

Andraus high-rise, Sao Paulo, Brazil, February 1972

Of the 450 rescued, 350 were lifted off the roof by a fleet of 11 helicopters over a period of 4 hours

100 were saved at the 14th storey level using ladders placed horizontally from a building approximately 25 ft away.

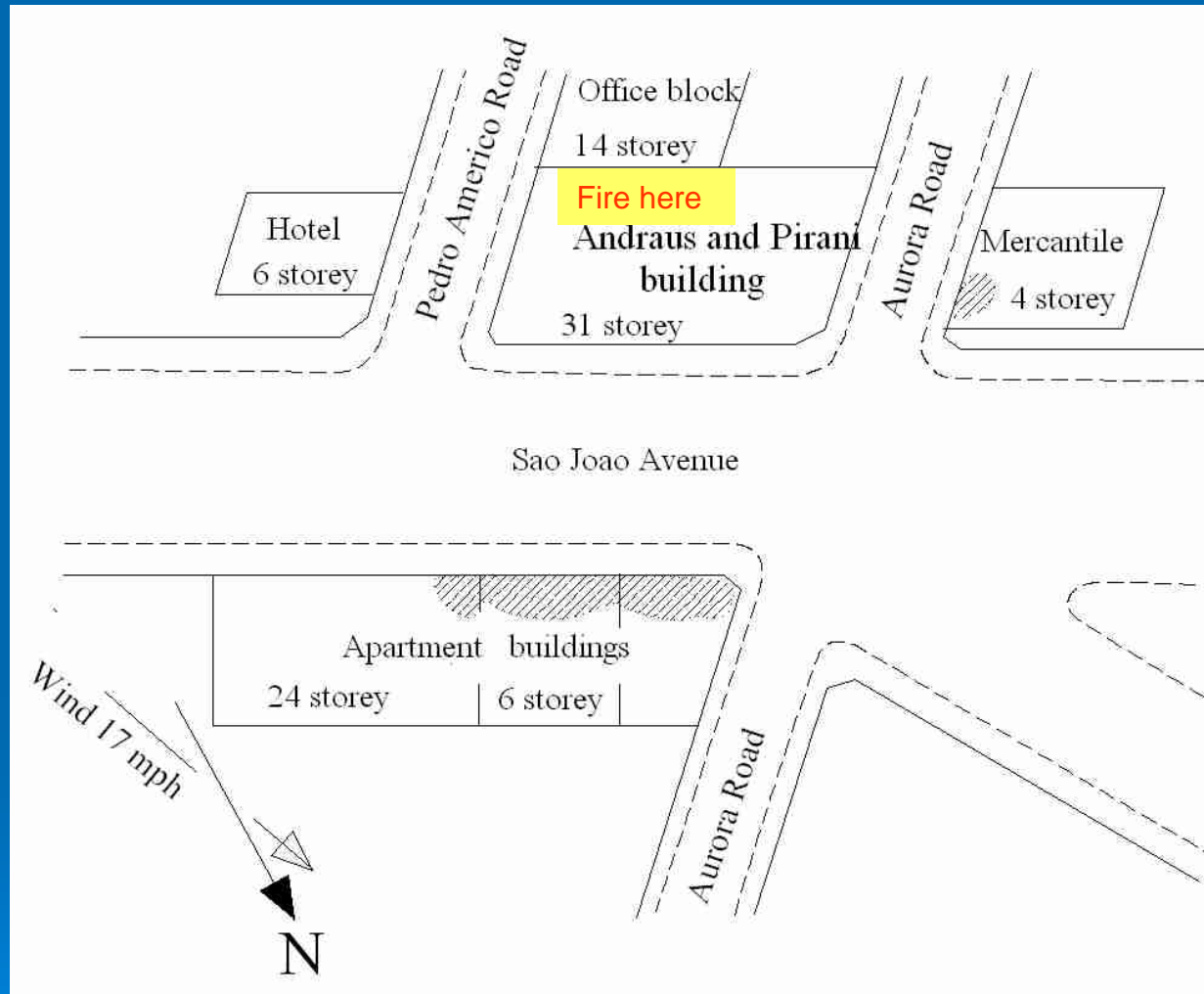
16 people died, several by jumping from the building, and 375 were injured.





- Multi-storey fire in 31 storey Andraus building. Fire has spread throughout presenting a major external radiation hazard.



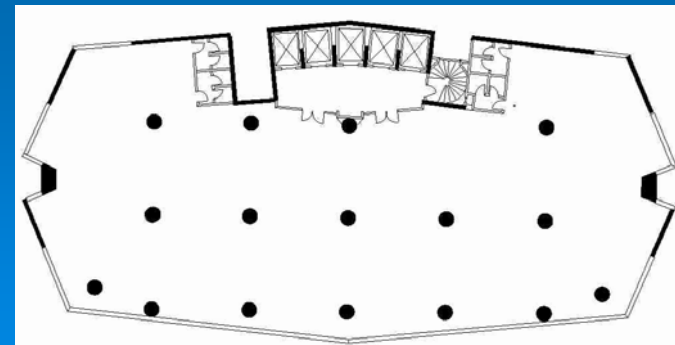


- Andraus site.
- Note damage to nearby buildings across streets (shown shaded)
- Note also wind direction

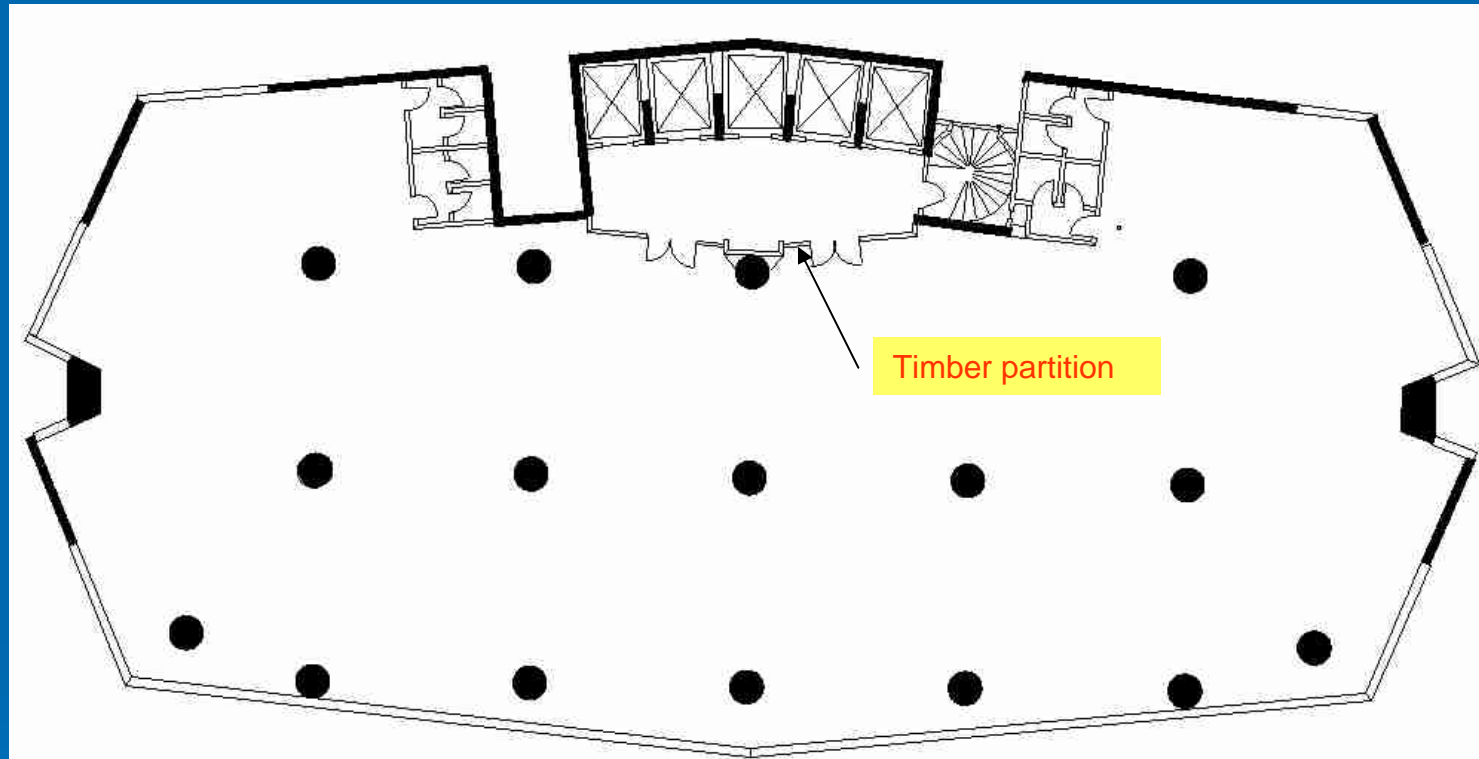




- Andraus office fire
- 31 storeys
- Fire started on 3rd floor
- 4 open staircases
- One protected spiral staircase
- 1000 people in building
- Timber partitions and ceilings
- 350 rescued by helicopter
- 100 rescued across ladder



Andraus – the open plan arrangement on upper floors



Typical office floor. Note open plan arrangement with no lobby fire protection to staircase and elevators. Timber partition would burn through rapidly allowing fire spread from office floor into staircase and elevator area



Andraus – the building details

- This 31 storey building comprised department stores in the 6 lower storeys and offices in the storeys above. The top four floors were finished as offices but were vacant.
- The building had plan dimensions of 23 m by 48 m and was 102 m high. It was built in 1961 and was of concrete frame construction with concrete walls and floors,
- The concrete floors used plywood as permanent formwork and the plywood had been left in place. Internal columns were cylindrical and ranged from 20 to 40 in diameter and were faced with cement plaster up to 1.5 in thick. Some internal non-load-bearing walls were 5.5 in thick made up of 4 in brickwork and concrete plaster on both sides.
- Office partitions, however, were of timber (one inch hollow core wood panels held in aluminium frames) some with glazed upper portions.
- Ceilings in the office and department store areas were of 12.8 mm wood fibreboard.
- In most areas the floor finish comprised wood parquet flooring using 25 mm thick blocks covered with carpet of unknown specification.



Andraus – the building details

- The department store had wood sandwich panel partitions separating certain office and storage areas and was served by 4 open staircases and two lifts.
- Office areas were served by a protected spiral staircase which went from basement to roof level.
- Windows were fortunately openable. There was no heating in the building but there were numerous LPG cylinders located on various floors used for cooking purposes.
- There were individual air conditioning systems for some of the office floors and also some window-mounted units.
- The building had no manual alarm or automatic detection or extinguishing systems but there was a fire main comprising a 2.5 inch riser with 2.5 inch hose connections in the office stairway.
- Water supply was from a tank at roof level, supplied by a pump in the basement.
- There was a heliport on the roof – the first heliport in Sao Paulo – but it was closed through failure to comply with safety regulations.



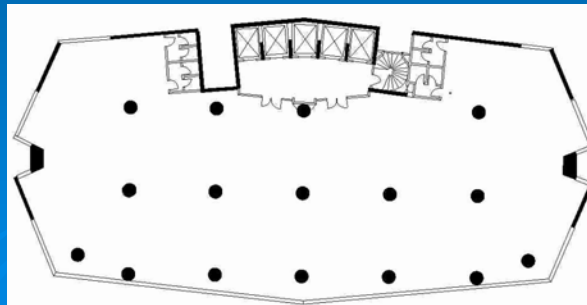
Andraus – the fire

- There were approximately 1000 people in the building at the time of the fire.
- Fire started at 16.00 hrs on 24 February (late summer) 1972 at the 3rd floor level in combustible material in the external ventilation and light well.
- When workers opened windows to fight the fire it spread inside the building and rapidly developed due to the combustible ceilings of wood fibre board and the hidden timber formwork. Fire initially spread internally through 4 floors and then externally up 24 storeys.
- Fire fighters arrived at 16.26 and were faced by a building with 100m high flames on one face projecting 15 m into the street due to wind
- After the single protected spiral escape stair became smoke logged at 4th floor level the remaining occupants on higher storeys were still able to move up the staircase which was fortunately on the windward side and 300 collected on the heliport roof.



Andraus – the fire

- 200 were trapped on the protected staircase because the heliport was overcrowded
- 100 of these were rescued at 14th floor level by the fire brigade using two ladders spanning horizontally from an adjacent building 24 ft away.
- Rescue by helicopter began at 17.15 hours.
- One man jumped to his death from the roof and another slid down the lightning conductor and also died.
- Panic took place on the roof which made rescue by the helicopter crew and fire crew hazardous.



Andraus - observations

- Unprotected staircases and lifts formed shafts through which smoke and fire could and did spread.
- Ceilings were highly combustible and once involved in fire produced large external flames causing fire to be spread from storey to storey externally. The phenomenon of massive flaming associated with wood fibreboard linings was shown in tests made by BRE in the 1960's, though only the effect of flames from a single storey fire was investigated.
- The method of rescue using horizontal ladders between buildings was very unconventional and risky but brave and apposite (100 saved)
- Rescue by helicopter was successful in this case, but it depends on good weather conditions and absence of a smoke/heat plume. It is not an accepted mode of escape in the UK.
- Despite the severe fire the building remained standing after the fire.

