



F.R. Note No. 317/1957

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND FIRE SERVICES' COMMITTEE
JOINT FIRE RESEARCH ORGANIZATION

This report has not been published and should be considered as confidential advance information. No reference should be made to it in any publication without the written consent of the Director, Fire Research Station, Boreham Wood, Herts. (Telephone: ELStree 1341 and 1797).

FIRE AT REMBRANDT PHOTOGRAVURE LTD., WATFORD

by

J. H. McGuire

Summary

A visit has been made to the scene of a fire which occurred as a gallon can was being filled with solvent from a tapped 50 gallon drum. It is suggested that the cause was probably associated with static charge previously generated on the operator when he was working near a printing machine.

June, 1957.

F.1015/6/9

Fire Research Station,
Boreham Wood,
Herts.

FIRE AT REMBRANDT PHOTOGRAVURE LTD., WATFORD

by

J. H. McGuire

Introduction

It was stated that just after midnight on the night of the 24-25th April 1957 a solvent ink mixture flowing from the tap of a 50 gallon drum, into a gallon can, ignited. The operator suffered burns on his left hand and other employees failed to extinguish the fire. They did not realize that the tap had been left on. The fire thus developed rapidly and substantial damage resulted. The scope of this note is almost entirely confined to the cause of the fire.

Incidents leading to the fire

A visit was made to the scene of a fire some days after the incident. The operator concerned stated that just prior to the fire he was tending a printing machine involving the rolling of paper and decided that a further supply of solvent was required. He therefore picked up a gallon can, walked about 10 ft to a 50 gallon drum and placed the can beneath the tap of the drum. After turning on the tap the operator turned his head towards the machine to ensure that everything was in order and at the same time proceeded to rinse his hands in the can. His first intimation of fire was when he realized that the solvent on his hands was aflame.

The drum had probably been filled from a solvent extractor plant during the day and, after standing for some hours in a store, had been pulled on a metal trolley to the site where the fire occurred. The solvent was based on a mixture of xylol and toluene.

Cause of the fire

The nature of the start of the fire indicates that the igniting source was near to the gallon can and the operator's hands. It had been suggested that the fire might have been initiated by a friction spark between the concrete floor and one of two exposed nails which held the operator's rubber heel to his shoe. Such a cause is unlikely because:-

- a) the fire occurred within about three seconds after turning on the tap and it is unlikely that a flammable atmosphere would have developed in this time around the region of the operator's heels:
- b) it is improbable that the operator's actions at this time would have given rise to such a friction spark.

It is probable that the cause of the fire was a discharge of static electricity between the can and the operator, originating as follows:- Whilst tending the printing machine the operator was obliged to stand for some time on a concrete floor within about two feet of a continuously changing area of paper about 3 ft wide extending from about knee level to well above his head. The atmosphere was said to be particularly dry and the paper was of a type which was known to generate high levels of static. The operator was therefore probably charged to an unusual degree either by a corona or by an induction process. He is presumed to have shared his charge with the gallon can which was of metal with a metal handle and thus, when he left it underneath the tap of the drum, the can was at a high potential. By grasping the tap of the drum, both of which were of metal and were electrically connected, the operator shared his charge with the drum. The latter probably had a higher electrical capacity to earth than did the operator and hence the potential of the operator was reduced to a relatively low value.

The flooring that was involved throughout was of concrete which would have a sufficiently high resistivity as to play no part in the incidents subsequent to the operator's picking up the gallon can.

The resulting conditions were that the can was at a high potential and the operator at a low potential and the solvent flowing into the can was probably ignited by a spark discharge between the operator's hand and the can.

Recommendations and discussion

With regard to eliminating the cause of the fire, consideration must be given to the economic and safety aspects as well as to the technical. The injury which the operator suffered was not serious, although hospital treatment was necessary, and no similar incident has, it is said, occurred at the works so far as is remembered (at least six years). The works manager therefore feels that steps to eliminate static, such as the installation of electric or radioactive static eliminators, are not warranted.

The works manager has however decided to change the taps on the barrels to a type which is only "on" when pressed.

The Hertfordshire Fire Prevention Officer has recommended that the barrels be contained within a bunded fire resistant enclosure.

The adoption of the above recommendations would very greatly reduce the probability of the spread of fire.