

Bus Accident In Zuerich-Switzerland

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Citation

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Abstract

The original case report was published in German language by "Rettungsdienst" (Author Olivier Wenker). It is re-published with full authorization of "Stumpf & Kossendey Zeitschriftenverlag-Buchverlag" in Germany. The original reference is: Wenker O: Bus-Unfall in Zuerich. Der Rettungsdienst 1993; 16: 888-891.

BACKGROUND STORY

On Sunday June 16th, 1991, a Fiat Uno carrying a driver and one passenger gets across the yellow double-line on the Duttweiler bridge in Zuerich-Switzerland. The reason for this maneuver is unknown. The small car crashes into an oncoming bus with 49 passengers on board. The bus is not longer controllable and falls of the bridge onto the railway tracks 10 meters below. As it hits a power pole of the Swiss Federal Railways the fall is slightly cushioned and a complete rotation of the bus is prevented. Luckily it comes to a stop on its wheels. Power cables are ripped of the pole and the consequent power outage paralyzes the Zuerich main train station area for 40 minutes. As consequence there is no additional danger from passing trains.

Figure 1

Severely damaged Fiat Uno



CHAIN OF ALERT

- 11:24 am: Time of the accident.
- 11:25 am: Power outage in the area of the Zuerich main train station is registered. Shortly thereafter, railroad workers report an accident on the Duttweiler bridge. The police is alarmed through their alert phone number 117. The information includes only the car on the bridge. Nobody realized yet the damaged bus under the bridge. The paramedics are called to the accident.
- 11:30 am: The first arriving ambulance unit realizes the extent of the accident and call for additional support.
- 11:32 am: The Swiss Air Rescue REGA is alerted. 3 physicians are flown by helicopter to the site of accident. 5 more off-duty REGA physicians in Zuerich are alerted.

- 11:36 am: A general disaster alert is called for the area of Zuerich. All hospitals in town are informed to expect a larger number of injured patients.
- 12:00 noon: A total of 158 persons (33 paramedics, 32 firefighters, 60 police, 13 REGA, and 20 railroad employees) are present and at work. Swiss Federal Railways makes sure that no trains run in this area and that there is no danger from the loose power cables.

Figure 2

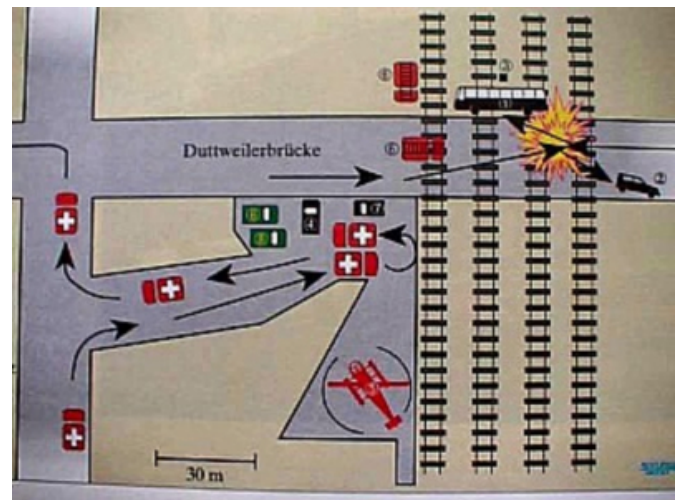
Evacuation of the driver. REGA rescue helicopter in the background



SCENE OF ACCIDENT

On the Duttweiler bridge the first rescue units find a completely crushed Fiat Uno with a dead 21 year old driver and a deadly injured 16 year old companion. She is going to die within the next few minutes. On the opposite lane the rail of the bridge is destructed. 10 meters below a severely damaged bus stands across a couple of railroad tracks. Slightly injured passengers are getting out of the remnants of the bus. The driver and 2 passengers (in the front row and in the 4th row) are trapped. Paramedics and trauma physicians enter the bus and start treating the injured. Specially equipped firefighters start to release the trapped passengers. 33 passengers - after triage considered to be slightly injured - are taken to a shelter under the bridge and from there shortly thereafter to a special transportation bus. The other 16 victims with various grades of injuries are treated on site by trauma physicians and paramedics and are prepared for transportation.

Figure 3



1. = Bus
2. = Fiat
3. = Power Pole
4. = Mobile Headquarters
5. = Helicopter Landing Area
6. = Fire Trucks
7. = Chief Paramedics
8. = Police
9. = Ambulances

Figure 4

Rescue teams at work



All patients are marked with the Casualty Handling System

CHSTM, a specially developed system to identify, guide and handle a large number of patients in disasters.

Figure 5
Casualty Handling System CHSTM



THERAPY/TRANSPORTATION

The specially equipped ambulance-bus takes the lightly injured passengers to different hospitals in the wider area (Limmattal and Baden). They are accompanied by paramedics. 2 patients are flown with helicopters to nearby trauma centers (University Hospital Zuerich and Hospital Winterthur). The remaining 14 are transported individually with ambulances to different area hospitals. At 12:34 pm the last victim (the bus driver) is brought to the nearby Triemli Hospital. Distribution of patients is shown in table 1.

Figure 6
Table 1: Distribution of patients.

Target Hospital	Number Patients	Mild Injuries	Moderate Injuries	Severe Injuries
University Hospital Zuerich	4	0	3	1
Triemli Hospital Zuerich	4	1	1	2
Wald Hospital Zuerich	4	2	2	0
Neumuenster Hospital Zuerich	3	3	0	0
Limmattal Hospital Zuerich	19	14	2	3
State Hospital Baden	14	11	3	0
State Hospital Winterthur	1	0	0	1

Salvage, triage, emergency care and evacuation of 49 victims and 2 casualties took a total of 1 hour and 15 minutes. All transportations were uneventful.

DIAGNOSIS ON SITE

Triage on the site of accident revealed the following injuries:

- 33 mildly injured (contusion, cuts)
- 11 moderately injured (fractures, thoracal contusions, deep and multiple cuts, mild back

injury)

- 5 severely injured (head trauma, multiple fractures, chest injuries)
- 2 deaths

TREATMENT ON SITE

All moderately or severely injured patients were treated with fluids (crystalloids, plasma-expanders or colloids). Oxygen, analgesics and/or other drugs were administered on an individual basis. No intubation was performed (the head trauma patients had both a Glasgow Coma Score of 13).

PROGRESS

A few hours later all involved hospitals were called. Precise diagnoses were collected and compared to the ones made during triage and emergency treatment on site. It became evident that in the group of mildly injured patients some major injuries (4 cases of fractured vertebrae, 1 serial rib fracture with hemothorax, 1 sternum fracture with cardiac contusion) were missed. A total of 8 patients had to undergo surgery (excluding minor cuts or reposition of a shoulder). In the evening 9 patients were in intensive care units. 3 of these 9 patients were judged during triage to have a minor injury. Another 4 patients were hospitalized and on a surgical ward. 11 passengers were transported later in the day back to their place of origin (Geneva-Switzerland) by ambulances. 25 passengers had only ambulatory treatment and got back to Geneva on their own.

DISCUSSION

51 persons got injured in a major traffic accident. The rescue mission was organized according to the existing disaster concept. Within 75 minutes rescue, triage, first aid and transportation of all victims is accomplished. Good access to the site of accident, low traffic on a Sunday and a variety of nearby hospitals facilitate the rescue mission. Thanks to immediate closure of the area for traffic and public, no disturbances of the salvage operation were registered. The media could not interfere with the ongoing rescue mission. Cooperation between the different rescue organizations (paramedics, police, REGA, firefighters, railroad employees) was optimal. Problems with wireless radio communication were caused by overcharging the frequencies. Rescue equipment and rescue personnel were at hand in a minimum of time and in a sufficient amount. 5 additional physicians were on site within a short period of time due to alert via REGA.

Figure 7

Front view of the damaged bus and the power pole on the left



A significant part of the victims suffered from chest and back injuries such as rib fractures, hemothorax, lung contusion, sternum fracture, cardiac contusion, thoracic and lumbar vertebrae fractures. While the bus was falling off the bridge all passengers were elevated from their seats and when the bus landed on the front wheels they were hurled against the back of the seats in front of them. Many of the passengers smashed with their chests against the upper edge of the seats in front of them. 3 patients were trapped in their seats and had to be freed by specially equipped firefighters.

The Casualty Handling System CHSTM, a system used to mark and handle larger amounts of patients, was used as

planned. It proved once more to be a success. Triage and distribution was effective. All hospitals in and around Zuerich and the media were informed about the event and could prepare themselves.

By some rather lucky circumstances, more serious or catastrophic consequences did not occur:

- the bus hit a power pole
- the bus landed on his wheels and did not overturn
- the power cables did not represent a danger
- no train was running on the tracks at the moment of the accident
- the location of the accident was easy accessible
- traffic was light and a variety of hospitals were nearby

Some of the diagnoses in group of mildly injured were missed. Fortunately, no complications resulted from this omission neither during transportation nor in the further progress.

ACKNOWLEDGMENT

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References

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