

ETHYL CORPORATION

100 PARK AVENUE BUILDING AT 41st STREET

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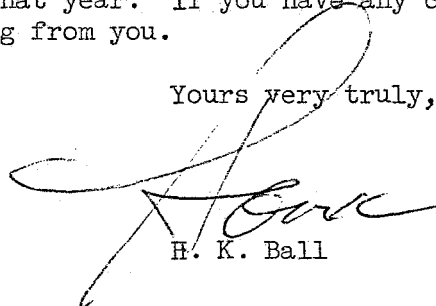
Dr. K. V. Kitzmiller
The Kettering Laboratory
Eden and Bethesda Avenues
Cincinnati 19, Ohio

Dear Karl:

Subject: Japanese Tank Cleaning Accident

We have just received a supposedly authentic report on the tank cleaning accident which occurred in Japan in 1958. It will be noted that the actual fatalities occurred between August 27 and September 2 of that year. If you have any comments, we would appreciate hearing from you.

Yours very truly,



H. K. Ball

HKB:vb
Attachment

CC: Dr. L. W. Sanders
Mr. J. J. Frey
Mr. A. J. Baldwin

Accident Caused by Lead-Hazard at Tank Cleaning

Introduction: This paper is to report on an accident caused by lead-hazard in Japan in 1958. This report has been made by summarizing an article which appeared in a magazine issued recently by an oil refinery in Japan. In the article an expert of lead-hazard and safety told the refinery's safety and TEL blending personnels about the accident as his personal comment. Due to the restriction placed by the U. S. Forces in Japan the expert could not check-up the accident officially while he could observe personally. Accordingly it must be noted by the readers that no one is responsible for the contents of this paper, though it is believable that the expert was only and one of the most reliable reporters of this accident.

occurred

in Koshiba near Yokohama

2. Date: 1958
3. Cleaning Personnel: Cleaning of the tanks was subcontracted by a Japanese tank cleaning company by order of the U. S. Forces under supervision of the U. S. Forces personnel.
4. Tanks: Under-ground aviation gasoline tanks, originally constructed by the Japanese Navy, which have been owned by U. S. Forces in Japan after the war. Number and capacity of the tanks are unknown but they are estimated approximately at 12 and 30,000 tons, respectively. On top of the tank there was a manhole in the center, which was the only entrance to the tank. Over the manhole a winch was installed by which sludge was carried out. Besides the manhole, ventilation hole was attached to the tank and pipelines through the tunnel beneath the tank.
5. Safety Equipments: According to the contract prior to the cleaning, the safety equipments such as rubber boots, rubber gloves, safety helmets, air-masks, coverall, etc. were furnished by the sub-contractor, while life-jackets were furnished by the orderer regarding the working condition.
6. Cleaning Procedure: After draining the gasoline, they filled the tank with water. A rafter made of empty drums floating on the water was used as platform on which the workers could wash the tank from top to bottom while water was drained.
7. Working Hours: Morning 8.30 - 12.00
(break for lunch 12.00 - 1.00)
Afternoon 1.00 - 4.30

During the working hours the tank crew stayed without taking any break-off to rest or to inspect clothing except at lunch. As it was summer the temperature outside the tank was 95°F the highest, while inside the tank was a little cooler.

8. How the Cleaning Went on: Tank cleaning was started in the first part of February 1958 and six tanks were cleaned by the middle of July 1958. The 7th tank was being cleaned between July 20th and August 26th. At the last part of cleaning of this 7th tank some people were beginning to complain of headache and sleeplessness, who were not able to continue to work. From this result, the director of the subcontractor was obliged to hire day-laborers temporarily who were not accustomed to cleaning leaded gasoline tank. In the meantime, the following number of the victims were dead:

August 27th	4
" 28th	2
" 30th	1
September 2nd	1
Total	8

The victim dead on September 2nd was the director of the subcontractor himself. This was reported to the public by some Japanese newspapers, which finally called the people's attention to the accident.

9. Factors to the Cause of the Accident: Some factors which were presumed as the causes of the accident are as follows:
- 1) Insufficient inspection of the safety equipments.
As the tank crew wore overall made of absorbent material, cotton, his skin was almost free to touch contaminated water which came down from the ceiling and wall. He should have worn water-proof clothing. Upon checking-up made after the accident, some of the safety equipments were found useless from damage. For example, 2/3 of rubber gloves were found broken, while 3 rubber boots out of 30 were broken. Due to neglecting daily inspection, complete equipments at the beginning of the cleaning were damaged while using.
 - 2) Severe working condition.
As there was no break-off to rest in the working hours of 3.30 each in the morning and afternoon, the tank crews in the tank sometime took their gloves and masks off to mop sweat.
 - 3) Insufficient knowledge of lead-hazard.
The cleaning procedure manual published in the U. S. was translated into Japanese and was given to the subcontractor by the orderer, in which there was no instruction suitable to this type of cleaning.
 - 4) The supervisor measured only concentration of gasoline vapor in the tank everyday at the beginning of cleaning. And he even advised the tank crews not to use masks when he measured little concentration of gas vapor in the tank.
10. Why Lead-Hazard appeared at 7th Tank's Cleaning:
By quantitative analysis of sludge the biggest quantity of lead was found in the sludge obtained from the 7th tank among all the tanks. It is presumed that in this 7th tank the gasoline specially contained TEL which exceeded the limit of regular dosage for some reasons. If not, however, it can easily be speculated that lead deposited, which had been introduced into worker's body through his skin and mouth during the last few months, had accumulated and lastly exceeded the limit by the period of cleaning the 7th tank.