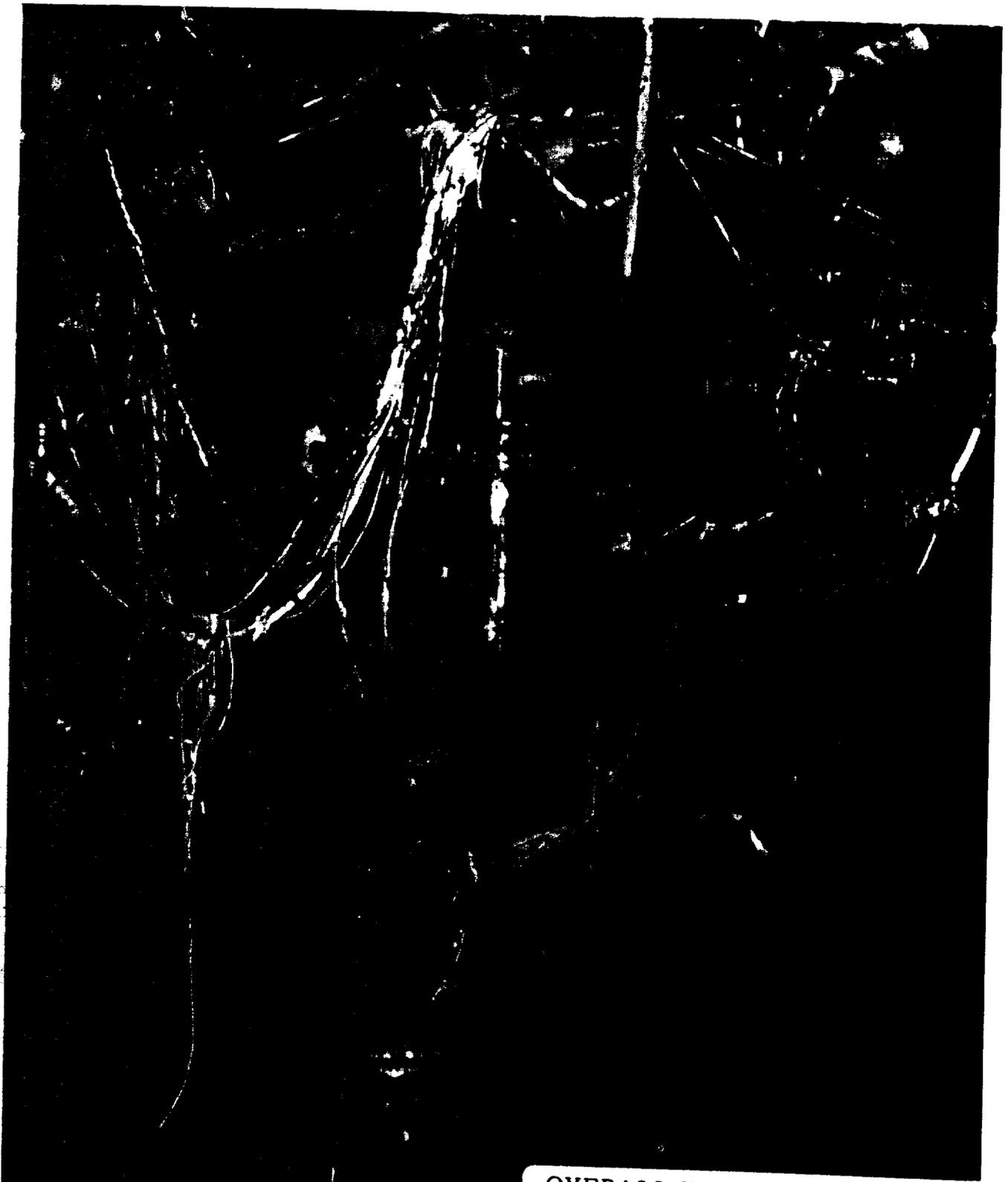
* NON-NASA FATALITIES

☛ FOUR NON-NASA FATALITIES

TWO NASA EMPLOYEES WERE KILLED IN COMMERCIAL AIRCRAFT CRASHES WHILE ON DUTY

FATAL ACCIDENTS ARE INCLUDED IN TYPE A ACCIDENTS

INCIDENTS AND MISSION FAILURES HAVE NOT BEEN INCLUDED IN THESE TABLES.



OVERALL VIEW OF ENGINE SHOW-
ING HPOP WHERE MAIN PUMP
DISCHARGE DUCT IS MISSING

TYPE A/B ACCIDENTS BY FIELD INSTALLATIONS

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
AMES	0/0	0/0	0/0	0/0	1/0	0/2	1/0	1/1	0/0	1/3
DRYDEN	0/1	1/0	1/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GODDARD	4/0	0/3	2/3	0/1	0/0	0/1	0/2	0/1	0/3	0/0
HDQTRS.	-	-	-	-	-	-	2/1	0/0	0/1	0/0
JOHNSON	1/1	3/1	3/3	6/2	1/0	0/5	0/1	0/0	2/1	0/0
KENNEDY	2/1	2/1	1/0	1/0	0/1	2/1	4/1	0/0	2/1	0/0
LANGLEY	0/1	0/1	1/0	0/1	0/1	0/1	0/2	1/1	0/0	0/1
LEWIS	1/0	0/0	3/0	2/0	0/1	0/0	0/1	0/1	0/0	0/0
MARSHALL	3/2	1/4	3/3	6/2	1/0	1/0	1/1	0/0	1/0	0/0
NSTL	-	-	-	-	-	0/0	0/1	0/1	1/0	0/0
WALLOPS	1/0	0/1	0/2	0/0	0/0	1/1	0/0	0/1	1/1	0/0
TRACKING STATIONS	-	-	-	-	1/3	2/0	2/2	0/3	1/0	0/0
TEST OPERATIONS	-	-	-	-	-	-	-	1/7	2/0	3/0
NASA TOTAL	12/6	7/11	14/11	15/6	4/6	6/11	10/12	3/16	10/7	4/4

Notes: TEST OPERATIONS recognize those types of failures which do not normally relate directly to the day-by-day operations at a facility, and include the high risk activities associated with testing.

The NSTL Type "A" accident was a contractor on-the-job fatality (heart attack).

The Type "B" individual injuries are not listed in this table, but are summarized later in the report.

Test Operations reflect the accidents which occur during particularly hazardous test operations at NASA locations or away from NASA installations, e.g., Thiokol plant in Utah. This does not reduce any safety responsibilities for NASA operations. However, it recognizes that some mishaps occur at facilities where the nature of the test operations involve predictably high risks/hazards and/or the NASA overview is considerably diminished. They do not include test mishaps where test hardware failure is the only cause. They include development and other marginal tests which are designed to approach maximum capabilities of the equipment. These should not be statistically charged

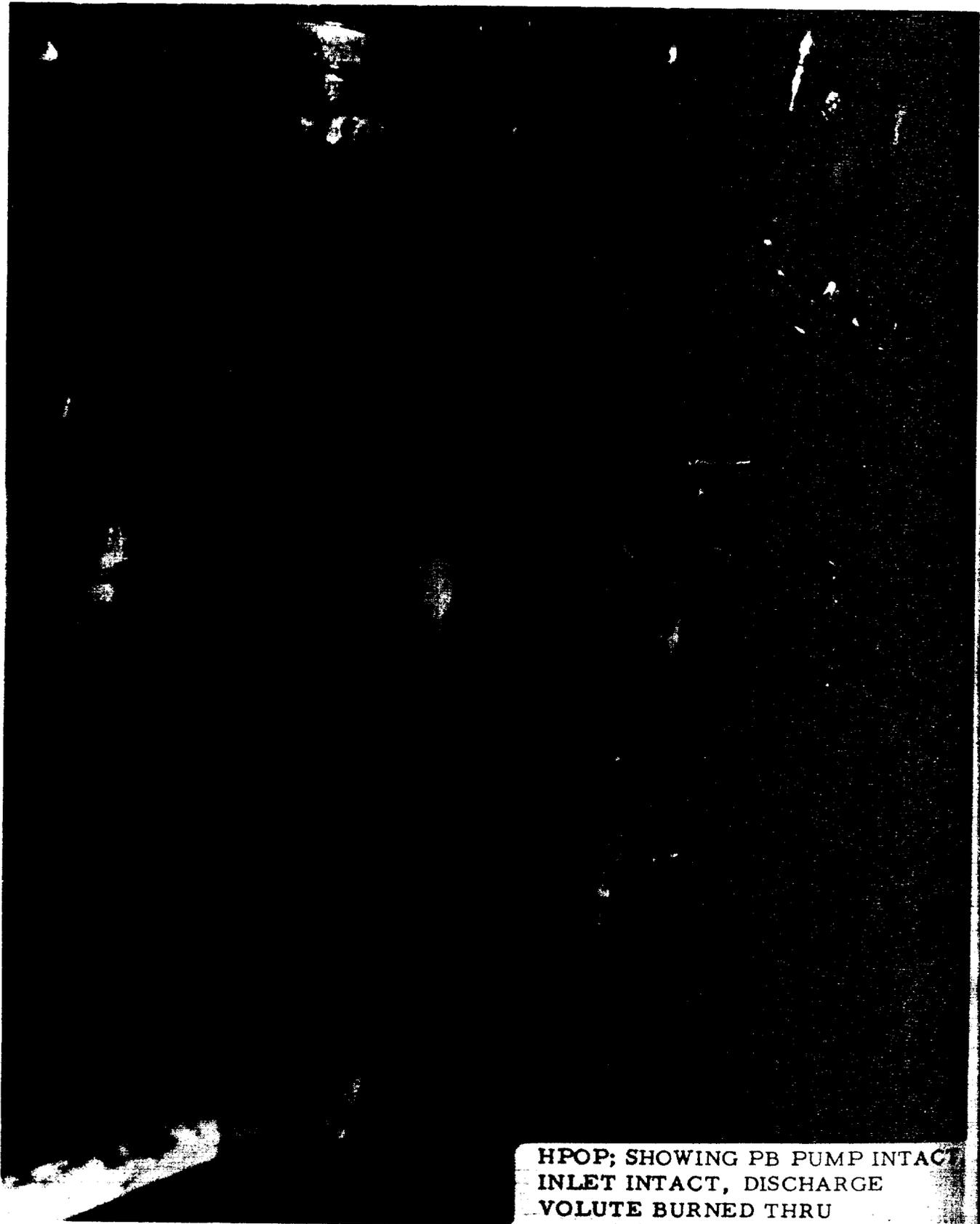
to a NASA field installation which may be half a continent away or which may have the responsibility of testing the hardware to determine maximum capabilities.

The combination of Type "A" and "B" accidents in 1978 was 8 as compared to 17 in 1977, and the number of Type "A" accidents was 4 compared to 10 in 1977. There does not appear to be an obvious lack of supervision, but the fact that some of these accidents occurred at all indicates a need for tightening up test and operational procedures. This should include design reviews of test items, test stand apparatus and procedures, and compatibility of the associated ground support equipment.

FATAL ACCIDENTS AND FATALITIES

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
NUMBER OF FATAL ACCIDENTS	4	2	2	3	2	2	3	1	6	1
TOTAL NUMBER OF FATALITIES	4	2	5	4	17	3	3	1	6	1
NASA EMPLOYEES	0	0	0	2	7	0	0	0	2	0
CONTRACTOR EMPLOYEES	4	2	3	2	4	1	1	1	3	1
PUBLIC	0	0	2	0	1	2	2	0	1	0
MILITARY	0	0	0	0	5	0	0	0	0	0

The one fatality in 1978 was a contractor fire-fighter who had a heart attack on the job. More extensive annual medical examinations as well as physical fitness programs for firefighters have been developed in an attempt to prevent and/or detect potential physical problems.



HPOP; SHOWING PB PUMP INTACT
INLET INTACT, DISCHARGE
VOLUTE BURNED THRU

TYPE "A" ACCIDENTS - 1978

<u>LOCATION</u>	<u>DATE</u>	<u>DESCRIPTION</u>	<u>CAUSE</u>	<u>COST</u>	<u>RECOMMENDED CORRECTIVE ACTION</u>
ARC	3-16-78	Mobile Analysis and Telecommunications Vehicle caught fire while traveling. Vehicle and equipment destroyed.	Possible fuel leak in engine compartment.	\$180,000	Impress vehicle maintenance status and fuel requirements on operator. Improve fire protection analysis and correct for vehicle fire hazards for vehicles carrying expensive equipment.
JSC	4-14-78	In-flight engine failure on NASA 946, Shuttle Training Aircraft.	Probable severe turbine section overheat as a result of engine compressor stall during acceleration	\$275,000	Modify simulation entry conditions, incorporate warnings for crew, improve flight crew advisories, change flight manuals, and make changes in maintenance manual instructions.
NSTL	7-11-78	Contract fire-fighter died of heart attack.	Heart Attack.	Fatality	Require medical examinations and physical fitness tests.
THIOKOL	12- 2-78	Center segment of solid rocket motor damaged.	Improper positioning of segment in breakover fixture due to poor design features and operational guides.	\$750,000	Redesign breakover fixture, revise procedures, and hold regular reviews of upcoming operations.
NSTL	12- 6-78	Engine damaged during test.	Probable leak in 3/8" tube which caused damage to other tubes.	\$1,800,000	Inspection and testing after any rework or modifications of hardware.

TYPE "B" ACCIDENTS - 1978

<u>LOCATION</u>	<u>DATE</u>	<u>DESCRIPTION</u>	<u>CAUSE</u>	<u>COST</u>	<u>RECOMMENDED CORRECTIVE ACTION</u>
ARC	4-27-78	UH-1B Helicopter tail rotor assembly damaged.	Inadequate proficiency experience for solo flights of difficult precision maneuvers.	\$13,006	Flight Operations Manual changed to improve definition of qualifications for currency.
LaRC	7-21-78	Detonating fuse for RSRA emergency escape seat inadvertently fired during seat installation.	Barostat arming cable worked loose and was pulled out.	\$12,000	Modifications have been made.
ARC	12-11-78	External arc from upstream electrode to downstream nozzle during test run in Giant Planet Facility.	Possible broken or melted gas line or excessive voltages between conducting electrodes and adjacent surfaces or sudden voltage transient with water injection to arc stream.	\$41,650	Increase care of assembly to minimize sharp projections where fields may be concentrated and examine safety procedures such as shut off and purging dangerous gases automatically with manual backup and fail safe.

SOME SIGNIFICANT NASA INCIDENTS - 1978

<u>DATE</u>	<u>DESCRIPTION</u>	<u>CAUSE</u>	<u>COST</u>	<u>RECOMMENDED CORRECTIVE ACTION</u>
2-10-78	Explosion of vacuum pump in N-239.	Failure to completely purge pump cavity of Silane. Air was left in.	\$ 1,000	Shield pump and provide inlet (N ₂) purge gas plus use of two pumps - one for Silane and one for air.
3-02-78	Contractor filling fuel oil storage tank. Pump cut-off did not work. Overflow ran onto floor, into electric conduits, and through other floor openings to lower floors.	Pump failed to shut off, overflow return line had been eliminated for economy.	\$ 3,000	Install over-flow return line.
3-29-78	Failure of No. 2 fan at 6-foot cooling tower.	Fan blade bolt fatigue fracture; had not been inspected for over a year.	\$ 2,500	Fan blade bolts will be inspected weekly and replaced annually.
6-27-78	8X7 Ft. Supersonic W.T. partial failure of model support drive system resulted in damage to model and model support.	Incorrect timing in system hydraulic pressure, relative to release of strut lead screw brake caused pilot operated valve to lock closed and lock strut load compensating cylinder.	\$ 8,000	Install a protective error detection system, remove the pilot operated check valve, monitor model position through TV system, improve operating instructions, conduct third party safety analysis.
6-29-78	Beech Queen Air, NASA - 506 aircraft left taxiway into soft earth. Damaged propeller.	Braking system design permitted loss of braking when two pilots use brakes at same time.	\$ 9,000	Better cockpit discipline and communication and an understanding of potential braking problems.

SAFETY AND ENVIRONMENTAL HEALTH SURVEYS
1978

The NASA Headquarters Safety and Environmental Health Division conducted surveys at four field installations during the 1978 calendar year:

Jet Propulsion Laboratory	January 16-20, 1978
Goddard Space Center	April 17-20, 1978
Lewis Research Center	June 12-16, 1978
National Space Technology Lab.	August 14-18, 1978

Since travel funds and manpower are limited, NASA HQ conducts Safety and Environmental Health survey visits to the Field Installations approximately every two years. The field centers are delegated responsibility for conducting self-surveys on the off-year. The field center self-survey teams are made up of third party members to negate the possibility of conducting a partisan review. The results of the field center self-survey program are encouraging, both in their comprehensive planning and productivity. The center self-survey program requires management involvement to appraise their own activities and to resolve their problems.

The surveys are conducted by the NASA Safety and Environmental Health and Program Assurance Divisions in a professional manner and are accepted and supported by Center Directors and Staffs.

NASA PERSONNEL INJURIES FOR 1978

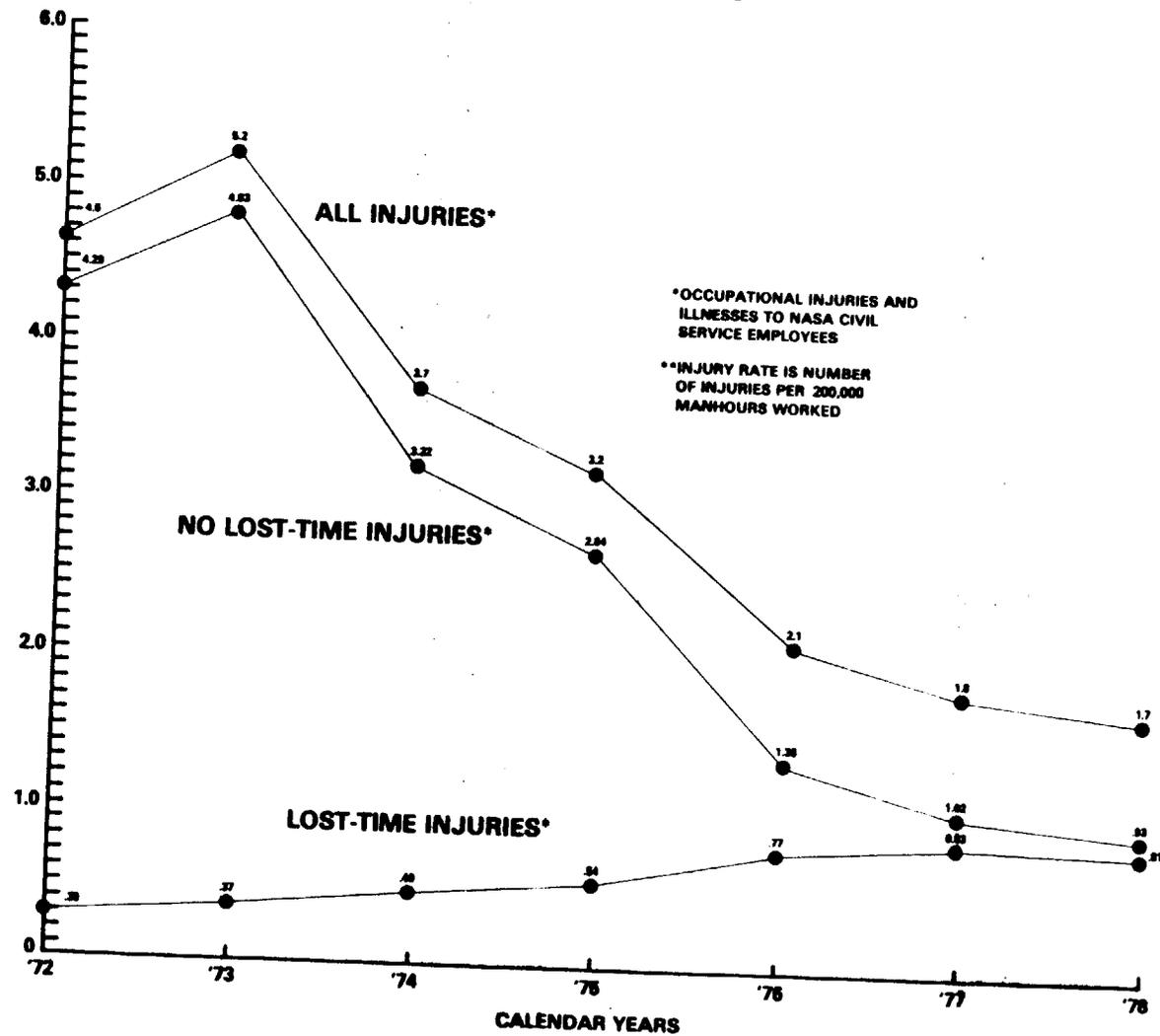
For the first time since 1972 NASA has had a decrease in lost time injuries/illnesses. This year we have added two new charts that compare injury rates (pp. 2 - 3): LOST-TIME INJURY RATES--NASA--FEDERAL AGENCIES & INDUSTRY and INJURY RATES: PRIVATE SECTOR--FEDERAL GOV'T--NASA--SELECTED INDUSTRY. The rates shown on these three charts for INDUSTRY were obtained from the Bureau of Labor Statistics and are significantly higher than those from the National Safety Council which have been used in the first figure of this report: NASA INJURY EXPERIENCE 1969 THROUGH 1978. Although the NASA Lost Time Injury rate increased steadily from 1969 until 1978, the total injury rate has decreased dramatically since 1973 (See p. 20). Our rates are still very favorable compared to other included activities, but still much greater than our goal of 0.2.

The NASA injury/illness frequency rate went down from 0.82 in 1977 to 0.81 in 1978. In 1978, there were two NASA facilities which attained the "Safety '76" goal of 0.20 injuries per 200,000 man-hours worked; this year kudos go to MAF and JSC for having reached that goal. In addition WFC had a rate of 0.25 and the MSFC rate was 0.32. The following installations reduced their lost time frequency rates during 1978: ARC, GSFC, HQ, JSC, LaRC, and MSFC. JSC made the largest percentage decrease in lost time frequency rate by reducing their rate from 0.36 to 0.20 (44%); HQ followed with a 30 percent decrease and GSFC was next with a 27 percent decrease. We commend them for their improvements. A review of the Total Injury/Illness data for 1978 indicates a small rate decrease for the agency and for seven installations. Those having decreases during 1978 are: ARC, DFRC, HQ, JSC, LaRC, MSFC, and WFC. Also, MAF had no injuries/illnesses during the year.

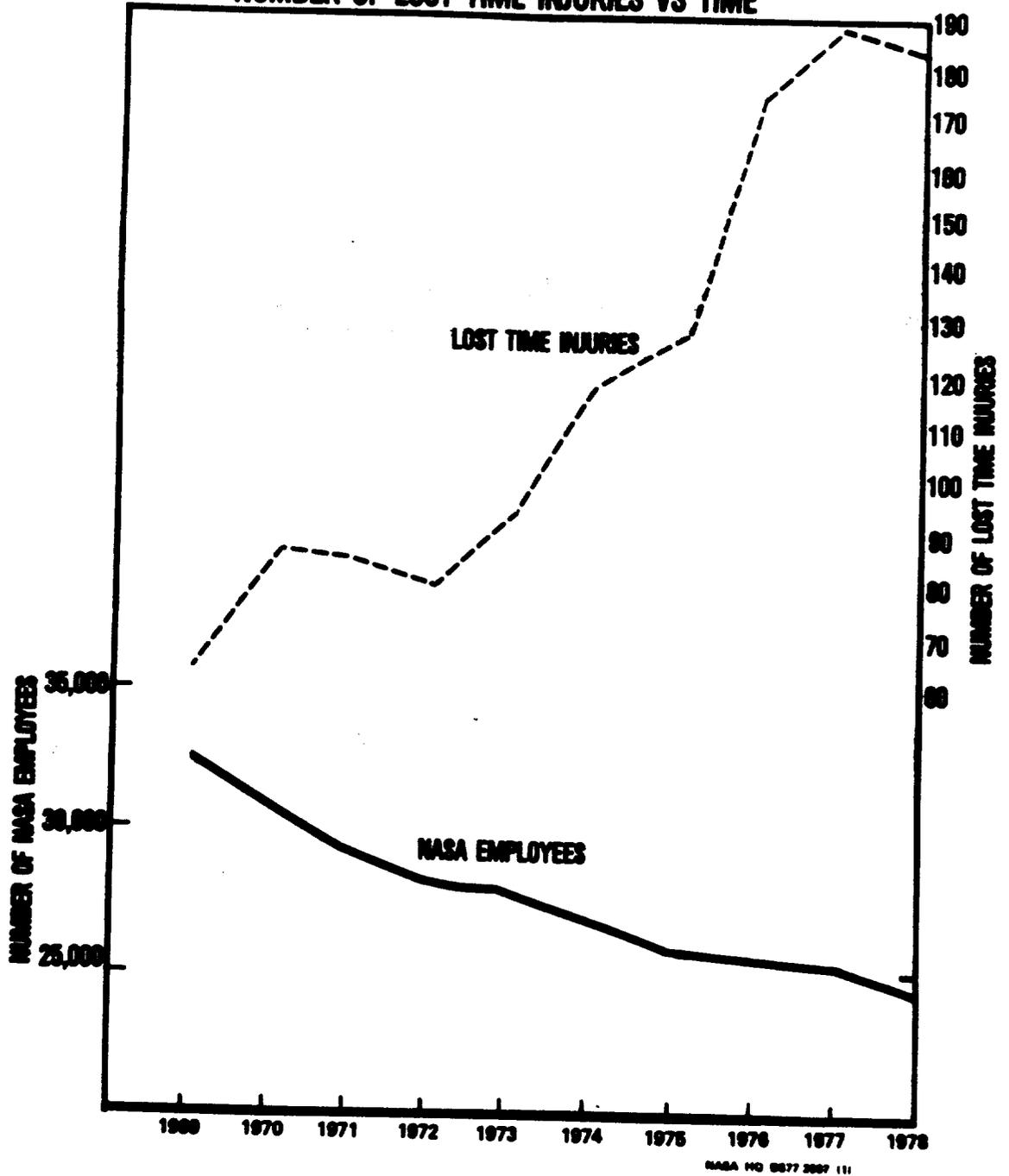
All centers except MAF submitted Form 345's (Accident Cause Analysis Reports) for Federal Employees, and MAF had no injuries. The lost-time cases indicated here differ by 35 from those reported on the Form 102F's (Federal Occupational Injuries and Illness Survey), and the total cases are approximately one half those listed on the 102F. This may indicate that some centers are not including the lost time cases in the total on the 345. Six centers also included 345s for contractors. Again there are some numbers that seem to be inconsistent; however, these apparent disagreements may be only the result of how they record reportable cases and first aid cases.

As in years past, the message from all of this is that while slips, trips, and falls will always be with us, top managers can and should exercise more direct supervision of day-by-day working conditions, fully investigate each injury, and take action to prevent recurrences and potential abuse of continuation of pay and Federal Employee Compensation procedures.

COMPARISON OF NASA INJURY* RATES** (1972-1978)



NUMBER OF NASA EMPLOYEES AND NUMBER OF LOST TIME INJURIES VS TIME



**CIVIL SERVANT
ACCIDENT CAUSE ANALYSIS REPORT**

Report No./Year (Calendar) 1978

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE
SECTION I: SHIFT					
a.					
b.					
c.					
SECTION II: PART OF BODY INJURED					
a. Head					9/39
b. Eye					6/64
c. Face					1/10
d. Arm					9/44
e. Hand					8/59
f. Finger					8/115
g. Torso					9/37
h. Back					62/120
i. Chest					11/14
j. Abdomen					6/20
k. Leg					22/69
l. Foot					14/50
m. Toe					11/24
n. Other					12/21
SECTION III: AGENCY INVOLVED					
a. Animals					1/1
b. Rollers and Pressure Vessels					3
c. Chemicals					1/8
d. Conveyors					
e. Dusts					4/18
f. Electrical Apparatus					9
g. Elevators					3
h. Hand Tools					2/52
i. Highly Flammable and Hot Substances					3/12
j. Hoisting Apparatus					1/2
k. Machines					6/40
l. Material Handling					45/124
m. Mechanical Power Transmission Apparatus					2/2
n. Prime Movers and Pumps					
o. Radiation and Radiating Substances					
p. Vehicles					19/40
q. Walking Surfaces					56/178
r. Agencies not elsewhere classified					36/158
SECTION IV: TYPE OF ACCIDENT					
a. Striking Against					21/129
b. Struck By					17/88
c. Caught in, on, or between					5/37
d. Fall on same level					19/76
e. Fall to different level					19/27
f. Slip (not fall) or over-exertion					51/110
g. Exposure to temperature extremes					1/10
h. Contact with electric current					
i. Inhalation, absorption, swallowing					3/11
j. Electric welding flash					4
k. Foreign body in eye					3/42
l. Type of accident not elsewhere classified					37/119

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE
SECTION V: UNSAFE MECHANICAL CONDITION					
a. Improper Guarding					3/56
b. Defective Substances or Equipment					11/39
c. Hazardous Arrangement					18/125
d. Improper Illumination					
e. Improper Ventilation					2
f. Unsafe Clothing					2
g. No unsafe condition					116/293
h. Unsafe condition not elsewhere classified					26/89
OTHER					2/34
SECTION VI: UNSAFE ACT					
a. Operating without authority					
b. Operating or working at unsafe speed					3/7
c. Making safety devices inoperative					1
d. Using unsafe equip/hands instead of equip/equip unsafely					5/31
e. Unsafe loading, placing, mixing, etc.					25/35
f. Taking unsafe position or posture					33/177
g. Working or moving on dangerous equipment					1/3
h. Distraction, teasing, abusing, startling, etc.					21/51
i. Failure to use safe attire or pers. protective devices					7/56
j. No unsafe act					62/238
k. Unsafe act not elsewhere classified					19/45
SECTION VII: TYPE OF INJURY					
a. Abrasion					8/43
b. Avulsion					2/2
c. Burn, Chemical/Cryogenic					2
d. Burn, Thermal					2/18
e. Contusion					17/114
f. Dermatitis					1/7
g. Foreign Body					36/36
h. Fracture					23/23
i. Laceration					47/48
j. Puncture					2/4
k. Sprain or Strain					145/147
l. Toxicological					3/10
OTHER					82/82
SECTION VIII: NO. LOST TIME INJURIES					
Total					219/227
SECTION IX: REMARKS					
PREPARED BY:			SUBMITTED BY:		
_____			_____		

Legend

25
5 / 25

Denotes injury cases only.
Top number denotes lost-time injury cases.
Bottom number denotes injury cases.

CONTRACTOR
ACCIDENT CAUSE ANALYSIS REPORT

Report No./Year (Calendar) 1978

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE
SECTION I: SHIFT					
a.					
b.					
c.					
SECTION II: PART OF BODY INJURED					
a. Head					5/62
b. Eye					6/209
c. Face					2/23
d. Arm					9/190
e. Hand					3/161
f. Finger					8/364
g. Torso					8/29
h. Back					37/163
i. Chest					21
j. Abdomen					3/19
k. Leg					15/142
l. Foot					11/94
m. Toe					6/22
n. Other					18/145
SECTION III: AGENCY INVOLVED					
a. Animals					15
b. Boilers and Pressure Vessels					1/17
c. Chemicals					7/105
d. Conveyors					8
e. Dusts					2/62
f. Electrical Apparatus					1/26
g. Elevators					
h. Hand Tools					1/173
i. Highly Flammable and Hot Substances					3/15
j. Hoisting Apparatus					1/9
k. Machines					9/74
l. Material Handling					40/345
m. Mechanical Power Transmission Apparatus					7
n. Prime Movers and Pumps					2/6
o. Radiation and Radiating Substances					2
p. Vehicles					3/30
q. Walking Surfaces					33/175
r. Agencies not elsewhere classified					21/331
SECTION IV: TYPE OF ACCIDENT					
a. Striking Against					20/334
b. Struck By					12/235
c. Caught in, on, or between					5/116
d. Fall on same level					10/79
e. Fall to different level					8/36
f. Slip (not fall) or over-exertion					5/248
g. Exposure to temperature extremes					2/20
h. Contact with electric current					1/5
i. Inhalation, absorption, swallowing					1/43
j. Electric welding flash					24
k. Foreign body in eye					6/155
l. Type of accident not elsewhere classified					14/341

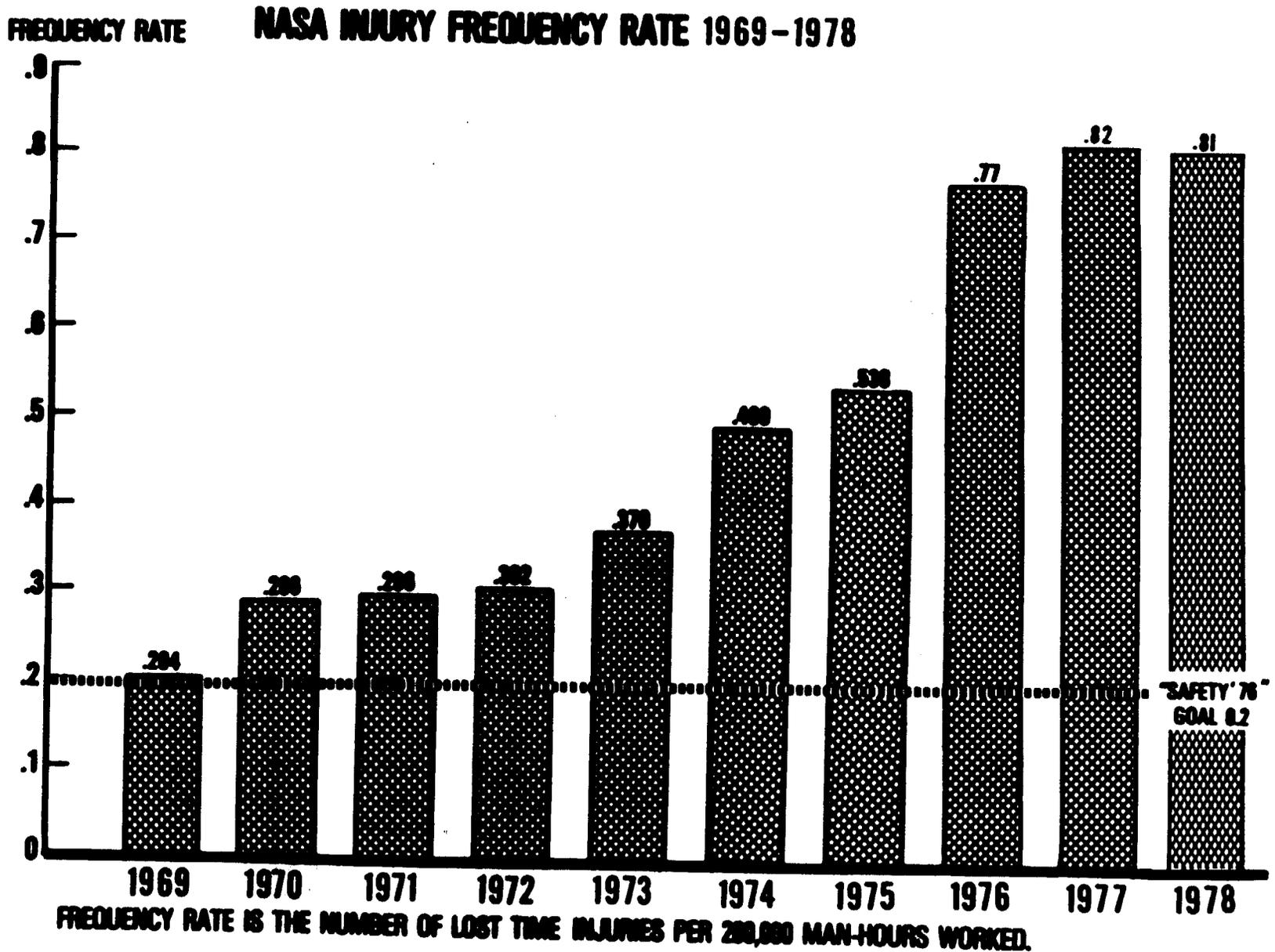
INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE			
SECTION V: UNSAFE MECHANICAL CONDITION								
a. Improper Guarding					4/47			
b. Defective Substances or Equipment					4/31			
c. Hazardous Arrangement					26/76			
d. Improper Illumination					1/5			
e. Improper Ventilation					8			
f. Unsafe Clothing					23			
g. No unsafe condition					57/1207			
h. Unsafe condition not elsewhere classified					38/253			
OTHER SECTION VI: UNSAFE ACT								
a. Operating without authority								
b. Operating or working at unsafe speed					6/16			
c. Making safety devices inoperative					6			
d. Using unsafe equip/hands instead of equip/equip unsafely					10/51			
e. Unsafe loading, placing, mixing, etc.					18/70			
f. Taking unsafe position or posture					33/250			
g. Working or moving on dangerous equipment					2/10			
h. Distraction, teasing, abusing, startling, etc.					3/16			
i. Failure to use safe attire or pers. protective devices					10/102			
j. No unsafe act					32/438			
k. Unsafe act not elsewhere classified					16/630			
SECTION VII: TYPE OF INJURY								
a. Abrasion					1/95			
b. Avulsion					6/48			
c. Burn, Chemical/Cryogenic					4/56			
d. Burn, Thermal					3/59			
e. Contusion					13/311			
f. Dermatitis					18			
g. Foreign Body					4/189			
h. Fracture					14/27			
i. Laceration					11/320			
j. Puncture					2/63			
k. Sprain or Strain					69/387			
l. Toxicological					5/57			
OTHER SECTION VIII: NO. LOST TIME INJURIES					130			
Total					100/104			
SECTION IX: REMARKS								
<p>Legend</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">25</td> <td rowspan="2" style="padding-left: 5px;">Denotes injury cases only. Top number denotes lost-time injury cases. Bottom number denotes injury cases.</td> </tr> <tr> <td style="text-align: center;">5/25</td> </tr> </table>						25	Denotes injury cases only. Top number denotes lost-time injury cases. Bottom number denotes injury cases.	5/25
25	Denotes injury cases only. Top number denotes lost-time injury cases. Bottom number denotes injury cases.							
5/25								
PREPARED BY:			SUBMITTED BY:					

NASA MISHAP, INJURY, AND ILLNESS DATA BY INSTALLATION--ANNUAL 1978

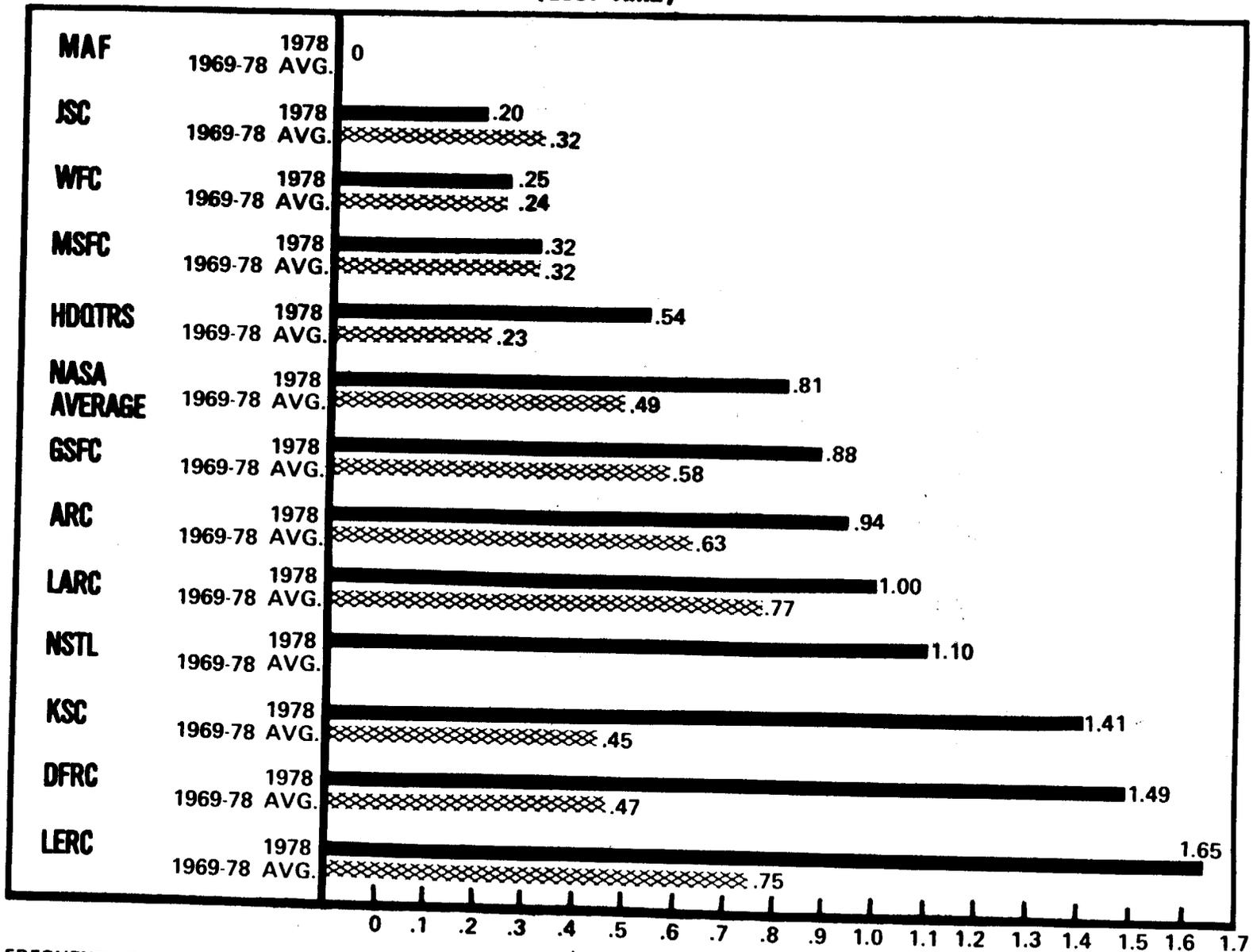
	NO. OF EMPLOYEES	MAN HRS WORKED IN K	TOTAL INJURY/ILLNESS DATA			LOST TIME INJURY/ILLNESS DATA					AUTO MISHAP FREQ. RATE		AIRCRAFT MISHAPS		FIRE LOSSES		OTHER MISHAPS		TOTAL MISHAPS	
			NO. CASES	FREQ. RATE 1977	FREQ. RATE 1978	NO. CASES	NO. DAYS	FREQ. RATE 1977	FREQ. RATE 1978	SEVERITY RATE	GOV	POV	NO.	RATE	NO.	(\$K)	NO.	(\$K)	COST (\$K)	RATE (\$K)
ARC	1,731	3,406	31	2.01	1.82	16	237	.97	.94	13.92	1.35	0	1	35.26	5	180.4	12	26.65	220.13	64.62
DFRC	487	937	10	2.28	2.13	7	58	.57	1.49	12.38	2.24	0	0	0	0	0	0	0	1.33	1.42
GSFC	3,666	7,312	59	1.40	1.61	32	254	1.21	.88	6.95	9.21	1.24	0	0	5	6.04	1	9.90	28.73	3.93
HQ	1,652	2,986	27	2.44	1.81	8	111	.77	.54	7.43	0	6.73	0	0	1	.22	0	0	.67	.22
JSC	3,810	7,822	11	.49	.28	8	176	.33	.20	4.50	0	0	0	0	1	.05	0	0	1.61	.21
KSC	2,317	3,972	29	.89	1.46	28	270	.55	1.41	13.59	2.09	1.36	0	0	3	3.00	2	6.07	10.31	2.60
LaRC	3,218	5,591	59	2.37	2.11	28	460	1.20	1.00	16.46	15.69	0	3	209.21	0	0	2	7.90	26.94	4.82
LeRC	2,945	5,345	128	4.50	4.79	44	635	1.52	1.65	23.76	30.73	2.22	0	0	0	0	0	0	5.07	.95
MAF	26	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MSFC	3,890	6,924	22	.78	.64	11	218	.35	.32	6.30	2.04	0	0	0	0	0	1	5.00	6.88	.99
NSTL	111	182	1	0	1.10	1	30	0	1.10	32.89	0	0	0	0	0	0	0	0	0	0
WFC	425	800	19	7.55	4.75	1	20	.23	.25	5.00	8.80	0	0	0	0	0	0	0	2.04	2.55
TOTAL	24,278	45,325	396	1.84	1.75	184	2,469	.82	.81	10.90	6.77	.99	4	17.69	15	189.71	18	55.51	303.72	6.70
LAST YEAR	25,015	46,227	425	1.84	—	189	2,777	.82	—	12.01	5.85	.34	4	18.51	21	5.85	15	55.50	174.66	3.78

- 1/ TOTAL INJURY/ILLNESS FREQUENCY RATE = NO. OF CASES PER 200,000 MAN-HOURS WORKED
- 2/ INJURY FREQUENCY RATE = NO. OF LOST WORKDAY CASES PER 200,000 MAN-HOURS WORKED
- 3/ INJURY SEVERITY RATE = NO. OF LOST WORKDAYS PER 200,000 MAN-HOURS WORKED
- 4/ AIRCRAFT MISHAP FREQUENCY RATE = NO. OF MISHAPS PER 100,000 HOURS FLOWN

- 5/ MOTOR VEHICLE MISHAP FREQUENCY RATE = NO. OF MISHAPS PER MILLION MILES DRIVEN
- 6/ TOTAL COST OF MISHAPS INCLUDES REPAIRS/REPLACEMENTS OF MOTOR VEHICLES AND AIRCRAFT, OTHER VEHICLE DAMAGE, AND TORT CLAIMS (AS ON OSHA FORM 102FF)
- 7/ MISHAP COST RATE = TOTAL COST OF MISHAPS PER MILLION MAN-HOURS WORKED



NASA INJURY FREQUENCY RATES (LOST TIME)

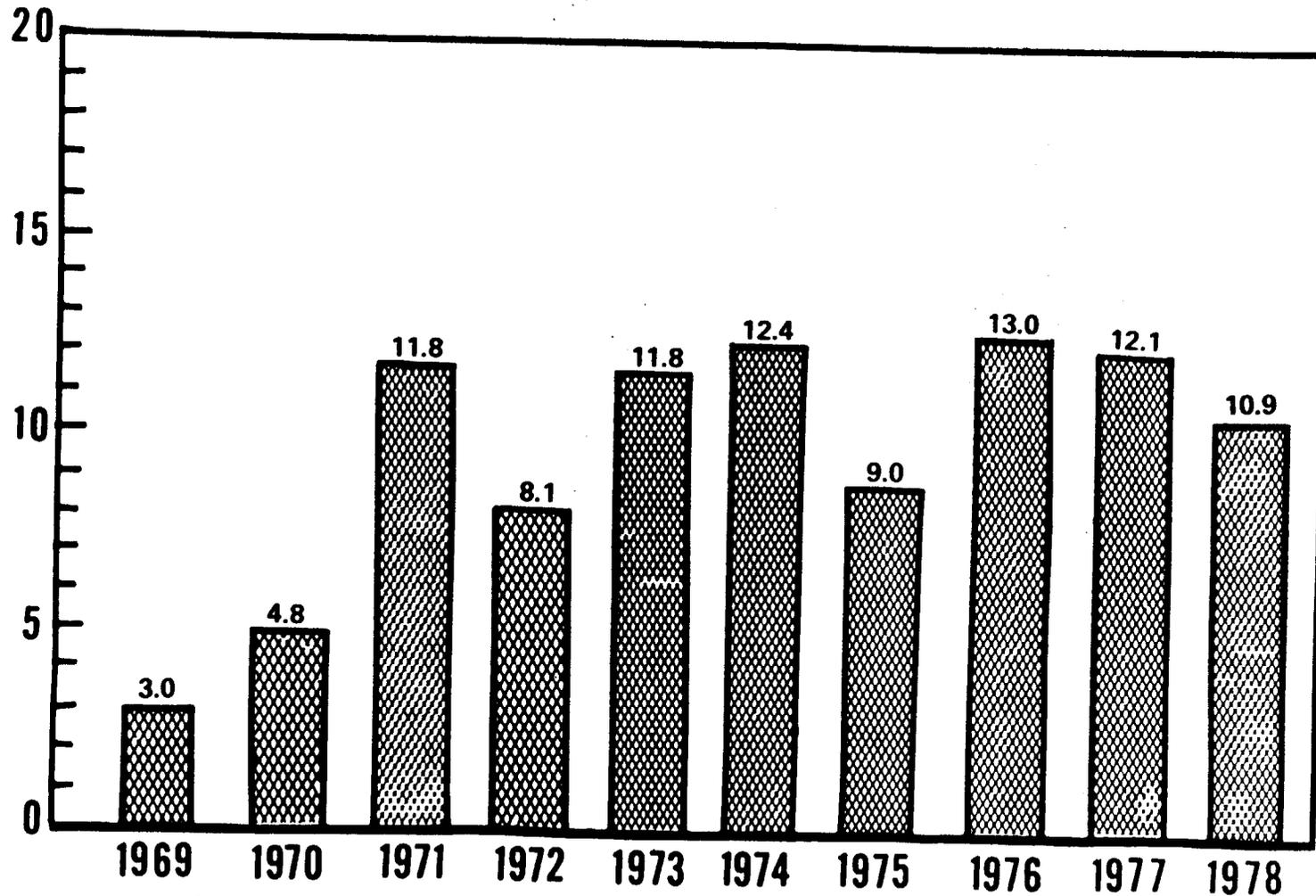


FREQUENCY RATE IS THE NUMBER OF LOST TIME INJURIES PER 200,000 MAN-HOURS WORKED .

FREQUENCY RATE

NASA HQ D877-2086 (11)

NASA INJURY SEVERITY RATE



SEVERITY RATE IS THE NUMBER OF MAN DAYS LOST MULTIPLIED BY 200,000, DIVIDED BY THE TOTAL MAN HOURS WORKED.

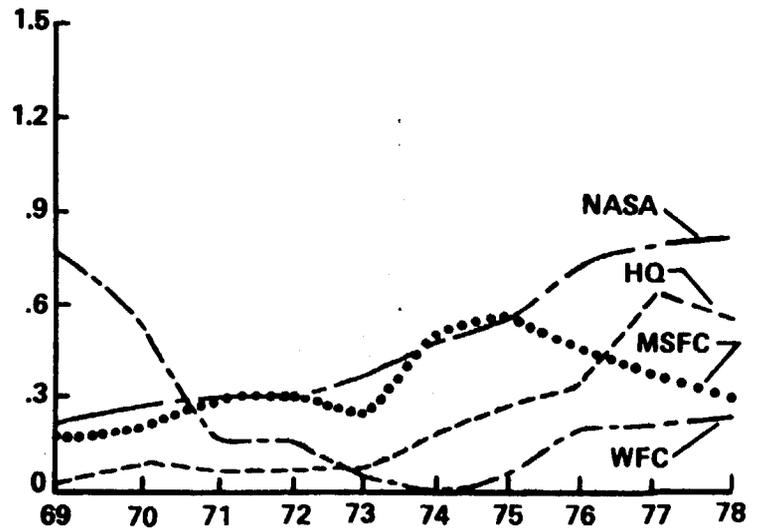
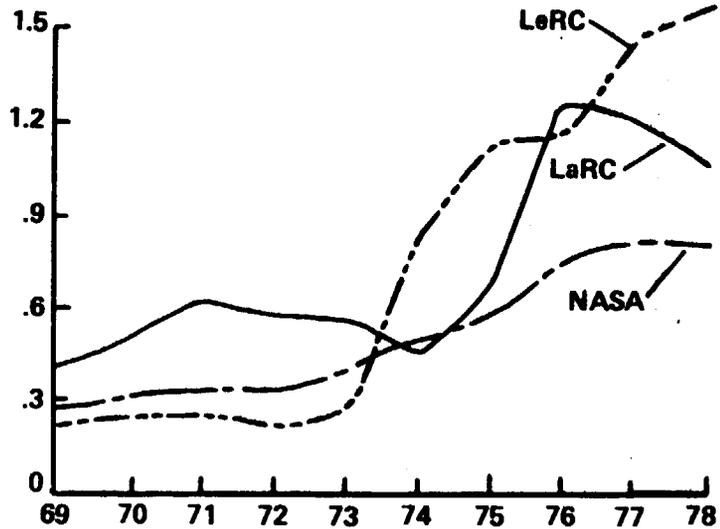
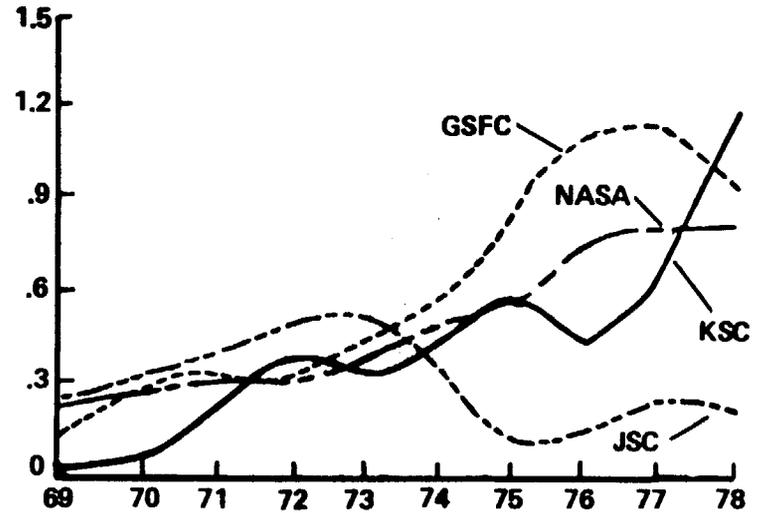
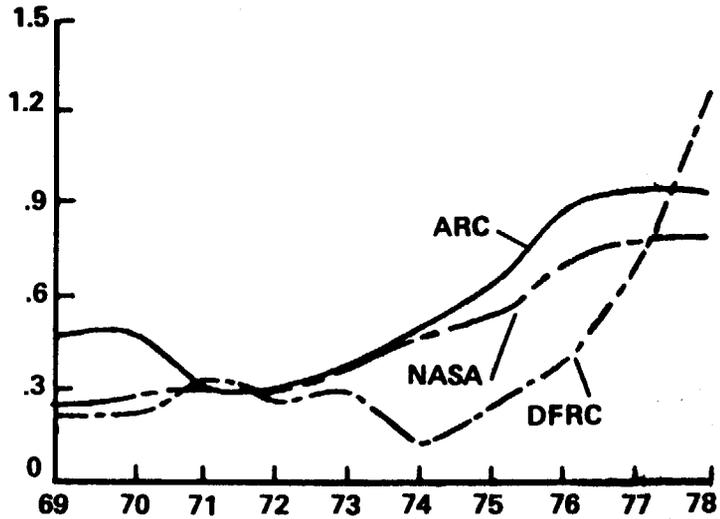
AUTOCORRELATED INJURY FREQUENCY AND
SEVERITY RATES FOR NASA IN 1978

The autocorrelated injury frequency data for all NASA and those centers which had sufficient data for the period 1969 - 1978 are shown in the following charts. These figures show the trends during this period. Five installations have higher rates in 1978 while six and the total are down. MAF is still zero and NSTL had one injury in 1978.

The related severity rates increased in all except three installations and the total for NASA. The increases continue to be quite pronounced in several installations. These increases may be related to the Continuation of Pay (COP) changes in the law, and there seems to be a willingness for physicians to suggest to injured personnel that staying home a few days or a week would be more comfortable than going to work. The net result seems to be a tendency for employees to stay away from the job more often and for longer periods. There is still no particular reason to assume that total injuries are more frequent or more severe than in the past.

The correlation procedure used to produce these charts is a smoothing technique which takes some of the randomness out of the data and yet preserves the form or pattern for the period being considered. Depending on the autocorrelation coefficient chosen, the program can retain the fine structure of the data or smooth the curve to show only the trends. A correlation coefficient of 0.5 was used for these curves; so the general form is retained, the trend is shown, and the extreme variations are smoothed.

INJURY FREQUENCY RATES 1969-1978 AUTOCORRELATED

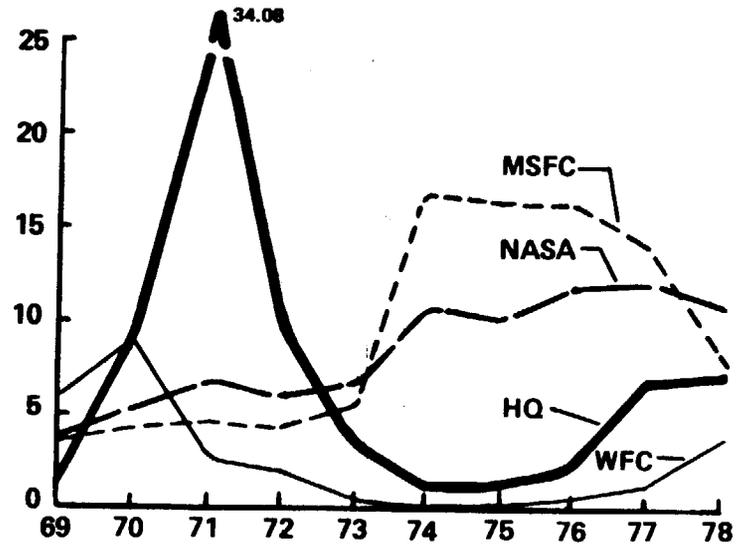
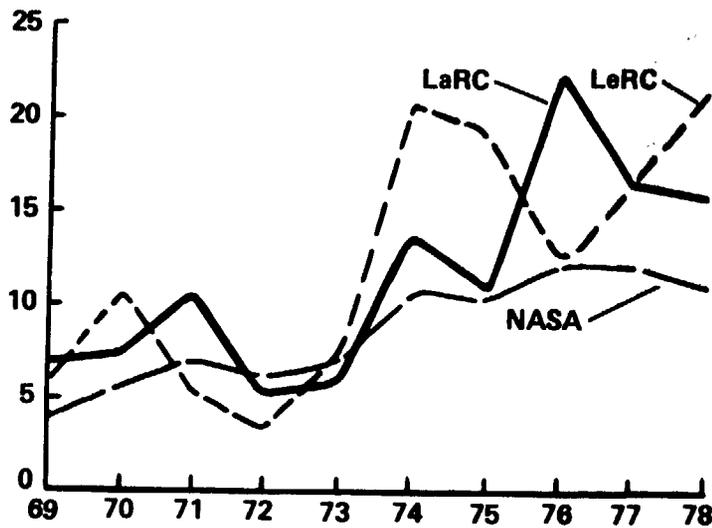
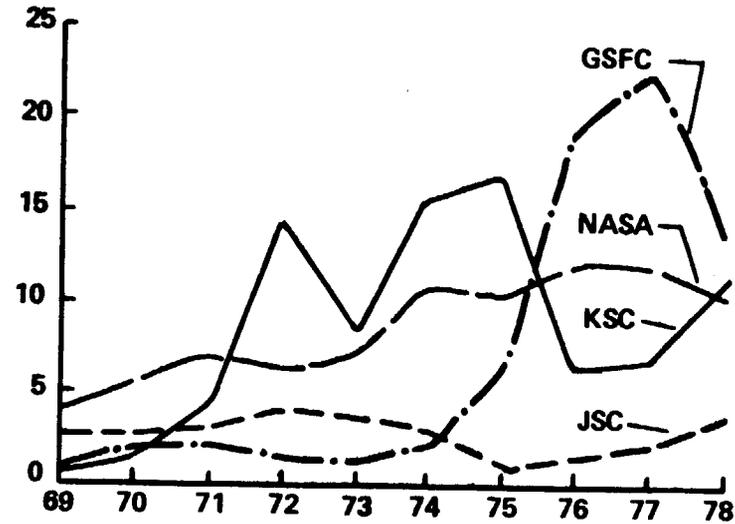
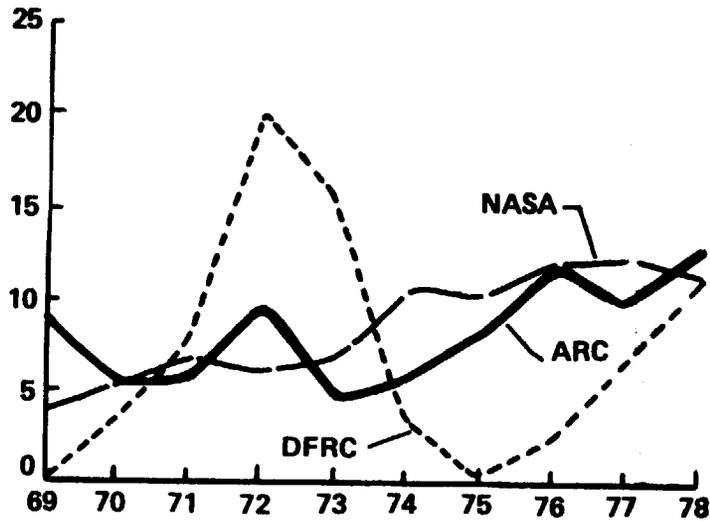


31

FREQUENCY RATE IS THE NUMBER OF LOST TIME INJURIES PER 200,000 MAN-HOURS WORKED
CORRELATION FACTOR = 0.5

NASA HQ DS773168 (1)
REV. 6-11-79

INJURY SEVERITY RATES 1969-1978 AUTOCORRELATED



32

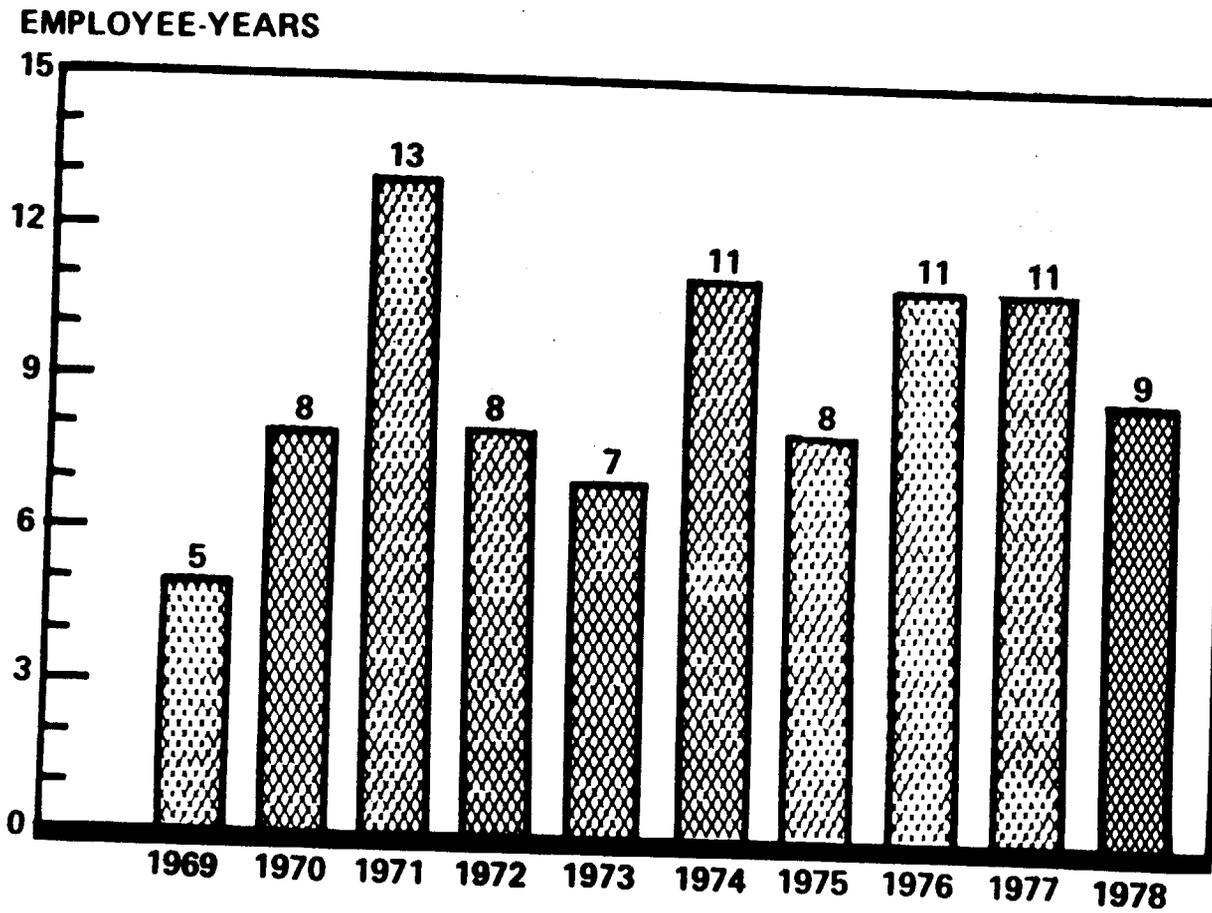
SEVERITY RATE IS THE NUMBER OF MAN-DAYS LOST BY ACCIDENT PER
200,000 MAN-HOURS WORKED
CORRELATION FACTOR = 0.5

NASA HQ DS77-3167-(1)
REV. 6-11-79

STATISTICAL CHANCE OF BEING INJURED IN NASA
ON-THE-JOB IN 1977 VS 1978

	TOTAL OF LOST AND NON-LOST TIME INJURIES	AVERAGE NUMBER OF EMPLOYEES	CHANCES OF BEING INJURED IN 1978	CHANCES OF BEING INJURED IN 1977
MAF	0	26	0	0
JSC	11	3,810	1 IN 346.4	1 IN 195.8
MSFC	22	3,890	1 IN 176.8	1 IN 135.5
NSTL	1	111	1 IN 111.0	----
KSC	29	2,317	1 IN 79.8	1 IN 128.7
GSFC	59	3,666	1 IN 62.1	1 IN 75.1
HQ	27	1,652	1 IN 61.2	1 IN 45.2
ARC	31	1,731	1 IN 55.8	1 IN 51.4
LARC	59	3,218	1 IN 54.5	1 IN 47.7
DFRC	10	487	1 IN 48.7	1 IN 48.7
LERC	128	2,945	1 IN 23.0	1 IN 24.6
WFC	19	425	1 IN 22.4	1 IN 12.9
NASA (TOTAL)	396	24,278	1 IN 61.3	1 IN 58.6

NASA EMPLOYEE-YEARS LOST DUE TO ON-THE-JOB INJURIES *



34

* 260 WORK DAYS - 1 EMPLOYEE-YEAR

NASA HQ DS78-2288 (1)

NASA AVIATION ACCIDENT/INCIDENT EXPERIENCE
IN 1978

Aviation Safety was great in '78! Most of our losses were small, with many lessons learned to help prevent major accidents. There were no fatalities or Type "A" accidents. One Type "B" accident involved damage to the tail rotor and shaft of a helicopter. There were seven incidents: A braking problem during taxi resulted in a damaged propeller, a bird strike, a rear rotor freeze-up on a helicopter, an afterburner screen failure in a F-104, loss of air in the front tires during a turn while repositioning a plane, an air sampler cannister failure in flight, and a damaged dive brake. The last four of these incidents were not considered reportable by OSHA guidelines.

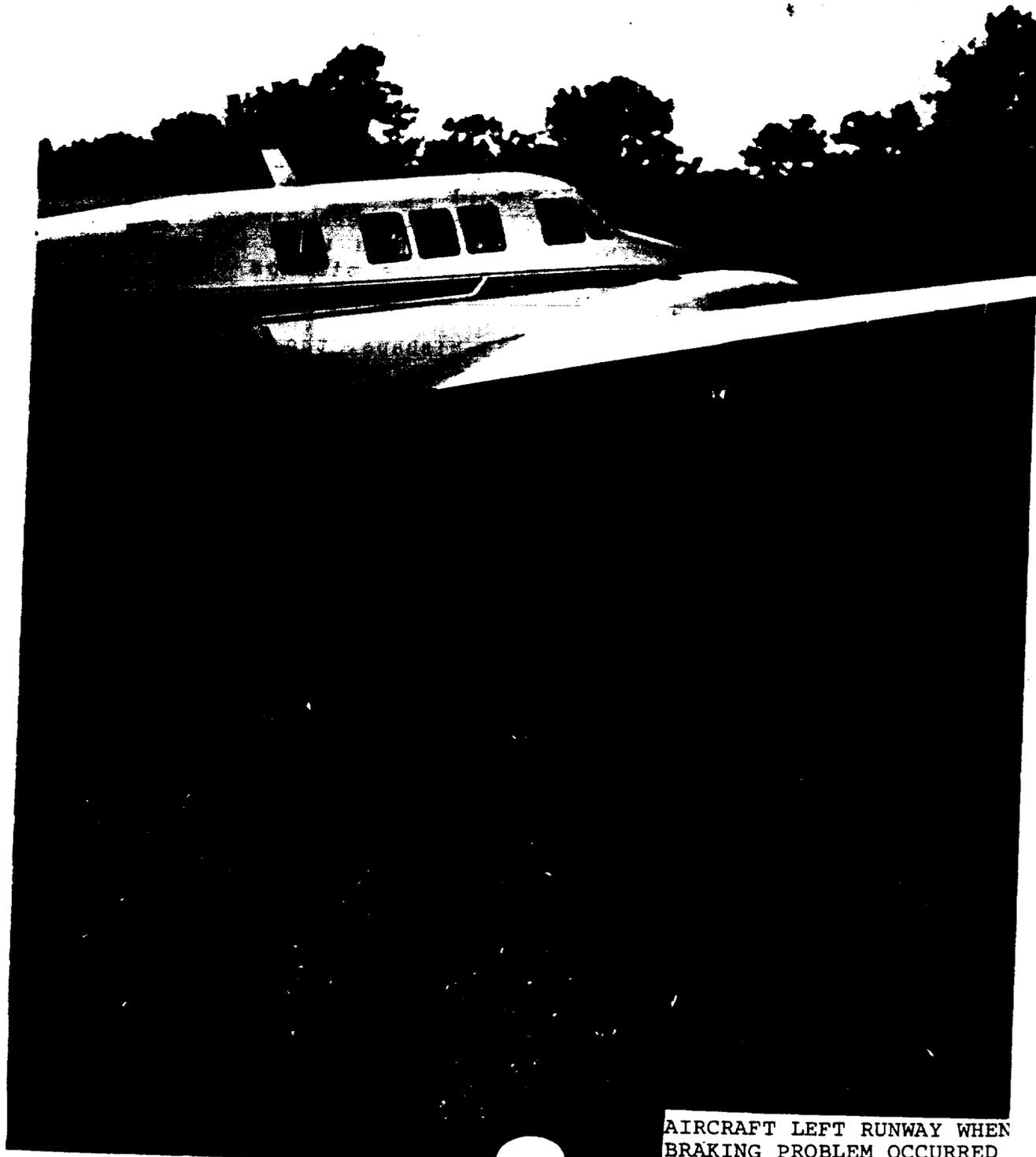
It is difficult to avoid bird strikes and perhaps the F-104 afterburner problem. The other mishaps were probably avoidable in some measure, and all the mishaps contain fruitful avenues for action.

Although there were eight reported mishaps, the costs were relatively small, and there were no personnel injuries or deaths. The Type "B" accident cost \$13,000, and the seven incidents cost \$16,000 including \$9,000 for the braking problem which resulted in the damaged propeller. Let us learn from this year's experiences and avoid the avoidable. This is the fifth year that our losses have been small, and it is imperative that we maintain our vigilance and avoid those ". . . few moments of stark terror."

The accident rates are based on flight accidents per 100,000 hours flown. The overall NASA rate of 4 can be compared to a military fighter trainer/test aircraft rate which normally may range from 6 to 15. The administrative aircraft rate has remained essentially zero except for one Type "B", Queenaire, accident in 1969.

There was one aircraft in-flight engine failure which cost-wise (\$275,000 to replace/repair the engine) falls into the Type "A" category. It was not included in the Aviation Mishaps Table, because it is more appropriate to consider this a test operation failure. NASA 946, Shuttle Training Aircraft, had an engine failure during Shuttle Simulations flight. As a result of this failure, several recommendations were made by the investigation board to avoid similar failures in the future.

NASA
L-78-4502



AIRCRAFT LEFT RUNWAY WHEN
BRAKING PROBLEM OCCURRED

AVIATION MISHAPS
1969-1978

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
TYPE A	5	0	2	2	2	1	0	0	0	0
TYPE B	0	0	0	1	2	1	1	0	0	1
INCIDENTS	2	5	6	2	10	3	2	0	3	7
AIRCRAFT DESTROYED	4	0	2	2	2	1	0	0	0	0
PILOT/CREW FATALITIES	0	0	0	2	11	0	0	0	0	0

AVIATION FLIGHT ACCIDENTS RATES - NO. OF ACCIDENTS PER 100,000 HOURS

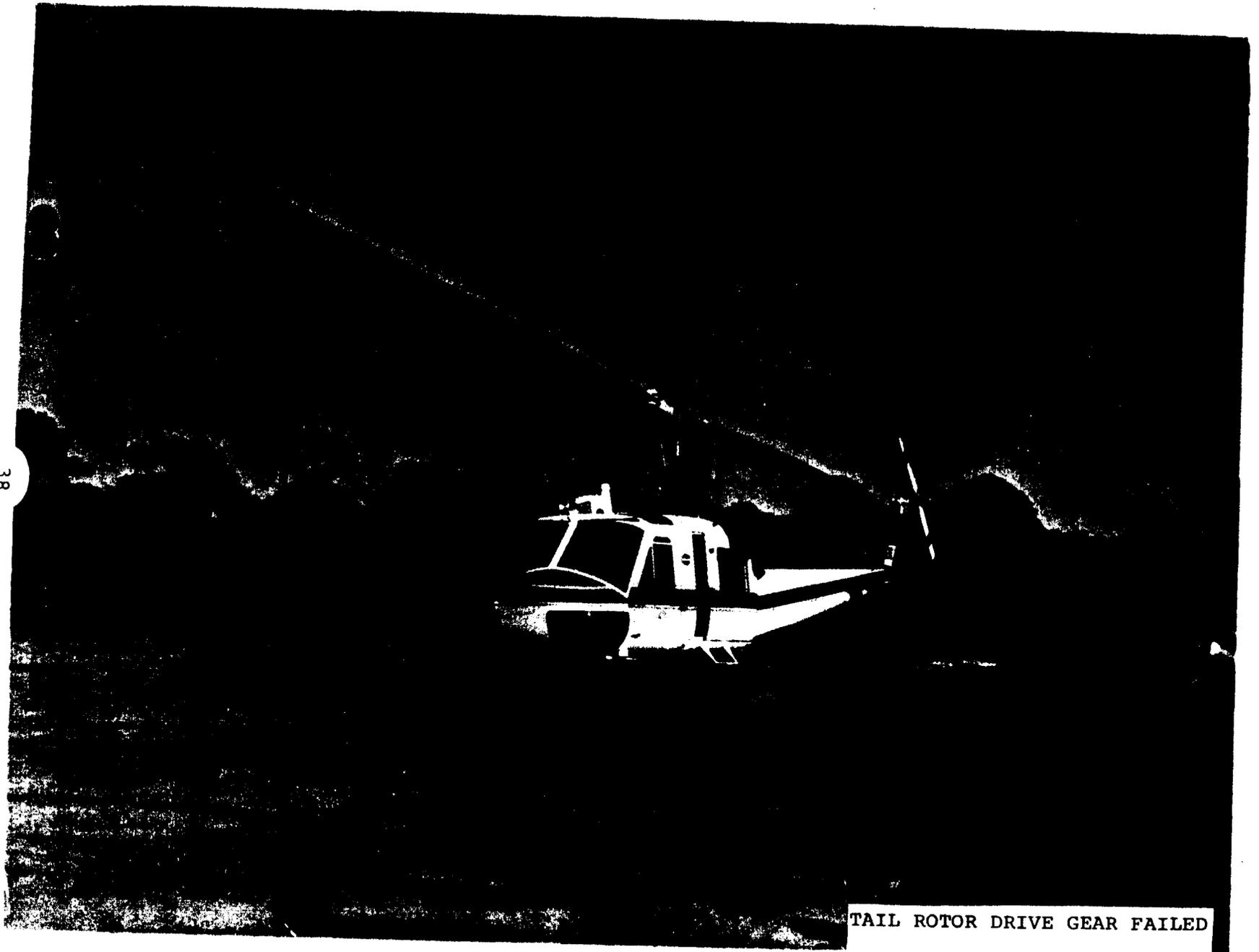
FLIGHT ACCIDENT RATE	20	0	4	11	14	9	4	0	0	4
FATAL ACCIDENT RATE	0	0	0	7	4	0	0	0	0	0
AIRCRAFT DESTROYED RATE	15	0	4	7	7	4	0	0	0	0

FLIGHT ACCIDENTS SUMMARY

<u>CATEGORY OF AIRCRAFT</u>										
ADMINISTRATIVE	1	0	0	0	0	0	0	0	0	0
PROGRAM SUPPORT	3	0	2	2	1	2	1	0	0	1
R&D	1	0	0	1	3	0	0	0	0	0

NASA
L-78-7707

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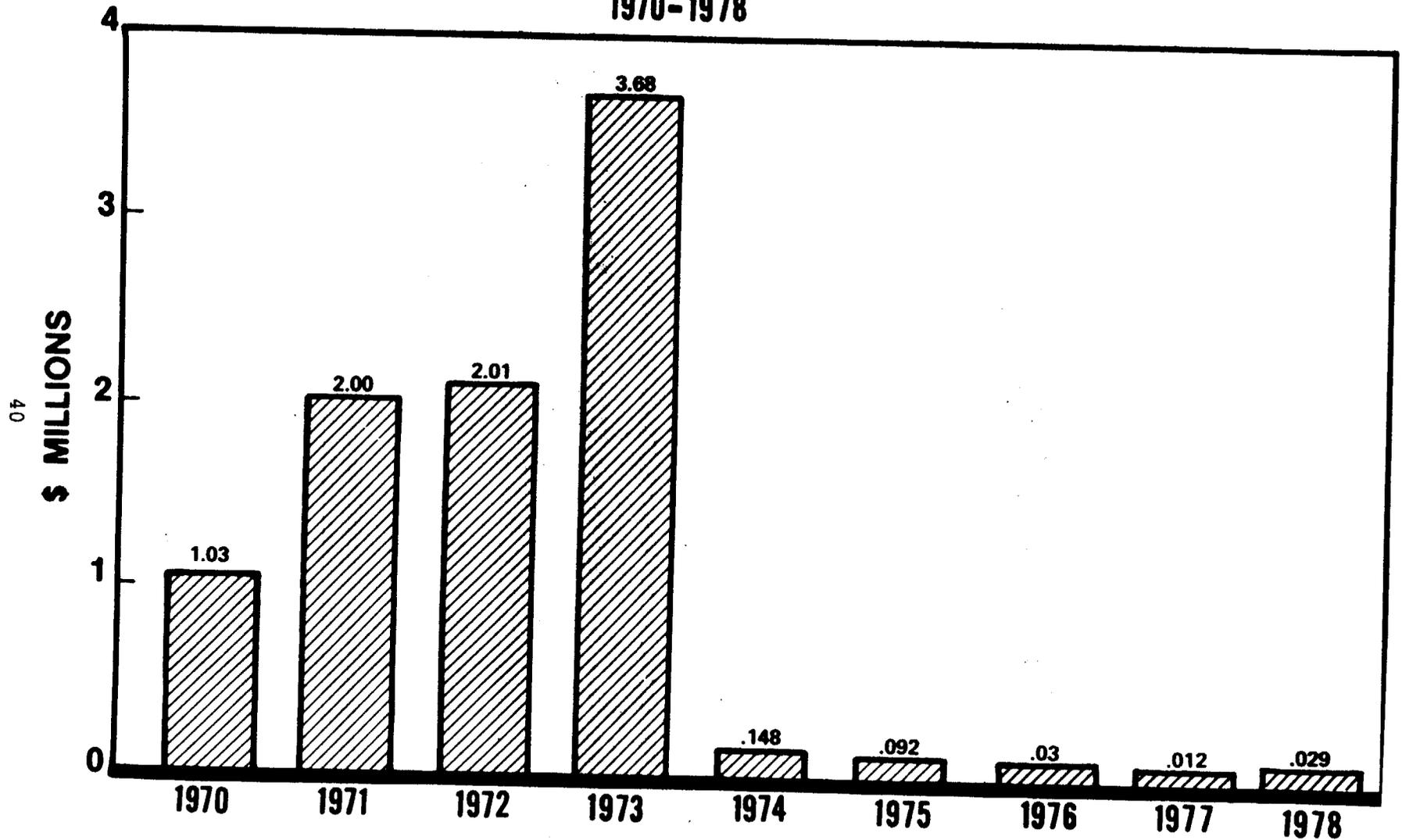
TAIL ROTOR DRIVE GEAR FAILED



FAILED TAIL ROTOR DRIVE GEAR

NASA AIRCRAFT LOSSES

1970-1978



NASA MOTOR VEHICLE ACCIDENTS

There was an increase in both the automotive accident frequency rate and the costs of accidents for 1978. Once again the "Safety '76" goal of 5.0 accidents per million miles driven, which we met in 1973, eluded us. This year the rate was up to 6.77 (a 28% increase) and the costs were also up 28 percent to \$23,000.

There were seven accidents reported for employee's private vehicles while driving 7.1 million miles for official business. There were 55 accidents to U.S. owned vehicles while driving them 8.1 million miles. Management is urged again to evaluate the driving practices and disciplinary needs to get the attention of those who do not observe traffic laws and good practices.

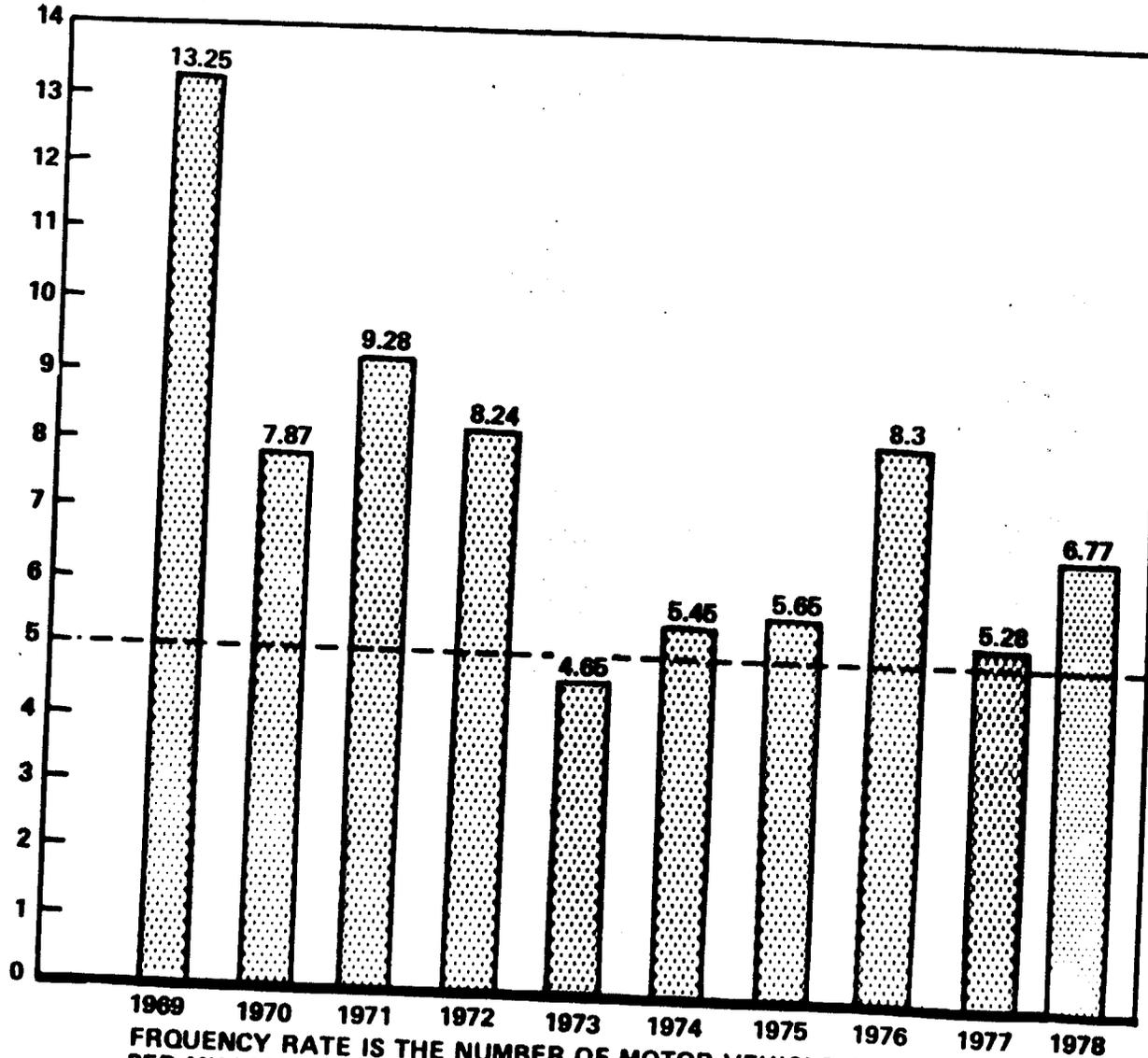
Four installations reported zero accidents while driving 331,000 miles in government-owned vehicles, and eight installations reported zero accidents while driving 3,832,000 miles (official business) in privately owned vehicles. This is 4 and 54 percent respectively of the total miles driven.

Have you examined the reasons for this great difference?

Let's buckle up for safety!

NASA GOVERNMENT MOTOR VEHICLE ACCIDENTS

FREQUENCY RATE



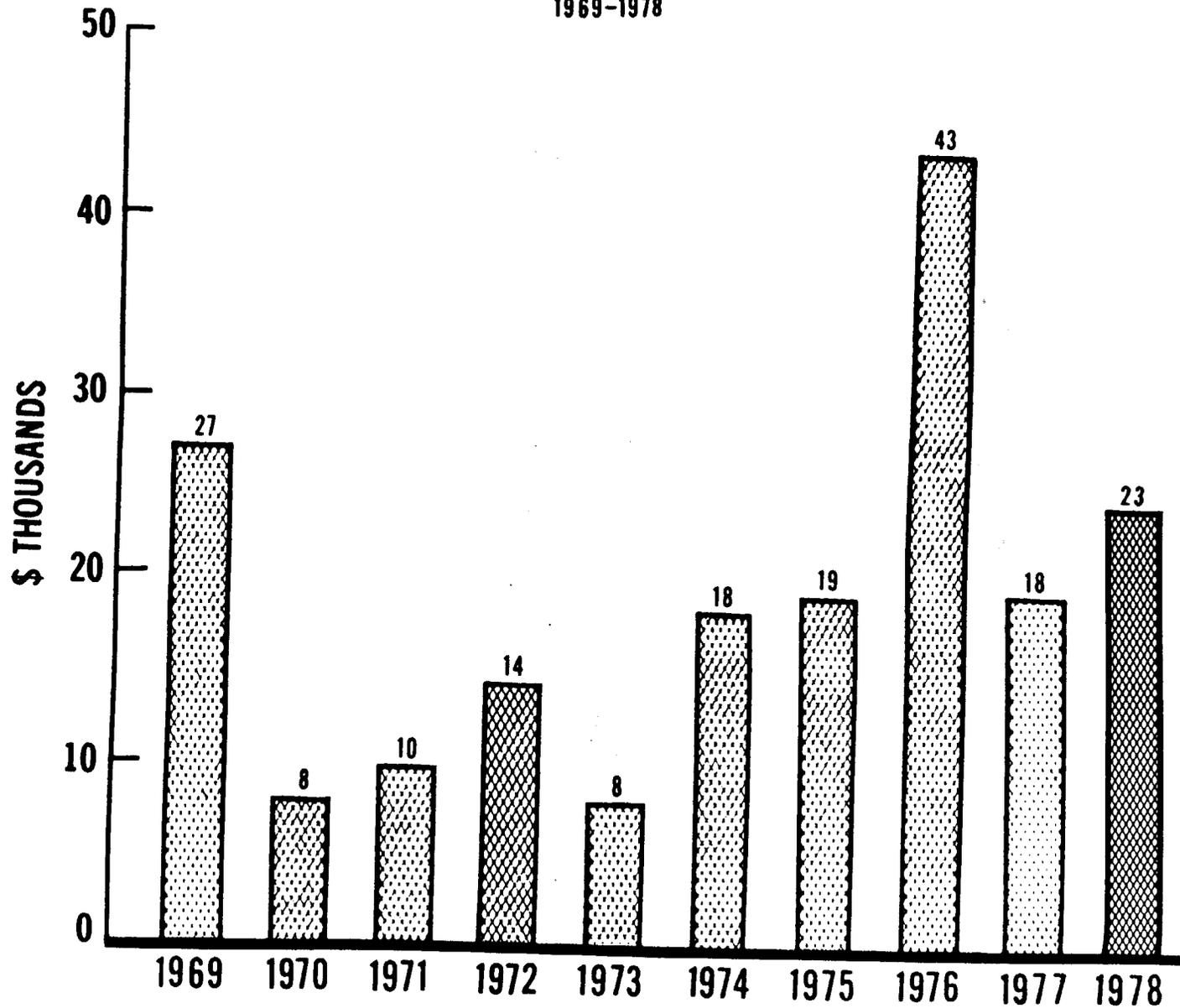
"SAFETY 76"
GOAL 5.0

FREQUENCY RATE IS THE NUMBER OF MOTOR VEHICLE ACCIDENTS
PER MILLION MILES DRIVEN.

NASA HQ DS78-2331 (1)

NASA AUTOMOTIVE LOSSES

1969-1978



NASA 1978 MOTOR VEHICLE ACCIDENTS

Field Installations	No. of Accidents		Total Miles Driven (in thousands)		Total Cost		Frequency Rate* of Accidents	
	Govt.	Private	Govt.	Private	Govt.	Private	Govt.	Private
AMES	1	0	743	461	80	0	1.35	0
DRYDEN	1	0	447	120	1,330	0	2.24	0
GODDARD	27	2	2,932	1,607	12,540	180	9.21	1.24
HEADQUARTERS	0	3	73	446	0	440	0	6.73
JOHNSON	0	0	253	1,107	0	0	0	0
KENNEDY	2	1	957	735	920	320	2.09	1.36
LANGLEY	5	0	319	728	2,170	0	15.69	0
LEWIS	11	1	358	451	4,920	0	30.73	2.22
MARSHALL	32	0	1,470	1,378	390	0	2.04	0
MICHOUD	0	0	4	11	0	0	0	0
NSTL	0	0	1	27	0	0	0	0
WALLOPS	5	0	568	0	1,100	0	8.80	0
NASA (TOTAL)	55	7	8,125	7,071	23,450	940	6.77	.99

* FREQUENCY RATE IS THE NUMBER OF ACCIDENTS PER MILLION MILES DRIVEN

NASA FIRE EXPERIENCE IN 1978

Through the efforts of all personnel, the number of institutional fire mishaps in our facilities and equipment was at an all time low, but their costs for 1978 were up to \$190,000. The fire costs in 1978 were dominated by a fire that destroyed a van loaded with satellite communications equipment. The fire started in the engine compartment and rapidly spread throughout the van. There were also three test stand fires which were caused by and involved the Shuttle Main Engines that were being tested. The combined cost of these three fires was \$13.5 million, and of course, dwarf the institutional, type fires.

The excellent record for buildings and facilities is the direct result of extensive fire prevention activities, excellent fire safety awareness, and a substantial investment in fixed fire detection and suppression systems. We have not allowed the results of these efforts to foster a false sense of security or complacency which would precede the relaxing of our vigilance and determination. It is important for us to maintain the level of our fire safety resources. At this stage in the NASA mission, fire could have a disastrous effect on our future, because Congress may not provide funds necessary to replace a facility.

In consideration of items such as reduced funding levels, changes in occupancy, operations, age of facilities, reduced staffing levels, and energy conservation, we must, in fact, reinforce and bolster our fire safety emphasis.

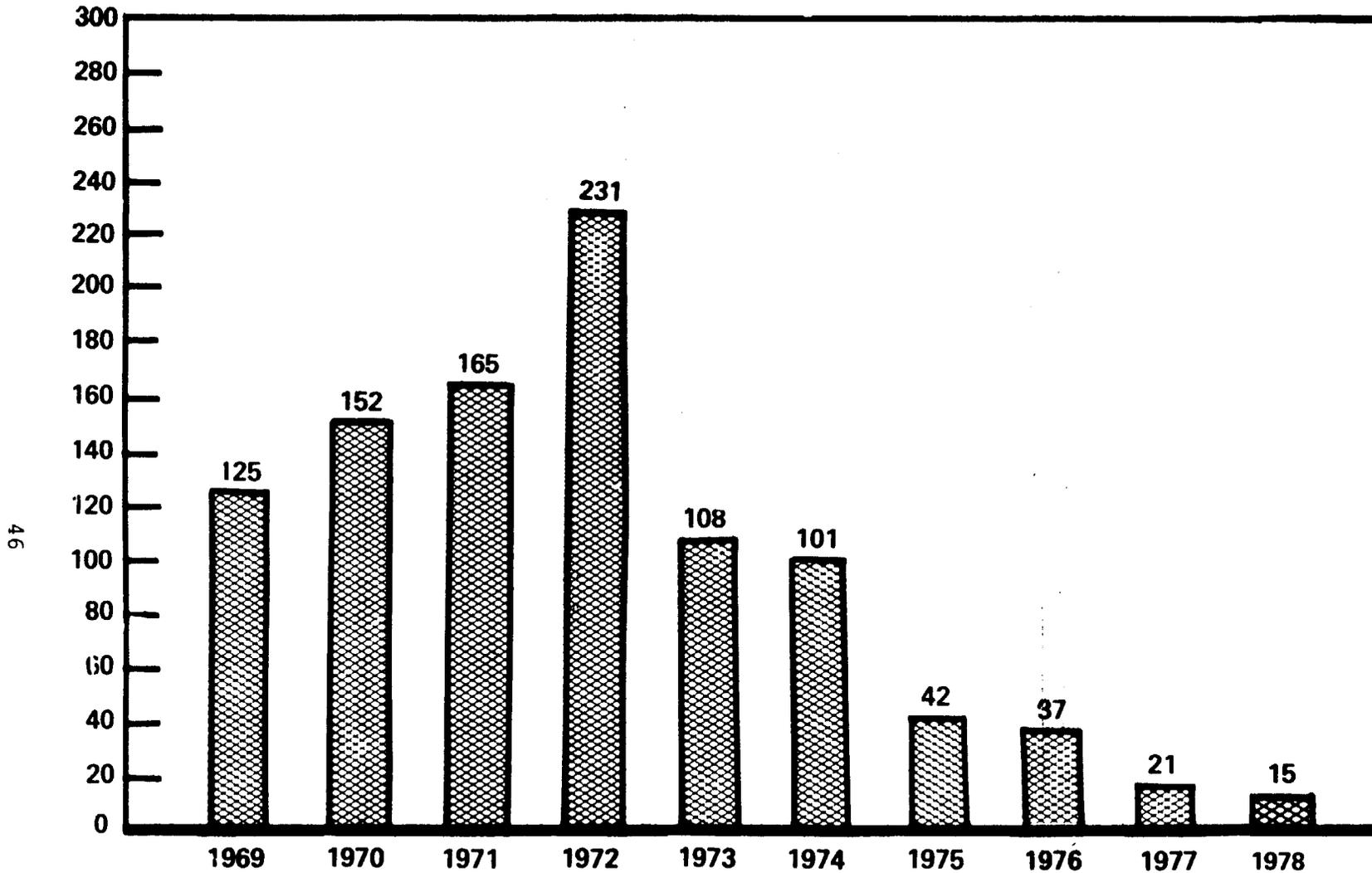
Programs to provide fire detection and suppression systems and to require safe materials and construction must continue. These activities must start on the drawing board and continue through all phases of projects. Training and education of employees and professional development of fire safety personnel, in the related technologies and state of the art, must be expanded.

Through balanced risk surveys and development of fire safety master plans, we will have tools to improve our fire safety and further reduce fire mishaps and losses.

Special precautions are taken during high risk test operations to protect personnel, test hardware, and test stands, but fires, other test failures, and mission failures still dominate our losses and require continued efforts to reduce their number and losses.

NUMBER OF NASA FIRE MISHAPS

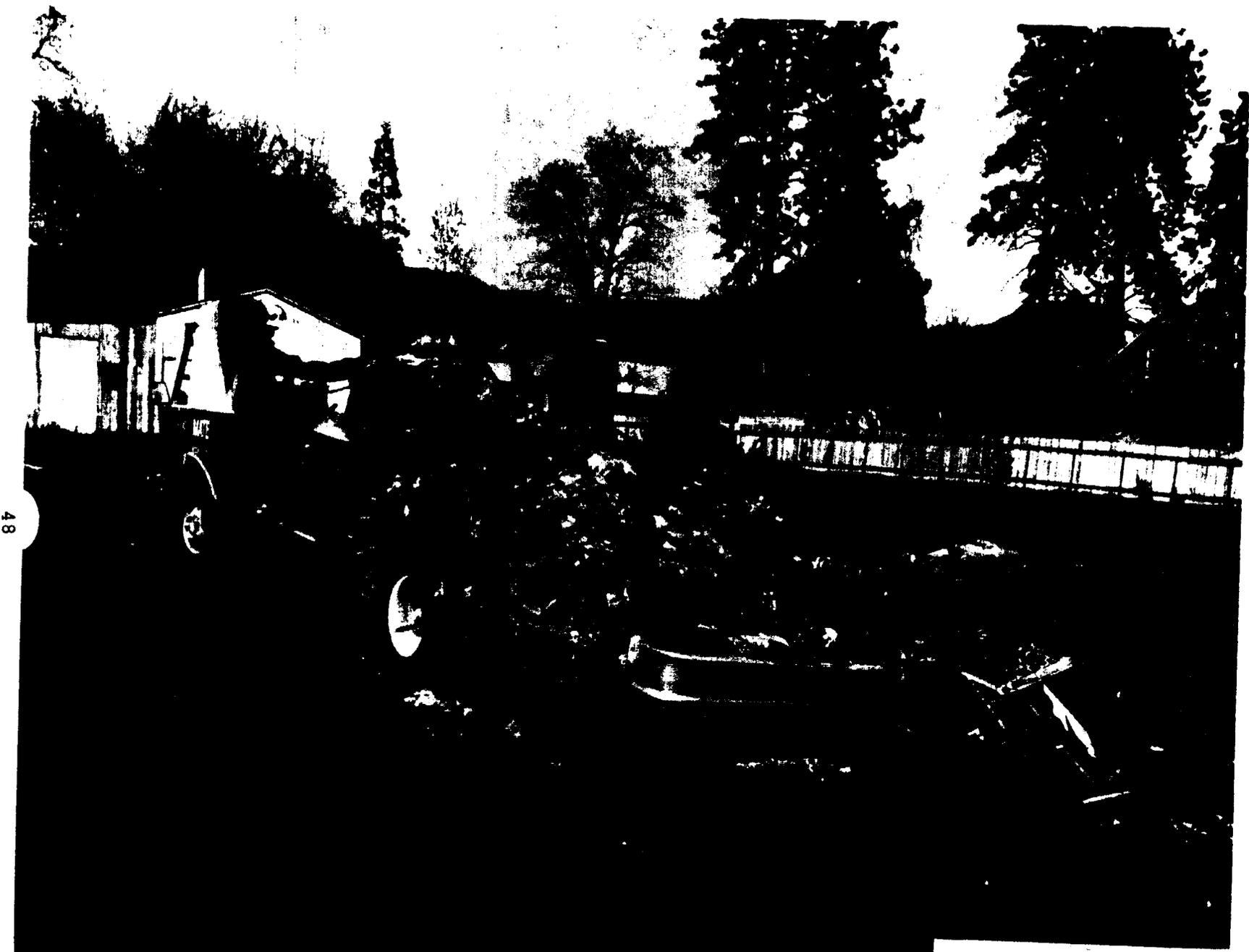
NUMBER
OF FIRES



46



RESULTS OF ENGINE FIRE

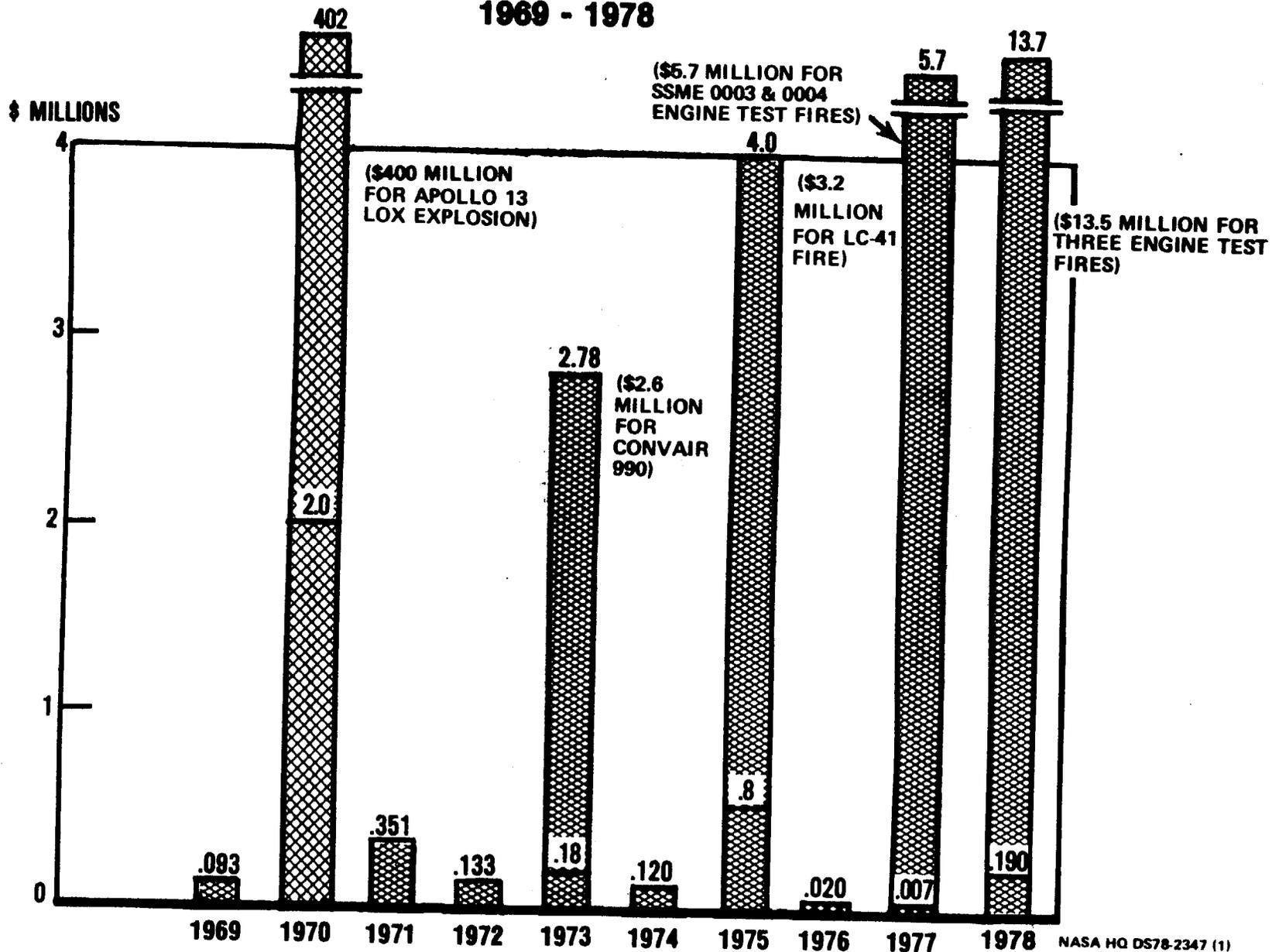


48

RESULTS OF ENGINE FIRE

NASA FIRE LOSSES

1969 - 1978



LOST TIME INJURY BRIEFS
1978
(GOVERNMENT EMPLOYEES)

NATURE OF ACCIDENT/LOCATION	No. of Days
✓Allergic reaction from eating pork chopettes in cafeteria (allergic to soybean, etc.).	1
Employee cleaning around cutter; scraped his hand on cutter.	1
Employee dropped hydrogen cylinder on foot; contusion.	1
Employee dropped steel plate on toe; fractured toe.	1
Employee lacerated right index finger while bending an 8" X 10" piece of metal in a brake machine. Laceration to second finger, right hand.	1
✓Employee lost balance while descending stairs and fell; contusion, left arm, knee, and side.	1
Employee slipped and fell down icy steps; injured lower back.	1
Employee slipped and fell on ice and snow; contusions, both knees.	1
Employee slipped off wing of aircraft; sprained back.	1
Employee slipped on ice; suffered contusions of both elbows and strained left thigh.	1
✓Employee slipped while walking on ramp; sprained ankle.	1
Employee spilled hot water on left arm and body; second degree burns.	1
Employee twisted back against heavy restraint harness of parachute and shoulder harness; sprained back.	1
Employee was assisting in lifting a piece of laboratory equipment; strained back.	1
Employee was sanding; fiberglass dust blew in eye.	1
Employee wrenched back while attempting to open stairwell door.	1
Picked up heavy support; strained back.	1
Right foot slipped on stone near curb and fell face down on concrete sidewalk. Injury to right wrist/forearm and left knee.	1
Rolling a large cylinder tank; caught and fractured left arm.	1
Shoe heel caught on curb, fell into street; injured head, face, nose, mouth, gums, teeth, lips, etc.	1
Slipped and fell in mud hole while going into building. Abrasion of the right foot and left knee.	1
Struck in right eye while trying to assemble scaffolding.	1

Tripped, dropped dish which struck head; laceration.	1
While driving to work on government property, a car pulled out and hit employee's car causing multiple contusions.	1
While performing pre-flight inspection, employee bumped head on landing gear door.	1
While safety wiring a bolt the pliers slipped and hit employee in corner of eye.	1
Worker turned head suddenly to shout instruction; strain, neck.	1
Airplane mechanic after crawling on knees later suffered a swollen knee.	2
Cutting tape off box, scissors slipped into left thumb, stiches required, tetanus reaction.	2
Employee bitten by insect while inspecting a cable tray outside a hangar.	2
Employee bumped foot on cable tray support member; contusion, left foot.	2
Employee closed a hose connector on finger; contusion and chip fracture, left 2nd finger.	2
Employee experienced sudden sharp pain while writing on blackboard; strain back.	2
Employee hurt back while unloading 72 pound boxes from truck to skid. Has done this many times and is not aware of doing anything wrong. Muscle strain in back.	2
Employee reached to pick up phone; muscle spasm, left shoulder.	2
Employee slipped on stairs and fell; laceration of knee.	2
Employee spilled xylene on hand while pouring it into a beaker over an electrical component. Four days later a rash appeared on hand.	2
Employee swallowed foreign object while drinking coffee from a styrofoam cup. Object had to be surgically removed.	2
Employee was getting out of vehicle in front of building, slipped and fell on ice; received injuries to head.	2
Employee working with dust-covered equipment; suffered contact dermatitis, both hands.	2
Erasing a black board, eraser slipped scattering chalk dust in eyes.	2
Falling down 4 steps of a platform; sprained right wrist and fingers.	2
Helping start car; injured back.	2
Ladder rung broke causing employee to fall; contusion, right knee, ankle, and shin.	2

Lifting boxes caused low back pain. Improper lifting technique.	2
Parked car behind and just beyond authorized parking area. After leaving car, stepped into rut partly covered with grass. Sprained ankle.	2
Ran into Winnebago Motor Home when on official travel. Injuries to knee, stomach, right leg.	2
Tripped over rug pad.	2
Valve core slipped that he was taking apart. Twisted his back reaching for it. (Weight approximately 50 pounds.) Pain in mid lumbar-sacral area of back.	2
While moving equipment, employee struck by dislodged shoring timber; fracture, great right toe.	2
While typing, hit elbow on desk, not sore at time of injury, but was later. Soft tissue injury, right elbow.	2
Worker's finger caught in pinch point between metal and forming roll; avulsion, left 2nd finger tip.	2
Employee lifted box from vehicle and sprained back. Improper lifting technique.	3
Employee sprained knee walking down steps from 2nd to 1st floor. No fall or twisting of leg involved.	3
Employee twisted foot on loose gravel in parking lot. A bone in foot was broken.	3
Employee was driving to work and his vehicle struck rear of other vehicle which was stopped on bridge. Whiplash and abrasions on both shins.	3
Employee was lifting portable partitions and injured back.	3
Noticed bite on ankle, possible spider. (2 days lost, 1 restricted.)	3
Struck by van backing up in parking lot; injury to back.	3
While cutting wood on band saw, worker cut right index finger.	3
While turning corner going up stairway, employee twisted and strained right hip.	3
While walking outside, wind blew object in employee's eye.	3
Worker struck by disconnected operating rod; abrasion and contusion, left shin.	3
Worker turned his body while holding heavy face plate; strain, back.	3
Worker wearing leather soled shoes, slipped on an oily aircraft wing and fell; cut, 3rd and 4th fingers; contusion, right hip.	3
Employee developed pain in back after walking under "I" beam approximately 4 feet from floor. Has history of back problems, this is recurrence.	4
Employee lifting boxes; strain, lower back.	4

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Employee lifting boxes; strain, lower back.	4
Employee pulled drawer open in filing cabinet and sprained back.	4
Employee walking around desk and hit leg on typewriter table, fractured toe. Confined space contributed.	4
Fell off truck and hit left side on a ladder, bruised left side.	4
Installing ejection seat in aircraft; strained back.	4
Pushing a piece of wood through a band saw; lacerated right thumb.	4
Setting down a metal plate, it slipped, hit right foot, injured large toe. Possible sprain or fracture of large toe, right foot. (2 days lost, 2 restricted.)	4
While filing in a low drawer of cabinet, employee suffered sprain to back. Improper stooping posture.	4
While walking in office bumped right shoulder on partition causing acute bursitis.	4
Bent down to pick up a piece of pipe and felt something pull in his back.	5
Employee on travel fell in high school parking lot; fractured left wrist, strained lower back.	5
Lifting a model with a chain hoist. The lifting strap slipped and the model fell and struck right leg.	5
Steel plate stored against wall fell over and struck worker's foot; fracture great right toe.	5
Employee failed to stop at intersection and struck other car. Four fractured ribs and lacerated tongue.	6
Employee picked up a metal guard for elevator controls and set it upright; pulled muscle in back.	6
Employee removing Charger Battery Regulator Module from refrigerator; another module located under the one he was removing turned over, fell out of refrigerator, and hit big toe.	6
Employee tripped and fell while descending exit steps. Multiple abrasions, sprained ankle.	6
Employee twisted ankle on stairway.	6
Employee was exposed to water base paint fumes when her office was being repainted. Suffered respiratory problems.	6
Employee was welding studs to floor of wind tunnel for holding foam pads treated with flame retardant. Foam and retardant released toxic fumes causing upper respiratory irritation.	6

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While moving heavy crate over raised section of floor, employee suffered strain, lower back.	6
Bending over working on truck. Raised up, back sore. Ben-Gay and heating pad used the night of the incident, but soreness did not go away. Lumbar sprain of back.	7

Coming down foot ladder carrying emergency battery light. Right foot slipped, missed footing on last two rungs of ladder. Possible fracture to metatarsal right big toe.	7
Employee fell from ladder; injured back.	7
Employee tripped over edge of rug and fell; injured ankle.	7
Employee turned ankle while stepping off curb; fractured 5th meta-tarsal.	7
Employee was walking across street in crosswalk and was struck by a truck, thrown into air, landed on right hip. Employee remembers bouncing twice. Injury to right hip.	7
While working with aluminum sheet plates, employee turned one plate over and leaned forward to put it on a work table; suffered back strain.	7
Bending over equipment on ladder, started to straighten up to come down ladder; felt pain in lower back. Acute back strain. (6 days lost, 2 days restricted.)	8
Employee hit the electrical cord of pot containing hot water, causing pot to tilt and spilled hot water on self; burns to body.	8
Lifting crane up on rail, back hurt again, (about three weeks earlier hurt back while lifting air conditioning unit.) pain has intensified. Back pain. (7 days lost, 1 restricted.)	8
Twisted right ankle in parking lot. Area was under minor construction and many small stones littered area.	9
Crawling in aircraft; employee injured knee.	10
Employee slipped and fell while walking on wet ramp. Fractured left ankle.	10
Employee slipped on ice in parking lot. Bad sprain. (3 lost days, 7 restricted)	10
Employee strained back while turning a crank on a machine.	10
Employee working in cockpit of aircraft, hit rib cage against control stick and broke a rib.	10
When commercial airplane was landing, tire blew out; emergency evacuation. After coming down shoot, he ran and fell, hurting right arm and wrist; fractured right radius and ulna.	10
While walking to car, tripped on curb. Torn ligaments right foot.	10
Worker slipped on oil slick and fell against fence; contusion, left knee.	10

Carrying a piece of brass to work bench; strained back.	11
Employee hit hand with hammer; fractured hand.	11
Employee walking with cane was distracted causing fall; contusions, right arm, elbow, and hip.	11
Tightness in left knee after kneeling on concrete floor.	11
Two inch piece of pipe rolled off cart on to worker's foot; fracture, left great toe.	11
While tightening bolts on a punch press, employee strained lower back.	12
Employee on travel fell through doors of moving Avis Shuttle; fractured rib, cut elbow to bone, partially severed tendon, bruises.	13
Employee slipped and fell on wet concrete inside building entrance; contusion, left arm.	13
Worker standing on top of cabinet fell when cabinet tipped; multiple contusions; laceration, right foot; abrasion, right lumbar.	13
Hurt back reaching out and lifting a piece of stock on to a lathe; recurrence of old back injury.	14
Slipped on trailer steps; twisted knee.	14
Twisting his hand using tube bender; tendonitis of the left hand.	14
Employee suffered a back injury from working in library, shelving books and pushing a cart loaded with heavy journals.	15
Fell down stairs; mild concussion, bruises.	15
Strain, shoulder, back, and neck lifting aircraft tow bar.	15
Thrown forward off bicycle; landed on back of neck and shoulders.	15
Fell while walking through shop with a cane. Cane was placed in some oil on floor and it slipped. Reinjured left knee.	16
Tripped on normal office walking surfaces; contusion both knees; possible muscle strain both shoulders.	16
While on TDY employee lifted suitcase from treadmill in airport; hernia.	16
While sitting in chair, employee reached down to get something off the floor and sprained back.	16
Worker tripped over air hose on floor; strain, back.	16
Employee experienced pain in back after lifting; strain, lower back.	17
Employee stepped insecurely on landing step; fractures (2), right foot.	18

Employee strained back due to excessive strain from using his arms above his head.	18
Heavy lifting. Strain lower back. (9 lost days, 9 restricted days.)	18
Lifting heavy boxes (50-75 pounds each); noticed pain in left shoulder and pains shooting down left arm; pains became worse. Muscular strain in chest area. (Restricted activity.)	18
Bumped into block; contusion right knee.	19
Box slipped and fell catching hand under box and wagon; amputating finger tip.	20
Employee involved in leak checking servo actuator tried to wipe a spot of hydraulic fluid from moving piston, caught finger between piston and assembly. Amputated tip of the right index finger.	20
Employee was lifting boxes and felt pain; strain, back; sprain, lumbo-sacral.	20
Employee working in mechanical equipment room was injured pulling self out of access duct. Employee reported to Health Unit 6 days after mishap. Strained left shoulder. (3 days lost, 17 restricted)	20
Lifting battery and felt "snapping" sensation in lumbar-sacral region. Lumbar-sacral pain. (19 days lost, 1 restricted.)	20
Employee slipped and fell while removing trench plate from flooded floor; bruise, right knee.	21
While positioning a trailer, worker sneezed; hernia, left inguinal.	21
Employee missed the step and fell while descending from lab bus; multiple contusions, face and both eyes.	22
Worker's hand struck against workpiece during free movement of hand tool; contusion, right hand.	22
Employee lifted heavy moving box; hernia, left inguinal.	23
Employee washing F 104 tail section, lowered front end to drain water from section. Section came loose striking employee on shoulder and pinning leg between tail section and stand.	25
Employee jumped to get feet out from under piece of steel that fell from rack; strained right lower back.	26
While working in office, employee tripped over typewriter table; fell and broke hip.	29
Aircraft mechanic had pain in left groin from lifting heavy tool box; suffered hernia.	30
Employee fell when his cane slipped on a wet spot on the floor; hernia, left inguinal.	30

Conducting RFI measurements, was necessary to enter through tightly sealed doorway. Repeated use of doorway caused discomfort in both groins. Hernia.	31
Employee stepped off piece of metal into some loose gravel and twisted right knee.	32
Employee stopped car to make left turn and was hit by car traveling opposite direction. Accident caused multiple injuries.	32
Mirror removed from vacuum chamber lid and mounted on fixture. Employee holding mirror steady when crane operator moved chamber lid wrong way and struck employee. Back injury.	32
Back muscle strain during manufacture of LDEF trays.	33
Low back strain from picking up lumber.	33
Hernia caused by lifting boxes. (Boxes weighed over 50 lbs.)	35
In the process of getting heavy equipment ready for shipping for disposal, employee suffered back strain.	35
Twisted right ankle and knee when stepping on uneven floor.	35
Employee operating tow motor struck by steering wheel knob which spun out of hand when vehicle wheels struck roadway obstacle; spiral fracture of proximal shaft of right 5th metacarpal.	36
At bottom of steps, opened door same time someone on other side opened door, fell through door but caught self before falling. Bad strain, recurrence. (17 days lost, 20 restricted.)	37
Employee stepped down from step stool; suffered sprain, left ankle and hernia of naval.	37
Low back strain developed while moving boxes.	37
Worker lifting bag of sand; strain, right and center back.	38
Scaffold slipped while employee was moving it; hernia right inguinal.	43
Employee suffered back sprain as a result of falling on waxed floor. Employee was wearing rubber soled shoes.	44
Employee stumbled over waste basket, fell to floor; aggravated pre-existing back problem.	45
Employee slipped and fell on wet cement while walking in passageway between two buildings. Ruptured tendon in left leg.	57
Employee leaned back in chair, lost balance; back injury.	60
Employee slipped and fell on icy steps; injured left leg.	66

Removing adapter from machine and strained right side of back.	66
Aircraft mechanic moving blower into position for fuel cells on C8A; twisted right knee.	73
Tripped on loose carpet, shoe heel caught under carpet, lost balance, fell on floor. Injured right leg and lower back.	73
Employee slipped on icy sidewalk; broke right leg and ankle.	86
Tripped coming down internal stairwell and suffered contusions of upper and lower back.	87
Employee was lifting mockup; low back strain.	90
After storing CPR equipment, bent over and could not stand up; low back strain. (68 days lost, 30 restricted.)	98
Employee coughed and felt pain; strain, back.	114
While repairing overhead steamline, employee fell 12 feet to floor; fractured tibia and fibula.	200

LOST TIME INJURY BRIEFS
1978
(CONTRACTOR EMPLOYEES)

NATURE OF ACCIDENT/LOCATION	No. of Days
After soldering transistor lead, employee used diagonal wire cutters to trim excess length of wire. The piece of solid 26-gauge wire about 1/8" long flew into right eye.	1
Bumped elbow on filing cabinet causing cellulitis of the left elbow.	1
Employee bitten on calves and ankles by ants that had nested in an operational complex.	1
Employee caught arm against ledge of blackboard which was loosely attached to wall.	1
Employee incurred foreign body in left eye while performing routine duties.	1
Employee incurred laceration of middle right ring finger on sharp object.	1
Employee opened door of freezer, packages of frozen meat fell out hitting right leg.	1
Employee slipped on wet hallway and suffered an internal derangement of left knee.	1
Employee struck hand with sledge hammer. Sustained contusion on left hand.	1
Employee tripped on rise between floor areas and fell to floor; bruise, left thigh.	1
Employee walked into darkened aircraft, cover was removed from scanner compartment. Stepped into compartment, fell 2 feet. Lacerated right shin, bruised left hip, and sprained ankle.	1
Employee walking down stairway fell; contusions of the gluteus region.	1
Employee was cleaning tubing with caustic in the field cleaning area, some of substance splashed in eye.	1
Employee was getting into forklift, slipped and bumped head against forklift door; concussion.	1
Employee was lifting material and sprained back.	1
Employee was lifting test chamber out of pickup truck and suffered right shoulder separation.	1
Employee was setting up work equipment, lost balance and strained back.	1
Employee was sitting on desk typing. Phone rang, looked quickly to left to answer it, felt snap in neck. Pulled muscle in neck.	1
Employee was using 30-lb magnetic hammer and said that the repeated operation caused him to strain his back.	1

Employee working for roads and grounds was struck from rear by truck while operating a vehicle; he had stopped for deer to cross road. Fractured nose, hurt neck, and irregular heart beat.	1
Performing duties in laboratory, employee incurred muscle strain in back.	1
Sprain of lower back was incurred by lifting and storing items.	1
While bending over to pick up tape; employee sprained back.	1
While helping three other employees lift heavy box of cables into back of van; received sprained back.	1
While installing video cable, employee stepped through hole in grate with left foot-full weight on right leg; pulled muscle.	1
While performing welding duties; employee burned left instep.	1
While realigning jacks, bottom support strut came loose from jack and struck employee on head; laceration of parietal area of head.	1
While turning valve to bleed line, employee started coughing uncontrollably. Wearing respirator. Diagnosis was chemical bronchitis.	1
During cleanup of work area, employee slipped on wet floor.	2
During test operation employee lacerated left index finger on sharp edge of equipment.	2
Employee missed step coming down stairs; fell.	2
Employee helped in moving desk; back strain.	2
Employee incurred strained back while performing lifting duty.	2
Employee slipped on recently painted steps; it was a rainy day.	2
Employee stepped on sharp object; puncture wound of right great toe.	2
Employee sustained back injury while lifting box.	2
Employee sustained injury to left shoulder while lifting an 80 pound compressor blade.	2
Employee walked by console and loose trim caught clothes, lost balance and aggravated old back injury.	2
Employee was deburring forms on machine with circular knives, trimming edges. Left index finger slipped under blade and tip of left finger was severed.	2
Employee was emptying trash from ramp, stepped on edge of ramp; twisted ankle.	2

Employee was emptying trash barrel into dumpster, dropped barrel and it hit right great toe.	2
Employee was loading materials in truck off base. Sprained right thumb on door of truck.	2
Employee was manipulating boxes of computer runs between two facilities; low back strain.	2
Employee was removing gauge from fuel (MMH) line. Employee was wearing goggles, not full face protection, fuel sprayed on face; second degree burns to face.	2
Employee was struck on chest and hand while removing bolts from plate which held a strainer in place. The line was pressurized at 60 psi, unknown to employee.	2
Employee was walking up stairs carrying illustration board. Tried to grasp handrail; fell and fractured elbow.	2
Overflow of MMH occurred in test area. Next day an electrician entered to check electrical wiring; inhaled MMH fumes.	2
Slipped disc in back while attempting to lift bolted down partition.	2
Employee crushed right big toenail when a piece of steel he was lifting fell on his foot.	2
Employee arose quickly from chair to answer alarm; sprained left ankle.	3
Employee had seizure; fell striking head on concrete floor.	3
Employee strained shoulder while attempting to catch a falling object.	3
Employee tripped on telephone cord; fell.	3
While walking to parking lot, employee was bitten by an insect.	3
Employee was cleaning restroom and foot slipped on floor twisting knee; trauma of left foot tissue.	3
Employee was loosening valve on fuel (MMH) line and the fuel sprayed on his face. Employee was wearing eye protection when it happened.	3
Employee was moving piece of equipment; strained elbow.	3
Employee was walking to front door of building, looked over shoulder, changed direction slightly and hit head on plate glass window beside door, glass broke; lacerated face, scalp, and right thigh.	3
Moving power unit cables, employee sustained groin pull.	3
While installing primacord on missile, employee twisted knee while getting up and down.	3
While stepping down from bus, sustained sprain of left sacroiliac.	3

Employee attempting to remove rod used to turn off water at underground hydrant. Rod got hung and in attempt to dislodge rod, pulled on it; strained lower part of stomach.	4
Employee opened door which was partially blocked by refuse receptacle on opposite side. Individual struck knee on door jamb.	4
Employee stepped backwards from platform, turned ankle, and fell; sprained right ankle.	4
Employee stepped in hole and strained foot.	4
Employee suffered strain while trouble-shooting, closing and opening a Cameron valve with manual wheel.	4
Employee was removing dolly from truck, it fell, hit his right arm and pinched nerve.	4
Employee was replacing chain on door pulley, chain slipped over side and caught finger between chain and pulley.	4
Installing computer cables under floor, gust of air blew dust and metal chips in eyes.	4
Security guard directing traffic; bug flew into left eye.	4
Employee sprained left wrist when detaching wringer from bucket.	5
Employee tried to stop piece of steel from sliding off forklift; hurt his back.	5
Employee walking in work area slipped on some tap oil on floor; contusion to knee.	5
Employee was moving desk; injured back.	5
Employee was moving mop bucket with wringer attached. The wringer fell off and struck toe; fractured toe.	5
Photographic chemicals splashed on employee's face shield and forehead. When employee removed shield to wipe his forehead, chemical ran into eyes.	5
Working on office door closure, door was closed and finger was caught between closure arm and assembly. Fractured right index finger.	5
Employee sustained injury to right little finger while loading two plates of steel.	6
Employee sustained pain to his foot while walking up the steps.	6
Employee assisting another employee position shrinker to horizontal position on wooden pallet. Shrinker toppled and hit employee's left foot; factured ankle.	7
Employee crossing top of gantry during removal of tape from a weld seam. Hit top of head on crane rail causing laceration.	7
Employee suffered paravertebral muscle strain when he tried to lift a garbage can weighing about 100 lbs.	7

Employee was descending stairs from scaffold. Right foot slipped on step and he slid spraining right ankle.	7
Injured back while moving truck rims from one pallet to another.	7
Electrician performing duties; twisted back.	8
Employee fell into cargo hold; cut left knee which required 10 stitches.	8
Employee fractured toe when cord of foot buffer became entangled around buffing machine. While untangling cord, buffer dropped on foot.	8
Employee of emergency services tripped over door stop; fractured left foot.	8
Employee sustained back injury stepping over pipe.	8
Employee sprained back while bending to pick up pan; could not straighten up.	9
Installing heavy equipment, using lifting devices, but apparently poor body mechanics resulted in lumbosacral strain.	9
Unsteady gas cylinder fell striking worker's foot; fractured great left toe.	9
Electrician sustained burn injuries while lying on his side wiping oil from electric motor with cloth. The cloth caught fire.	10
While performing duties, employee incurred severe right ankle sprain.	10
Chipped bone in left knee as result of bumping into table in work area.	11
Employee twisted ankle in arising from chair.	11
Sprained muscle in back while lifting sandbags used to secure fragment catcher to top of holddown post.	11
Employee working in clean room rust-stripping, dropped equipment in solution, reached to retrieve equipment, solvent entered glove of left hand; second degree burns of left hand.	12
Mechanic working under diesel engine; strained his back.	12
Employee lost balance getting out of chair, fell forward hitting head and left knee.	13
Employee strained his lower left back while lifting boxes and stacking them.	13
Employee reached for crimping tool, roller on chair slipped in hole in subfloor, cut out for cable entry. Fell out of chair onto tool box with right side; internal injuries.	14

Employee was moving console racks to work on wires when he sustained strain to left groin area.	14
Employee experienced pain in lower back while trying to lift cornbread mixer. Sprained lower spine.	15
Employee incurred right knee injury while performing duties in laboratory.	15
Security patrolman, while crossing street, started to run, slipped on wet road surface; sprained right ankle.	16
Stepped off forklift and tripped on piece of wood; twisted right knee.	16
Walking to office in area undergoing modifications, temporary floor collapsed, employee's right foot fell into hole; pinched nerve in neck.	16
Attempting to lift access door to cable vault by latch handle. It came loose and door fell on employee's foot; fractured toe and lacerated foot.	17
Employee was lifting concrete bench, bench leg fell off; injured left great toe.	18
Employee twisted and bruised knee on scooter brake handle.	19
Injured back when lifting 83-pound pin from track section of crawler transporter.	19
Section of air conditioning duct struck employee on upper part of back. Duct not properly secured.	19
Employee was kneeling on concrete floor for long period while performing routine task; torn ligaments, right knee.	20
Mechanic strained right knee while closing hangar door.	20
Employee walking down in a pit, jerked his head to look when another employee called to him; injured his neck and left shoulder.	22
Employee was cleaning grill; strain of sternum area.	22
Employee was pulling heavy trash; muscle strain in back.	24
Employee struck piece of equipment; injured left knee.	28
Employee walking in cafeteria, slipped and fell on wet floor; fractured left upper arm.	29
Employee was bending over large box to remove heavy equipment; sustained left inguinal hernia.	29
Employee was picking up and moving wall panels; received inguinal hernia.	31
Craftsman lifting motor; strain in lumbar region of back.	32

Employee fell; fractured coccyx.	32
Employee involved in motor vehicle accident; contusion of upper rib/shoulder.	35
Back condition aggravated by lifting food warmer which weighed approximately 20 lbs.	38
Machinist climbing and changing piping lifted 30 to 50 pounds; low back strain.	38
Tripped on rock in parking lot; hurt left ankle.	38
Employee slipped on wet ramp while transporting computer runs to another facility; suffered low back strain.	40
While on TDY trip, employee was involved in automobile accident.	45
Employee working on top of seagoing buoy (in storage yard) testing cable used as hand rail, stanchion gave way, employee fell on deck; aggravated pre-existing knee condition.	46
Janitor injured left thigh while performing duties.	53
Employee bumped against equipment; injured right knee and hip.	56
While installing lift gate on truck, employee inserted hand between truck frame and lift gate. Hand and wrist caught; major compression injury to hand and wrist.	60
Employee was lifting heavy equipment without adequate help; sustained injury to cervical vertebrae.	63
Employee was pulling electrical wire; inguinal hernia.	66
Security patrolman while running across wet lawn in response to alarm, slipped and injured right arm.	73
Employee going to get spatula, slipped on floor; sprained lower part of back.	80
Employee performing maintenance duties; suffered low back strain.	80
Employee was lifting heavy trash; neck strain.	83
Employee was manhandling equipment without adequate help; incurred low back strain.	83
Plumber in performing duties injured lower back.	94
Employee incurred sprained back muscle, neck, and shoulder while performing duties.	120
Employee fell from elevated walkway to floor; fractured heel.	128
Sprained back while changing tire on bus.	143
Storekeeper in redistribution salvage yard injured back while adjusting forks on forklift.	150
Employee injured back while working on millipore bombs.	172

Employee stepped on rotten board 6' above ground, fell. Compound fracture of left ankle.	188
Employee opened door to trailer, gust of wind caught door and pushed him against side of trailer; neck injury.	284
Crew was dispatched to service Halon bottles. One bottle was overfilled, required dumping. Bottle not secured and became jet propelled object. One employee received severe foot injuries.	304