

# RECONSTRUCTION OF A BATHROOM FIRE

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## INTRODUCTION

One never considers a bathroom to be a fire hazard. In fact they are considered to be safe places from fire point of view. This is basically because of low load of combustible materials, availability of water and the resident moisture. The present day bathrooms however, can be quite prone to fires mainly because of electrical appliances used therein. These appliances may include geyser, washing machine, massager, shower/suna stalls etc.

On the other hand once started a bathroom fire may prove to be difficult to extinguish as bathrooms have very few openings and to fight such a fire successfully one has to enter it. Also a bathroom fire can lead to a major incident since the modern architecture advocates bathrooms attached to bedrooms which contain the major fire load of a dwelling.

The present communication deals with one such fire incident at the authors own residence.

## BACKGROUND TO THE FIRE INCIDENT

A fire incident took place in a contemporary urban bathroom. The building where the fire occurred was a double storey, four apartment block. Each block comprising two bed rooms, a bath, WC, kitchen and drawing/dining area. All the apartments in the block were of identical design (Figure 1).

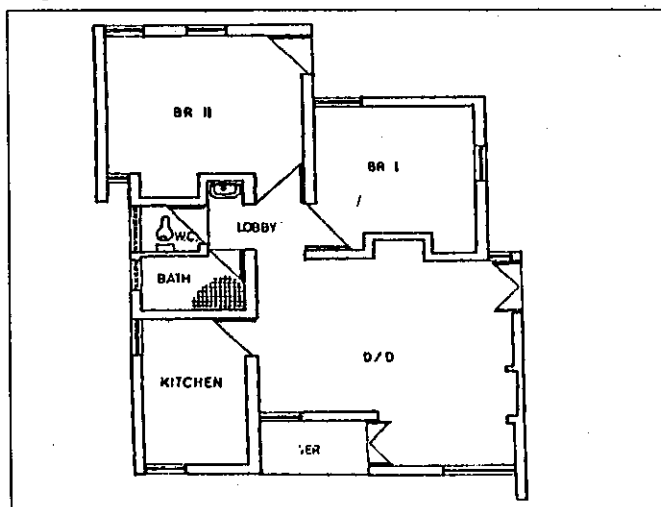


Fig. 1 Plan view and the site of fire

Fire took place in the bath room of one of the ground floor apartment. The bathroom had a geyser (storage type wall mounted unit) and a semi automatic twin tub washing machine as the main electrical appliances.

On the day of fire occurrence, there was a power failure from 0900 Hr. onwards. By which time everyone in the house had already taken a bath except a child. The child however, forgot to switch off the geyser after his bath mainly because there was no power at that time. It may however be noted that switching off the geyser is not mandatory as storage type geysers are installed with a thermostat to cutoff the power supply once the desired temperature is reached. The family left for a get together cum lunch at about 1230 Hr.

## FIRE OCCURRENCE

Neighbors in the ground floor of the adjacent building smelled that something was burning but they did not realize what could be the cause of this smell or where could the possible burning be taking place. At 1305 Hr there was an explosion and people came out of the neighboring apartments. At 1307 Hr first sighting of smoke emerging from the bathroom ventilator was confirmed. People were not sure about the whereabouts of the occupants of the apartment under fire and so no immediate action could be taken. By the time the occupants could be located another explosion of relatively smaller magnitude was heard at 1315 Hr. The occupants were traced and brought back from the lunch party at around 1325 Hr. By now the fire had already grown and raged for about half an hour.

## INSIDE THE APARTMENT

Each ground floor apartment had the main entry at the front, however, an entry had also been provided in the rear through the master bed room. Entry to the apartment was made through the front door. The entire interior was full of smoke. This was mainly because January being a winter month all the bedroom windows were closed shut. A lot of smoke was present and as such no Fire/ flame

attained. It was observed that the geyser was (apparently ) intact except:

1. Soot deposit on the main body
2. Completely burnt electrical cable, 3 pin power plug, socket, switch assembly. At some places even the char had fallen off to expose the metal conductors of the cable.

Lot of smoke had accumulated under the loft (Figure 3) because of the reduced ceiling height at the circulation space (lobby) connecting the bath, WC, the two bed rooms (BR I & BR II ) as well as the drawing cum dining room (D/D). Smoke deposits indicating the path of smoke movement

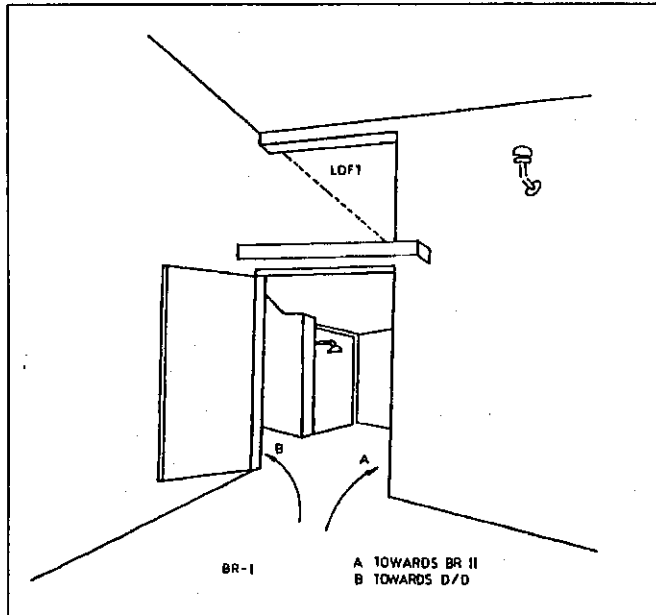


Fig. 3 Loft under which smoke accumulated

was observed under the loft which is located at 2.0 meters height from the floor level and on heavy cotton curtains leading to the two bed rooms. Since the smoke had also logged the two bed rooms, smoke deposits were found in both the bed rooms clearly indicating the 'would be' path of fire which could only be averted by the timely action taken. The curtains were very warm to touch (may be of the order of 75-80° C), and it would have only been a matter of time when the wooden door of the bathroom would be fully involved in Fire resulting in higher temperature and further spread of fire to other parts of the apartment.

### RECONSTRUCTION OF EVENTS LEADING TO FIRE

It was established that electrical supply was

restored at 1243 Hr. Apparently, the contacts between the 3 pin power plug and socket had sparking. A towel bar was fitted just beneath the power point on which a synthetic cardigan was hanging. At the time of the incident geyser was connected to the power point. As shown in Figure 2 washing machine was located just below the towel bar. Two possible explanations are possible to the chain of events that took place.

1. Spark Ignition : Sparking occurred at the power outlet. The sparks fell on the cardigan (resting on the towel bar) which caught fire and started burning slowly resulting in melt droplets. These droplets in turn fell on cotton garments left inadvertently on top of the washing machine.
2. Short Circuit : The second possible scenario could have resulted from an electrical short circuit. The possible cause for which could be:

Over voltage and line noise : Line borne transients tend to produce sparking at contact points. Any loose connection in plug and socket assembly would accentuate sparking. At the time of restoration, power supply might have contained excessive noise component. Noise/ loose connection combination might have initiated sparking in the plug socket assembly. The sparks fell on the cardigan under this scenario, the melt drops from the cardigan fell on the cotton garment. Geyser cable would burn only when the flames below impinge on it. Geyser would however remain reusable.

Fault in Geyser: A fault (deteriorated insulation/ short circuit) in geyser, over loaded PVC cable and contact between plug and socket. Heating and subsequently flaming occurred in the assembly and the cable began to burn from the plug end ( the cable on the other end was found to be intact). Melt drops fell on the cardigan and the chain of events started. In this case the PVC cable would burn first and cloths later. The geyser would be unusable if this is the sequence of events.

### Chain of Events

Once the fire was initiated, either due to spark ignition or as a result of short circuit, its propagation appears to have taken the same route. Within minutes of the cotton garment having caught fire the washing machine started burning