

Lecture PA11
Toulouse Accident

B Hueber



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Chairman of SAFEX INTERNATIONAL

**Friday 21 September 2001
A catastrophe in TOULOUSE**

THE MAJOR HAZARD in Toulouse
September the 21st, 2001



The plant (1/4)





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**On 21 September 2001, at 10.17 am,
an industrial risk became a reality...**

An enormous explosion ripped through the AZF factory in Toulouse,
which is owned by the Grande Paroisse Company, a subsidiary of the
TOTAL FINA ELF Group.

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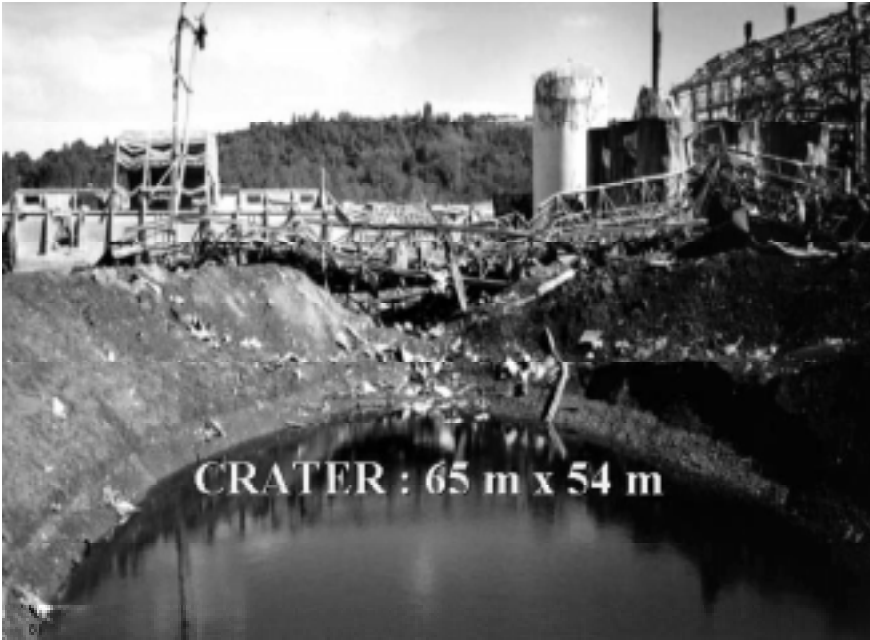
Explosion in the AZF factory - The known facts

The origin of the explosion was at the centre of a pile of about 250 tonnes of fertilizer ammonium nitrate and industrial ammonium nitrate granules stored in bulk in shed n° 221.

The Midi-Pyrenees Observation Centre recorded a seism of 3.4 on the Richter scale.

The explosion left an open crater about 65 m long, 54 m wide and 10 m deep.





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Explosion in the AZF factory – Initial assessments

- The ammonium nitrate in question came from downgraded batches that were to be recycled. These products were likely to explode if a sufficiently large detonating source was present...
- No prior traces of decomposition (smoke, fire or suspicious smells)
- No “domino” effect on the other stocks of calcium ammonium nitrate or on the neighbouring SNPE factories
- No air pollution problem
- But ... a very heavy toll



Sack-filling buildings

225-224-223



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A human catastrophe

- 30 dead
- 30 people hospitalized for more than a month
- 2,000 people slightly injured

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A human catastrophe

and the city of Toulouse was severely damaged and traumatized

- 25.000 homes were damaged and about 1,000 families had to be rehoused
- 7.200 people were laid off, including 1,000 in the chemical processing sector of Toulouse alone (it is at a standstill even now, due to a government decision), and 800 affected by the total destruction of their work tool.

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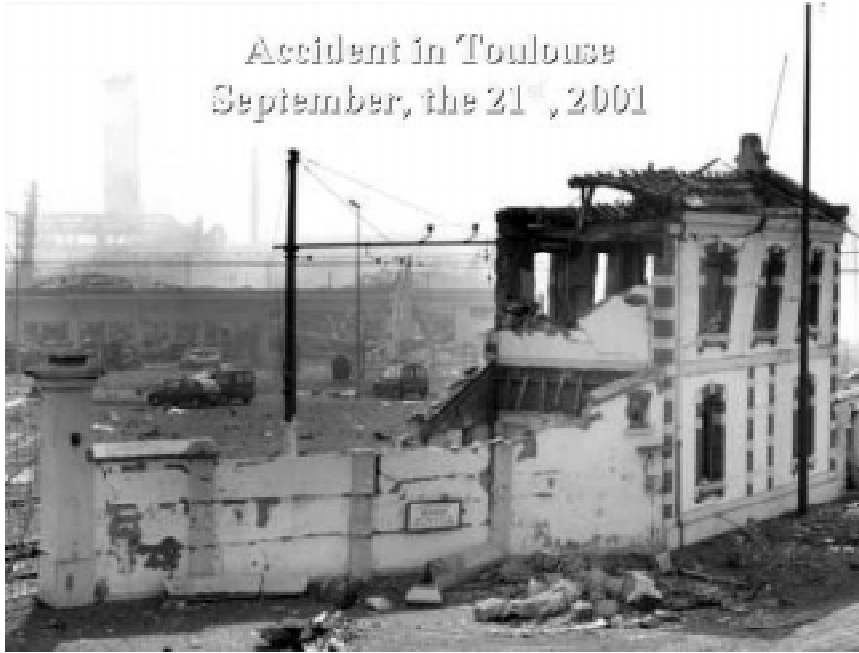
A catastrophe for the environment

After the explosion

- Within a radius of 200 m : complete destruction of the buildings
- Up to 900 m : serious damage to buildings, but the tanks, silos and piping stood up better than the flat façades to the blast...
- Up to 3,000 m (5,000 m downwind) : slight damage to buildings and many broken windows...



Accident in Toulouse
September, the 21st, 2001



Overpressure : > 200 mbar
• Shop : 150 m from explosion center



Overpressure : > 200 mbar
• Shop : 280 m from explosion center



Overpressure : > 200 mbar
• Shop : 320 m from explosion center



Overpressure : 150-200 mbar
- Shop : 320 m from explosion centre



SNPE CHEMICAL PLANT
500-1000 m from explosion centre



SNPE CHEMICAL PLANT
500-1000 m from explosion centre



SNPE CHEMICAL PLANT
500-1000 m from explosion centre





Overpressure : 70-150 mbar
• Institute : 760 m from explosion center



Overpressure : 20-50 mbar
• 2000 & 700 m from explosion center





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The inquiry turned out to be a long, difficult one

As early as 21 September

- Opening of a judicial inquiry...
- Setting up by TOTAL FINA ELF of an internal inquiry committee
- Setting up by the French Parliament of a parliamentary board of inquiry into industrial risks
- Opening of an administrative inquiry into the control of sites with SEVESO classification
- Launch by the Prime Minister of a wide-reaching debate on technological risks.



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The Inquiry after 6 months...

- Faced with intense media coverage of the catastrophe, which was often the only source of information,
- A number of leads are being followed up....,
- With deafening silence from the Judicial Authorities and TOTAL FINA ELF....,

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The Inquiry under way...

The hypotheses currently advanced can be sorted into 4 categories

- A malicious or criminal act
- An industrial accident beforehand leading to the disaster
- An unexpected explosion of the stock of calcium and ammonium nitrates after spontaneous ignition
- And as a reminder, the fall of a meteorite or the unexpected explosion of a bomb dating from the Second World War

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TO SUM UP 7 months later...

The Judicial Authorities give priority to the chemical lead linked to a poorly maintained storage shed, poorly managed stocks and accidental pollution with chlorinated products.

TOTAL FINAL ELF is of the opinion that this hypothesis is unfounded, but it is continuing to analyse the following leads

- triggering by projections due to an initial accident
- accidental contamination of the stock by products whose nature has not yet been defined
- an electric arc that acted as a detonator



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And after the catastrophe of Toulouse...

After all industrial catastrophes, everything possible must be done to find out the **truth**, while keeping in mind the fact that the rythm of the Judicial System is not that of Politics or of the Media...

Can we now draw some concrete conclusions from the accident in Toulouse and thus make our industries **safer** and more **serene**.



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Some concrete lessons to be drawn from the catastrophe in Toulouse

**The stock in shed 221 had an explosive power that was known...
but neglected.**

Fertiliser waste is by nature more sensitive and its explosive characteristics have been demonstrated. Did the management of AZF take this into account?

**We must avoid losing our industrial memory. We must do all in
our power to prevent trivialization of risks... we must not
underestimate them.**

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Some concrete lessons to be drawn from the catastrophe in Toulouse

**From the Workers to the Senior Management, we must all be "on the
lookout for drift" in our establishments.**

When faced with the dangers inherent to the nature of a product, a process, or a technology, we must multiply the safety elements through systematic use of feedback from experience.

**All accidents or near-accidents must be known, analysed and
used.**

**The list of the dangers must be exhaustive and must be updated
systematically.**

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Some concrete lessons to be drawn from the catastrophe in Toulouse

The "chemical" hypothesis is probably caused by human error...

**The human behaviour factor accounts for 80% of the probability
of occurrence of an accident.**

- by showing our will to give priority to safety
- by setting out a clear, accepted organizational system
- by giving our staff more training in safety aspects

Safety must be fully integrated in quality management

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Some concrete lessons to be drawn from the catastrophe in Toulouse

We can avoid all serious accidents in our Industries

- through deeper knowledge of all our potential risks...
- through action to modify staff habits and behaviour...
- by providing those around us with full transparency as to the characteristics of the materials we use and their potential dangers

In this post-Toulouse period, we must ensure that our Governments do not seek to prohibit the presence of **sites presenting risks** when they are located in **urban areas**.

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