

Wright Aeronautical Corporation
Dr. John R. Meek



Reorder No. 1112-1/3

PARK BRAND FOLDER
HEAVY WEIGHT

Inspection at Wright Aeronautical Plant, Lockland, Ohio, 9-8-44

Observations

Through the courtesy of Dr. Meek the valve houses and sumps over the tanks where gasoline is stored were visited in the company of Mr. Davidson.

The tanks are apparently used for the storage of 100, 91 and 62 octane gasoline, "Varsol," which is the trade-name of "a low grade petroleum naphtha," and "28 R," an "experimental fluid" of which they had "3 tanks full," but have none at present.

The odor of gasoline was evident in the north valve-house, and rather strong in the pit beneath the operating area. There were visible leaks in the piping in the area. Mr. C. Roby demonstrated one way the attendants get further exposure to gasoline fumes. Occasionally a disc in the pipe leading from the filling stand-pipe to the tank needs changing. This is accomplished by attaching a long rubber hose to the drain-pipe leading from the stand-pipe, and leading the hose to a pillar. There is a crack in the flooring around this pillar through which gasoline can flow, but which is not large enough to allow the nozzle of the hose to be inserted in it. When the drain was opened, 5-10 gallons of gasoline flowed through the hose, a considerable amount spilling on the floor at the entry and the exit from hose. I was informed that to empty the stand-pipe about 75 gallons of gas are so discarded. The floor in the region of the drainage crack was then washed with water. There is no forced ventilation to this pit.

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The corresponding part of the pit to the south valve-house is outside the building, in a shallow sump, access to which is obtained through metal covers that were so designed that they need to be removed to allow men to work comfortably in the sump and get sufficient light to see by. When these covers are removed, a relatively free interchange between the ambient and pit air can take place by natural ventilation.

The most apparent hazards is in neither of these areas, but in the pits over the storage tanks. The storage tanks are on the north and south of each valve-house, and are about 48 in number. The top of each tank forms the floor of a concrete chamber about 6x8x6 feet. Entry into this chamber is through a man-hole about 3 feet in diameter at the center of the top. The man-hole cover is of light wood and does not seal the opening tightly.

These pits allow access to the pipes and valves leading to the storage tanks. About six or eight of these pits were inspected, chosen at random. In all the odor of gasoline was strong - Roby and Albright both stated that fifteen minutes was the longest a man could tolerate working in these pits without developing dizziness and weakness. Albright stated that Roby was once overcome working in a pit, and had to be pulled out. Roby confirmed this story. Mr. Walker of the Safety Department stated he had not heard of it.

The men enter these pits (daily, according to Albright and Roby) to repair minor leaks. Their routine procedure is to uncover the man-holes to "allow natural

ventilation to get rid of the fumes" and then enter the pits. Usually there are two men there, so one of the men watches while the other does the repairing. No masks or safety belts are worn.

I spoke to Mr. Walker about this. He stated that major leaks are repaired by a special crew, with the man doing the work wearing an air-line mask, with air supplied by a manually operated Mine Safety Appliances Company pump.

The men use steel wrenches. Mr. Walker stated that a year ago copper wrenches were unobtainable.

Mr. Walker also stated that air sampling had been done at intervals with an explosion meter. I did not learn the frequency of the sampling and the results found.

Discussion

In the design of the pits above the tanks precautions against explosion and death from the fumes does not appear to have been considered. The evidence for this is the following:

- (1) The pits do not appear essential to proper tank operation.
- (2) Natural ventilation will not effectively clear a sump of vapors heavier than air.
- (3) The "aqua" system, being always under pressure, apparently uniformly allows the escape of gasoline into these areas.
- (4) The vapor pressure of gasoline is such that explosive concentrations (1.4%) are easily reached when free gasoline is lying in the sump.

- (5) The pits are entered under the most dangerous conditions; i.e., when there is an obvious leak.

The information available to us does not agree as to the usual practice in entering these pits. If the men are to be believed, they uniformly enter the pits when the concentration is such that it makes them dizzy in 15 minutes. (Possibly 0.3% can do this.) If this is the case, they apparently violate established safety practices.

It would appear to be relatively simple and cheap to design precautions such that the sumps can be quickly rendered free of dangerous concentrations of vapors even in the presence of small leaks, so that men can work in the pits without the use of air-line masks.

Conclusions

The sumps above the gasoline storage tanks are dangerous to life through explosion or narcosis because of the potential and actual occurrence of high vapor concentrations of gasoline.

The present design of safety precautions is inadequate both in theory and practice to control this hazard.

From a standpoint of the explosion and toxicological hazard, the best method of control would be to lower the ground level to the top of the tanks and demolish the concrete cells on top of the tanks.

It would be relatively simple and cheap to establish a procedure in cleaning out the sumps before entry that would be theoretically and practically safe except

in the presence of large leaks.

The problem as to whether the men are at present suffering from chronic gasoline intoxication is an open one. The first step in such an investigation would be weighing the men and determining if they have uniformly lost weight since their exposure began. This should be controlled by weighing another group of men of comparable age, background of industrial, social and economic experience, and time with the company, but with no significant exposure to gasoline. It would be of interest to us to have this first step taken. It does not appear absolutely essential to take this step to properly discharge the company's responsibility for the health of the workmen. This decision is left up to the company physicians.

We would appreciate all recorded information on the gasoline concentrations in the air as determined by the safety department.

Submitted by:

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Approved by:

September 12, 1944

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