TO THE MARITIME COMMISSION

WASHINGTON, D. C.

INDUSTRIAL HEALTH SURVEY

of the

BATH IRON WORKS CORPORATION

BATH, MAINE

September 22, 1942.

Philip Drinker, Harvard School of Public Health
L.K. Sessions, Lt. Cmdr., (MC) U.S.N.
T.P. Connelly, Lt., (MC) U.S.N.
Kenneth W. Nelson, Ensign H-V(S) U.S.N.R.
Merwick Rose, Ensign H-V(S) U.S.N.R.
L.H. Woodman, Ensign H-V(S) U.S.N.R.

PLAINTIFF'S EXHIBIT 569

GENERAL RECOMMENDATIONS

Dispensary facilities at the yard are inadequate because of crowded quarters. Waiting and treatment rooms are small and not physically capable of handling the volume of work without crowding and unnecessary delay to workmen.

Medical personnel is adequate and no increase is considered necessary.

Additional forms, one authorizing treatment and another for re-dressings and re-visits should be instituted.

A more comprehensive break down of the medical department accident case reports should be made by the safety department. Although the data are available from tables compiled routinely, it is now impossible to estimate the cases of actinic ray ophthalmia (flash burns of the eye). It would not be at all difficult to re-index injuries now so that one could tell how many such cases occur and also to estimate injuries of the feet or head.

Periodic examinations of all workers engaged in occupations potentially hazardous to themselves or others should be conducted.

Anti-flash safety goggles, having No. 2 or No. 2.5 tinted lenses and side shields, should be ordered for immediate distribution to welders and to men working near welding area.

Portable welding screens of opaque, non-inflammable material should be procured and used wherever practicable.

Air line hoods and respirators approved by the U. S. Bureau of Mines should be supplied for spray-painting work.

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No department, including the insurance carrier, now knows what solvents are used in many of the paints and thinners. Some we saw in use are efficient as solvents but should be used only with special precautions. The Safety and Medical departments should know what the men are using and see that proper precautions are taken.

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Turnover, Insurance, and Personnel: Turnover in this yard is about 1% weekly with a working population of about 8500. According to Mr. John Newell, the present shipbuilding schedule needs a total of about 11,800 which they hope to get without having women actually working in the yard.

There is no law in the state of Maine awarding compensation specifically for occupational disease, but compensation insurance against accidents is carried by the American Mutual Liability Insurance Company of Boston. The local representative is Mr. Neil Nelson, whom we met at the Todd-Bath Ironworks, as the same company carries insurance in that yard. As we happen to know the officials of this insurance company, especially the medical and engineering men, we told the Boston office that we felt strongly that both Bath Iron Works and the carrier had been lax in checking up, especially on dust control in asbestos handling and in not knowing the chemical composition of paint thinners and solvents used in the yard.

Having heard the interesting talk of Dr. Fuller, the company physician, at the meetings in Portland on September 19th, we had rather expected to note evidences of unusual trouble from dermatitis among the electricians engaged in handling the I.C. (inter-communication) cables on destroyers outfitting and of metal fume fever from welding galvanized iron. In our opinion, neither problem is serious in this yard as both are well understood. We are fully aware that the use of galvanized iron is required by specifications, but it is obvious that the less of it used, especially on hull plates and on reinforcing members, the less will be the likelihood of exposing welders to heavy

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concentrations of zinc oxide evolved from the galvanized coatings.

The housekeeping and the systematic salvaging of usable metal and scrap metal in this yard was the best we have seen anywhere.

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MEDICAL FACILITIES

The medical facilities of the main yard of the Bath Iron Works consist of a dispensary, a pre-employment examination room, and, at the Harding Plant, of a First Aid Station.

The dispensary contains a small combination waiting room and clerical office, three small treatment rooms, a doctor's office, and an eight bed ward.

The pre-employment examination room is located in the personnel building and consists of a single room and a narrow passageway where eye examinations are conducted.

The first aid station of the Harding Plant is located on the second floor of the prefabrication shop and consists of a waiting room and treatment room.

The buildings housing these activities have been furnished by the company as well as equipment and expendable supplies.

Medical personnel consists of three physicians and nine registered nurses at the main plant and two registered male nurses for the first two shifts with one being procured for the graveyard shift at the Harding Plant.

Dr. E. M. Fuller, Sr. is the plant physician and he, together with Dr. A. Williams, are present at the yard during the day shift, while Dr. E. M. Fuller, Jr. conducts all pre-employment examinations and is responsible for night calls.

The nursing staff is utilized as follows: Five on the day shift, two on the swing shift, and one on the graveyard shift, while one nurse is

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used for relief.

Local medical facilities consist of the Bath Memorial Hospital containing sixty beds. Patients needing hospitalization as well as those needing special examinations such as X-ray and serology, are sent here.

There is no ambulance attached to the yard and private ambulances are used when necessary.

Patients needing transportation to the dispensary are carried on stretchers or are transported by truck.

There is no visiting nurse service.

Records: No form authorizing treatment is required from workmen reporting to the dispensary for treatment.

Upon reporting to the dispensary for treatment, the check number and name of the injured man is taken together with a description of the injury, name of foreman, shop or hull, and time of the accident. This information is recorded on a mimeographed form which is transferred to the Safety Department for completion of a permanent card comprising an individual accident report. Not all cases are recorded on this mimeographed form, however, for it is the practice, in order to speed up treatments, to take flash cases directly to the treatment room ~~for treatment~~ without making any record.

If the case is one which must be seen by a physician outside the yard, a special physician's form is filled out and the patient given a "Pass Out Slip" to leave the yard. Upon completion of treatment by the physician, the lower portion of the physician's form is filled in by the doctor with a notation as to disposition of the case.

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In addition, all doctor cases must have completed a form for the insurance carrier, The American Mutual Liability Insurance Company, and a form for the State Industrial Accident Commission.

Verbal appointments are made for re-treatments and re-visits.

Examinations: About eight to nine Hundred pre-employment examinations are conducted monthly on all prospective employees. This examination includes a general physical as well as serologic examination and urinalysis. The Kinton test is used, done by the State Department of Health Laboratories, and about 8% positives are returned.

In our opinion, it would be well to exclude from IC cable handling men, especially young men, with a tendency to have pimply skins. This is a simple thing to do, and has been found very effective elsewhere. The reasons for so doing can be explained to the men without causing any uneasiness on the part of anyone. It would be well to re-examine occasionally electricians engaged in such cable handling.

New workers are offered typhoid inoculations which can be accepted or refused. About 80% accept inoculations and the intradermal method is used.

Periodic examinations of workers engaged in occupations potentially hazardous to themselves or others are not conducted.

Special examinations, such as X-ray, etc., are conducted at the Bath Memorial Hospital.

Cases: About eight to nine hundred cases are seen weekly. These are new cases and do not include revisits. Accident reports are turned over to the Safety Department daily for statistical purposes. There they are broken down as to shops and cause, but the effects of the accident, i.e., the part of the

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body injured, are not tabulated. We believe that this company, as have most others, would find such information useful.

No record is made of eye injuries due to actinic rays of the welding arc. It is the opinion of the medical personnel, however, that about 12 to 15 cases of actinic ray ophthalmia are treated at the first aid station daily.

A considerable number of metal fume fever cases are seen. This is due to the fact that most of the welding and burning is on galvanized metal.

No cases of lead poisoning have been observed.

Cases of dermatitis are frequently encountered. The main ones are due to Haloxan in I. C. cable handling, and to Fiberglas while few cases are seen from cutting oils and solvents.

Absenteeism: There are no records kept of lost time due to personal illness. Cases who have reported for work and sign off because of illness must be checked out through the dispensary and rechecked upon return. Those calling in and reporting personal illness must also be checked at the dispensary on return to work. Alcoholism and venereal disease are rarely seen and time lost due to these conditions cannot be estimated.

Provisions for Air Raid Dressing Stations: There have been no permanent sections designated as first aid dressing stations in the event of an air raid. The yard has procured thirty first aid pouches which are stored at the dispensary, and these are distributed in time of emergency to thirty men trained in first aid.

The first aid station has not been screened by sandbags or otherwise for protection from splinters and concussion from bombs.

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OF SAFETY AND ACCIDENT PREVENTION

September 10, 1942

PRESENT

H. Adams	C. Farrington abs.	W. McFarland	J. Sylvester
W. Adams	F. Fournier	L. Cole	H. Farrington
P. Brown	J. Gilman abs.	H. McLean abs.	H. Sprague abs.
H. Barker	E. Gaw	B. MacDonald	A. Safstrom
P. Baldwin	W. Hamel	W. Osgood abs.	H. Thomas abs.
W. Carver	A. Harrington abs.	C. Partridge abs.	M. White
J. Conley, Jr. abs.	P. Johnson	C. Perry	F. York
W. Desjardins	T. Kerrigan	M. Perkins	A. Roberts
C. Dorsey abs.	L. Lewis	R. Peabody	H. Sutton
L. Davis	F. Hart	R. Racine	G. McKenzie
J. Emerson	G. Larrabee	M. Raymond	G. Renaud
S. Elwell abs.	L. Lavertu abs.	L. Staples	R. Risteen

The accident detail from September 3 to September 9, 1942, inclusive, was reported as follows:

TOTAL NUMBER OF ACCIDENTS	859
SENT TO THE DOCTOR	40
TREATED AT FIRST AID	819
MEN OUT ON INSURANCE	13
LOST TIME ACCIDENTS	1

SENT TO THE DOCTOR

Shipyard	15	Paint Shop	3	Pipe Cov.	1
Tin Shop	2	Welders	7	Out. Mach.	2
Mach. Shop	1	Copper Shop	1	Pipe Shop	3
Misc.	2	Operating Crew	1	Electric	2

DIVISION OF ACCIDENTS

Mach. Shop	82	Carpenters	22	Out. Mach.	77
Shipyard	207	Elec. Shop	70	Paint Shop	32
Pipe Shop	59	Joiner Shop	4	Weld. Dept.	109
Tin Shop	76	Boilermakers	14	Pipe Cov.	22
Copper Shop	11	Stores	5	Maint.	10
Burners	17	Operating Crew	5	Out. Pipers	8
Misc.	12	Bending Floor	8	Erectors	3
Out. Riggers	1			Rigging Loft	3

NIGHT SHIFT

Shipyard	29	Erectors	1	Paint Shop	4
Mach. Shop	32	Stores	2	Out. Mach.	21
Pipe Shop	9	Bending Floor	2	Burners	1
Tin Shop	26	Boilermakers	3	Maint.	4
Welding	32	Copper Shop	3	Carpenters	4
Electric	12			Pipe Cov.	10

MILLS

196-86	196-84	197-88	196-89	199-78	200-74
201-49	202-33	203-44	204-12	205- 9	206- 2

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The minutes of ...ng were read and approved. Those o... ...e were as follows: Mr. Wheeler will be in Acr.. , Messrs. Caron and Fenderter will be out another week. The following will be out indefinitely: Messrs. Jordan, Labelle, Lidback, Shea, Trask, Wight and Moon.

Mr. Adams told the committee that on hull 200 in the after deep tank, the second rung on a thirty foot ladder was found with holes in it. These would not have been seen by anyone using the ladder. He told them that this was under investigation and urged them to acquaint all employees to be on the lookout for any such condition. He also passed the ladder rung around so that the men could see just what was done.

One of the members suggested that the roof on the south side of the old mold loft be cleared of tin and glass. Mr. Perry will take care of this situation.

Mr. Nelson of the American Mutual Liability Ins. Co. was present and explained to the committee, unofficially, that the big transport that was destroyed by fire was thought to have been caused from a cigarette butt. He urged all employees to be very careful and put their butts out.

Mr. Adams along the same line and referring to a notice posted by the management approximately one week ago, urged the workmen not to leave their jobs in order to smoke. He explained to them that there must be sometime during the day when a man must leave the ship in order to obtain material which should give him time to smoke. He assured them that the management meant business and smoking will be prohibited throughout the plant if this practice is not stopped.

One of the members suggested that something be done to the roads throughout the plant in regards to keeping the dust down. Mr. Adams explained to the committee that the roads around the plant will be oiled in the near future.

Another member suggested that the lights outside the tin shop be turned on or repaired if necessary. This will be referred to Mr. Wallace.

Another member suggested that the cable piled near the planer in the Joiner Shop be moved as it is very inconvenient for the men working in that department when they have to plane boards longer than ten feet. Mr. Adams will investigate this situation.

The Leadingmen #2 will meet on September 17th.
The Foremen will meet on September 24th.

Respectfully submitted,

C. Perry

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BATH IRON WORKS CORPORATION
ACCIDENT RECORD
July 194[illegible]

Department	Hours Worked		Perm. Disa.		Fatal		Total Lost Time Acc.		Days Lost		Frequency		Severity	
	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.
Tank Testers	12074 ½	71296												
Hold Loft	8520 ½	49435												
Erectors	10935	60109												
Small Assembly	38061 ½	221761						3	27	104		13.52	0.70	0.46
Bending Floor	23570	229893						2		35		8.86		0.15
Crewmen	3056 ½	20288 ½												
Plate Shop	26332 ½	131909 ½						8	19	130		61.41	0.72	0.98
Galvanizing	10762 ½	61251					1	2	12	29	92.9[illegible]	32.62	1.11	0.[illegible]
Riveters	34539	175687 ½					1	4	9	51	28.9[illegible]	22.76	0.26	0.17
Drillers & Reamers	17383	126487 ½					1	2	2	142	55.6[illegible]	15.82	0.11	1.12
Chip. Caulk. Grind.	22038	125442 ½					2	6	17	86	95.2[illegible]	47.83	0.77	0.68
Welders	206563 ½	1119090 ½					1	4	37	244	4.8[illegible]	3.58	0.16	0.21
Operating Crew	13544	76870												
Outfitting	4639	33840												
Burners	26048 ½	137958					1	4	22	53	38.3[illegible]	29.08	0.84	0.38
Watchmen	29884 ½	149284												
Layout	25488 ½	121439						1		19		8.23		0.15
Fitters	169181	1018008 ½					3	14	65	382	17.73	13.75	0.3[illegible]	0.37
Perm[illegible] Safety Arrgmn.	7241	37696												
Salvage	2396	2396												
Total	1184962 ½	9917303					18	92	414	2227	9.5[illegible]	9.37	0.21	0.22

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July 1942

Department	Hours Worked		Perm. Disa.		Fatal		Total Lost Time Acc.		Days Lost		Frequency		Severity	
	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.
Office	12756	239033												
Draftsmen	17074	96373												
Machine Shop	81768	807885					1	3	19	40	12.02	3.70	0.25	0.04
Stores	39500	229658						1	27	81		4.40	0.68	0.35
Out. Machinists	104345	493460						6	10	160		12.19	0.09	0.32
Machine Fipers	23222	109198					1	1	16	16	43.10	9.15	0.68	0.14
Pipe Coverers	45679	190878												
Engineer Riggers	14714	69238						2		16		28.90		0.23
Copper Shop	14201	69297						3		21		43.29		0.30
Boilermakers	45331	229010					1	3	4	23	22.07	13.10	0.08	0.10
Pipe Shop	157473	710901					2	4	18	137	12.69	5.62	0.11	0.19
Bricklayers	5041	22617												
Tin Shop	132966	668573					1	5		100	7.51	7.47		0.14
Production	18892	77665												
Electric Shop	148177	630773					2	4	13	61	13.49	6.34	0.08	0.09
Maintenance	64226	378090						1	27	44		2.61	0.42	0.11
Pattern Shop	919	9263												
Joiner Shop	13299	63593												
Counters	24242	119790						1		19		8.34		0.15
Carpenter Shop	47836	252659						2		67		7.91		0.26
Straighteners	16735	30713												
Paint Shop	83478	377915						6	70	167		15.87	0.83	4.41
Rigging Loft	6438	31560												

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ANNUAL ACCIDENT DETAIL REPORT JANUARY 1942

	1934	1935	1936	1937	1938	1939	1940	1941
Av'g. No. Men	687	715	1192	1649	1878	2318	2785	4815
Total Hrs. Tr.	1127881	1213771	2480619	3400775	3639255	4390345	6023019	11053595
Total Accidents	1488	1608	1855	1455	1031	4708	11184	20185
To First Aid	1237	1441	1505	878	639	4067	10411	18451
To Doctor	201	167	350	577	392	641	773	1734
No. Lost Time	12	7	43	84	90	150	149	214
No. Days Lost	251	114	713	1476	1454	2296	2110	2507
Loss of Limbs	0	0	0	0	0	0	0	0
Loss of Eyes	0	0	0	0	0	4	0	0
Perm. Disability	0	0	2	0	0	0	0	0
Part. Disability	0	0	1	0	0	6	0	1
Burning	0	0	0	8	3	5	7	12

The Percentage Hours Lost to Hours Worked

1930	1.01 %
1931	.905
1932	.638
1933	.147
1934	.110
1935	.048
1936	.200
1937	.347
1938	.320
1939	.418
1940	.280
1941	.162

Frequency
1934 - 10.19
1935 - 5.74
1936 - 17.33
1937 - 24.70
1938 - 24.73
1939 - 34.18
1940 - 24.73
1941 - 19.36

Severity
1934 - .21
1935 - .09
1936 - 5.12
1937 - .43
1938 - .39
1939 - 2.18
1940 - .34
1941 - .22

H. L. Adams
Supervisor of Safety

S1816-3

Industrial Health Survey of the Bath Iron Works Corporation for the Maritime Commission (1942)
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Date	10 PM		11 PM		12 PM		13 PM		14 PM		15 PM		16 PM	
	DAY	M	DAY	M	DAY	M	DAY	M	DAY	M	DAY	M	DAY	M
Janitor														
Building Floor														
Boilermakers														
Burners														
Carpenters														
Copper Shop														
Electric														
Erectors														
Galvanizing														
Liner Shop														
Machine Shop														
Machinist, Out														
Maintainence														
Miscellaneous														
Mold Loft														
Operating Cr.														
Paint Shop														
Pattern Shop														
Pipe Shop														
Pipe Coverers														
Pipers, Out.														
Plate Shop														
Rigging Loft														
Riggers Out.														
Shipyard														
Stores														
Tin Shop														
Welding														
DAILY TOTALS	3	3	4	1	3		1		4		1		1	
Non-MECH. TOTAL														
Welding														
Building Floor														
Boilermakers														
Burners														
Carpenters														
Copper Shop														
Electric														
Erectors														
Galvanizing														
Liner Shop														
Machine Shop														
Machinist, Out.														
Maintainence														
Miscellaneous														
Mold Loft														
Operating Cr.														
Paint Shop														
Pattern Shop														
Pipe Shop														
Pipe Coverers														
Pipers, Out.														
Plate Shop														
Rigging Loft														
Riggers, Out.														
Shipyard														
Stores														
Tin Shop														
DAILY TOTAL	47	19	44	13	98	18	30	8	46	17	47	23	47	
GRAND TOTAL	69	44	90	31	110	31	76	8	99	38	105	31	103	

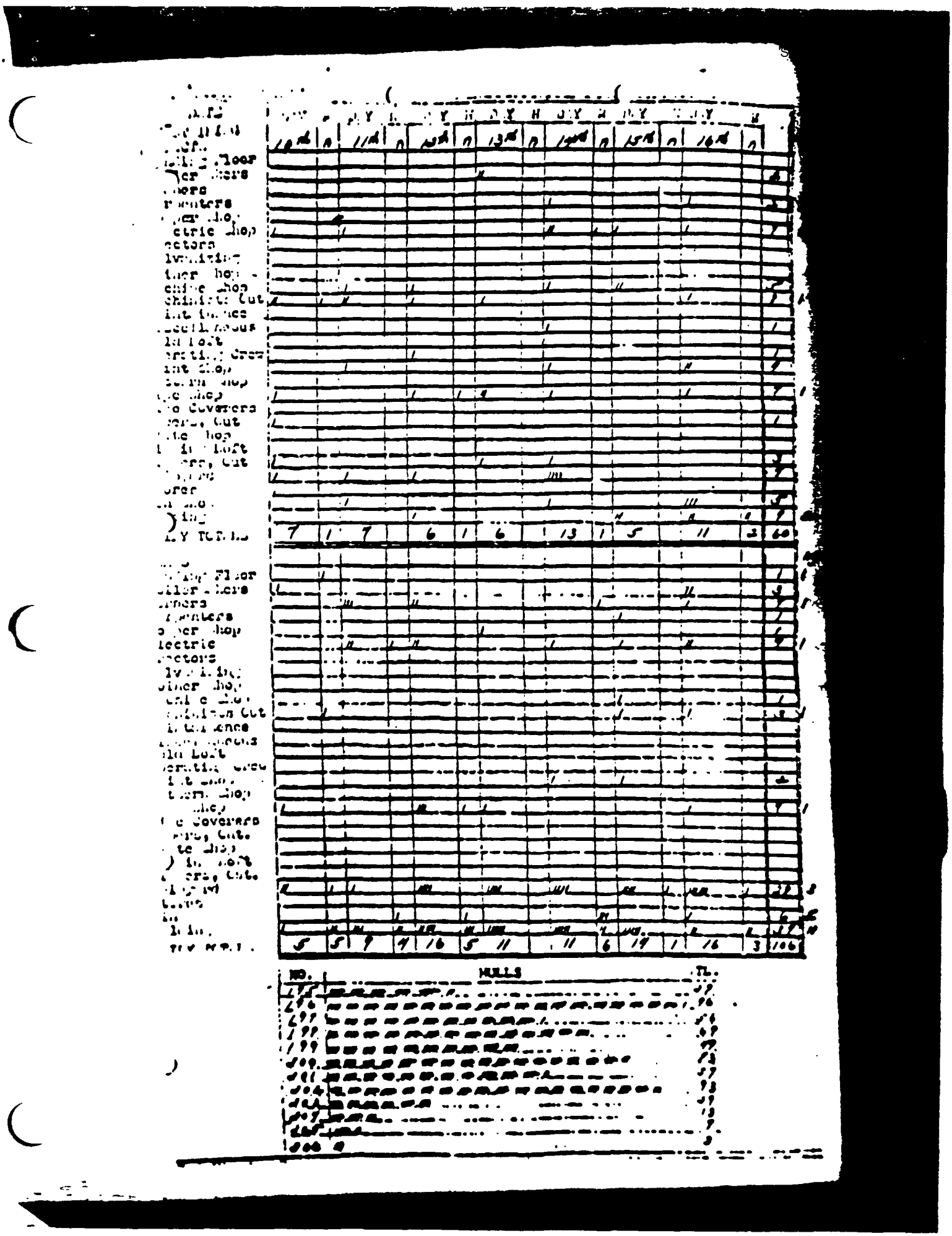
WEEKLY SUMMARY TOTALS

FIRST AID 139

TO DOCTOR 12

LOST TIME 0

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BATH IRON WORKS CORPORATION
ACCIDENT RECORD

July 1942

Department	Hours Worked		Perm. Disa.		Fatal		Total Lost Time Acc.		Days Lost		Frequency		Severity	
	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.
Tank Testers	12074 ½	71296												
Hold Loft	8520 ½	49435												
Erectors	10935	60109												
Small Assembly	38061 ½	221761						3	27	104		13.52	0.79	0.46
Bending Floor	23570	223893						2		35		8.86		0.15
Crossmen	3054 ½	20288 ½												
Plate Shop	26332 ½	131509 ½						8	19	130		61.41	0.72	0.98
Galvanizing	10762 ½	61251					1	2	12	29	92.9[illegible]	32.62	1.11	0.45
Riveters	34539	175687 ½					1	4	9	51	28.9[illegible]	22.76	0.26	0.89
Drillers & Reamers	17383	126487 ½					1	2	2	142	55.6[illegible]	15.82	0.11	1.12
Chip. Caulk. Grind.	22038	125442 ½					2	6	17	86	95.2[illegible]	47.83	0.77	0.48
Welders	206563 ½	1115090 ½					1	4	37	244	4.8[illegible]	3.58	0.16	0.21
Operating Crew	13544	76870							—	—				
Outfitting	4639	33840												
Burners	26048 ½	137958					1	4	22	53	38.3[illegible]	29.08	0.84	0.38
Watchmen	29884 ½	149284												
Layout	25488 ½	121439						1		19		8.23		0.15
Fitters	169181	1018008 ½					3	14	65	382	17.73	13.75	0.36	0.37
Perm' Safety Appren.	7241	37656							—					
Salvage	2396	2396							—	—		—		
Total	1184962 ½	9917303					18	92	414	2227	9.56	9.37	0.21	0.38

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Form No. 7-4

PASS OUT SLIP
BATH IRON WORKS CORP.

Badge No._____ Dept._____ Shift_____ Date_____ 19____

Employee _____

TO GUARD AT_____ GATE:

Please PASS OUT abovementioned employee at_____ A. M. / P. M. for the reason checked below:

Returned_____ A. M. / P. M.

☐ Sickness. (If ☐ Flashes / ☐ Galvanizing } Signature of First Aid Dept. MUST appear below.)

☐ Death or Illness in Family.

☐ Personal Business.

☐ Weather.

☐ _____

FOR USE OF FIRST AID DEPT. ONLY

☐ Yard injury—shift credit allowed

☐ Non-occupational—shift credit not allowed

_____
First Aid Dept.

_____
Foreman

☞This notice MUST be accompanied by Employee's Time Card.☜

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FOREMAN..... 8-9

No.....

Issued at.....A. M. / P. M.....19.....

to DR. E. MOTLEY FULLER

Mr.....Clock No.....

was injured at.....A. M. / P. M.....19.....

Extent of injury.....

.....

.....

.....

BATH IRON WORKS CORP.

Per:.....

.....

EMPLOYEE'S RELEASE

This slip must be returned to Bath Iron Works Corp. First Aid Department before employee can resume work.

Name..... No.....

Is able to return to work on.....19.....

at.....A. M. / P. M.

Remarks: .....

.....

.....

Date..... .....M. D.

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Water Supply: The municipal water supply is furnished to the yard. No secondary supply for fire-fighting is cross-connected with the municipal supply so no health hazard is involved.

Sewerage: All sewage from the yard is disposed of by discharge, directly into the ocean. The city of Bath uses this system and the yard merely follows suit. Adequate toilet facilities, conveniently located, are provided.

Cafeteria: The yard has one central and several smaller canteens. The outlying canteens are stocked from the central one where the cooking is done. All food and drinks are served in paper containers, and therefore no dishwashing is involved. The major defect noted was the number of flies in the canteens. Better control by fans at the doorways and by fly papers is needed.

Housing: A housing shortage exists but the general feeling is that it would be undesirable to attempt to house all of the workers in Bath, for it would create an overexpanded city when the war is over. Instead, methods to facilitate transportation from neighboring towns and cities are being devised.

Mosquito Control: No mosquito control program, for health reasons, is necessary this far north.

Garbage and Rubbish Disposal: The yard has its own incinerator for rubbish while garbage is collected and hauled away by an outside contractor. The general housekeeping on the ships and in the yard was very good. Salvage procedures were observed which were also excellent.

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VENTILATION

The ventilation department is under the direction of Mr. J. W. Lesier, who is responsible to the welding department. The ventilation crew consists of fifteen men, twelve of whom are on the day shift, and the other three on the swing shift. The yard maintains a very small swing and graveyard shift, and this division of ventilation men is entirely in order.

Equipment of the department is as follows:

60 Buffalo Forge, adaptable for use with four 8" flexible hoses.

8 Ilg blowers (4 H.P.)

24 Coppus blowers

2 General Blowers (General Blower Company.) (1400 c.f.m. each)

1 Buffalo Forge Blower (3000 c.f.m.)

In addition to the above equipment, the company has on order twenty of General Blower Company, 1400 c.f.m., exhaust fans.

Ventilation practices at this yard are represented almost entirely by local exhaust, with general ventilation, or ventilation by dilution, virtually absent. In view of the difficult problem which the ventilation of hulls using galvanized steel presents, ventilation aboard ships under construction is relatively good. However, general ventilation is definitely needed, and the ventilation department here should provide itself with flexible eight inch canvas ductwork for that purpose.

The dispensary reports that a large number of metal fume (zinc fume) fever cases are uncovered during the course of construction of a destroyer, and the reason for it can be traced back to the ventilation. Zinc fumes in low enough concentrations will not produce ill effects on the workers exposed, and it is the job of the ventilation department to see that this low concen-

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tration is attained and maintained. The department is to be complimented on the manner in which it has trained the welders in the use of flexible metal exhaust hoses - it is noticeable everywhere that the welders are entirely familiar with the proper method of using local exhaust lines, and are conscientious in using them. However, while standards of local exhaust ventilation should not be lowered, general ventilation by the introduction of fresh air into the hulls should be practiced in conjunction with the local exhaust. If general ventilation were used as successfully as is the local exhaust at this yard, conditions would be exemplary.

We noticed one undesirable feature with the permanent exhaust duct which parallels the ship on the ways. The exhaust fan which is used with this ventilation set-up is not powerful enough to maintain proper airflows through the local exhaust lines into the ships. As a result, these lines do not draw properly, and welders who use them are subjected to an unnecessarily high concentration of zinc fume. This condition should be improved either through the installation of a larger fan or through proper balancing of the present system.

When the destroyers in this yard reach a point of construction at which the ship's ventilation system can be operated, the ship's fans are started and conditions kept clean in this manner. Since this cannot be done until the ships reach the outfitting docks, however, it cannot be counted upon to assist in ventilation of the ships during assembly.

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Pipe Covering Shop: The former mold loft now houses the pipe covering department, and part of the sheet metal shop. Each occupies about half of the long room, and no partition exists between the two. The work involved in the making of asbestos covers for the pipes on board the ships includes the cutting and pounding of asbestos matting into the desired shapes. It also requires the cutting of hard wedge-shaped pieces of asbestos by means of a bandsaw. All of these processes result in the spreading of asbestos dust and fibers throughout the shop. A homemade exhaust system has been installed for the bandsaw cutter, but it had practically no effect as dust spread in all directions. The conditions in this shop present a very real asbestosis hazard and immediate steps should be taken to segregate the most dusty processes into a well ventilated area. Local exhaust systems of proper design should be installed; however, if conditions can not be completely controlled in this manner, then suitable dust respirators should be worn by the workers. Periodic physical examinations of the chests of all workers should be made. Every six months is a reasonable interval.

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HARDING PLANT

Because further expansion within the yard was difficult, the company has built a pre-fabrication plant a short distance outside of the town of Bath. In this plant considerable flat welding is done, mold loft activities are carried on, all galvanizing is done, and some of the lighter sections, such as the fore-peak, are pre-fabricated.

The shed is large and is ventilated naturally by roof ventilators. Fumes from the acid and zinc tanks are not noticeable except to a slight degree during the dipping process, and are quickly dispersed. Adequate care is observed in dipping the metal parts into the zinc bath, and workmen are protected by screens behind which the dipping crane is controlled.

The welding slabs within the plant are not equipped with welding arc shields, and as a result men working on and near the slabs are constantly in danger of actinic ray ophthalmia. Some of these men so exposed wear anti-flash goggles, but the practice is not universal. We recommend that every man on the welding floor be equipped with anti-flash goggles, and use of the goggles made mandatory. We further recommend that the shop be equipped with welding screens, designed to be light and easily portable so the workmen will make the most efficient use of them.

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Bulb Coating Process: One corner of the second floor of the paint shop is being used for the bulb coating procedure. By applying a mixture of denatured alcohol, and two other substances known only as Dolph's Glasote varnish No. 253, and Dolph's Thinner, No. 2064, the bulbs can be made more resistant to breakage and shattering. The exact constituents of these products could not be determined, but the odor was irritating to eyes, nose, and throat according to the men working with them. A paint remover known as "Clearvap" is used to remove the paint from old bulbs being returned for reconditioning, and it is suspected that this contains carbontetrachloride, although definite information was not available.

No attempt was made to ventilate the bulb coating process and it is recommended that an exhaust hood of proper design be installed at once to correct the conditions. The hood should be large enough so that all related processes, such as the paint removal from the bulbs, can be carried out completely beneath the hood.

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Welding: Eye flashes due to exposure to welding arcs are not recorded as injuries, thus no exact figures are available. Nurses' estimates, however, place the number of actinic ray ophthalmia cases as between three and four hundred per month.

The safety department made no complaints about goggle shortages. Investigation of the supply of goggles and of the safety department's policy disclosed that no goggles are ordered or issued specifically for the prevention of eye flashes. None of the goggles on hand is suitable for the purpose, being designed for burners, shippers, and the like. Some tinted safety glasses, without side shields, are issued only on request of the safety department for men working in bright light or sun glare.

Screening of welding operations in the shops is generally good. Permanent booths have been set up for piece work to protect adjacent workmen in the shop. In the assembly shops and on board ship, no attempts are made to use portable welding screens.

Spray-Painting: The use of zinc chromate primer on Navy vessels eliminates the danger of lead poisoning. Protection is necessary, however, from solvent vapors and from the nuisance mists that are produced.

The paint department has seven DeVilbiss hoods for use when spraying must be done in confined areas. Twenty more hoods are on order. Under ordinary conditions, American Optical Company "Dustproof" respirators are worn. The respirators are of the simple filter type, not approved by the U. S. Bureau of Mines and not designed to prevent inhalation of organic solvent vapors. Each man is responsible for the care of his own.

In connection with spray painting we were informed that air-line hoods

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could not be used during the winter months because of the alcohol vapors in the compressed air lines. On visiting the compressor unit, it was found that ethyl alcohol denatured with methyl alcohol is put into the air lines during cold weather to clear out moisture that may freeze and cause stoppages. No means is provided for drying the air prior to compression, and the air is often used so rapidly that it leaves the compressed air storage tank warm and with a high moisture content. Ordinarily most of the water vapor condenses out as the air cools in the tank.

If the compressed air can not be dried by the usual means, we suggest that it be handled by small rotary multistage units working at pressures of 5 to 10 pounds. This is not unusual practice and is perfectly satisfactory to the wearers of air masks. The disadvantage to the company is that the usual small bore air hose has too much resistance to air flow at these low pressures and will have to be changed to hose of at least one-half inch inside diameter.

A paint remover is used to clean spray guns and for general cleaning which contains "10 to 90%" benzene. Benzene is highly toxic as well as inflammable and care should be observed in its use.

We were informed by the superintendent that the use of the "Bulldog" benzene remover had been prohibited aboard ship due to its inflammable and explosive properties. As a substitute, a commercial preparation know as "Clear-Vue" is used for all paint cleaning work.

Large quantities of carbon tetrachloride are stored in the paint shop, but the compound is not now used by the paint department. Small amounts are used by the electrical department for cleaning insulators in coaxial antennae, and larger amounts are used in cleaning completed switchboards on board ship. The first case presents no health problem, but the latter practice presents the possibility of inhalation of sufficient carbon tetrachloride

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vapor to cause serious illness or death. Fatalities from carbon tetrachloride poisoning are known to have occurred in the ship-building industry.

Admitting the difficulty of getting the solvents one wants today, it is urged strongly that the Safety and Medical Departments be responsible to the Purchasing Departments for the toxicity and chemical composition of solvents used in paints and as paint removers. We found indisputable evidence that toxic materials were in considerable use without the knowledge of either of these departments. If they must be used - and we admit that circumstances often require it - better safety precautions should be enforced. We urge strongly that the company require of vendors of such solvents that the chemical names and approximate compositions be given. It will not be necessary to divulge patented or trade secrets.

Fiberglas: Batts of Fiberglas are applied to the side bulkheads of the Navy ships and around the ventilation ducts. Delfinite No. 1873, containing carbon tetrachloride, was formerly used as the cement for keeping the Fiberglas in place, but the use of 1873 aboard ship has been stopped and non-toxic Delfinite preparations have been substituted. Some of the 1873 is being used in the Pipe-Covering Shop, but only occasionally to seal up a tear or fill a gap in the insulation. The putty-like quality of No. 1873 makes it useful for that purpose.

No serious trouble has been experienced from Fiberglas dermatitis. After a week of exposure, the men suffer no discomfort from the particles of fiber. Those who fail to become immune are transferred to other work.

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Protective Equipment: A variety of respirators including Willson "Duritc" No. 66, Willson chemical cartridge Numbers 41 and 42 are kept in the tool room and issued as tools. Respirators are repaired, cleaned, and sterilized when turned in.

An ample supply of several types of goggles, except anti-flash goggles as already mentioned, is on hand. A repair service is maintained, and workmen may obtain lenses ground to their prescription at cost.

The safety store is operated by the company and sells goggles, safety shoes, welders helmets, and other equipment at cost.

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