

Utsläpp av fenol-formaldehyd-harts efter en explosion på en plast- och gummifabrik.

950301 MARS 1800_009_004

Då ett ventileringssystem stängdes efter ett operatörsmisslag uppstod en oväntad tryckökning. Tryckökningen ledde till att bildningen av fenol-formaldehyd-harts i en tankreaktor skenade. Den bildade harts mängden släppte ut ur tankreaktorn på ej redovisat sätt.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
Paraformaldehyd	30525-89-4	100 ton
Fenol	108-95-2	200 ton

Skador:

Människor:	Fem människor på fabriken skadades. En kvinna utanför fabriken skadades.
Materiella:	Tankreaktorn ifråga togs ur drift ett par månader vilket resulterade i nedsatt produktion.
Miljö/ekologi:	Inga skador rapporterade.
Infrastruktur:	Inga skador rapporterade.

Erfarenheter redovisade (Ja/Nej): Ja.

Se "The British Plastics Federation.- Thermosetting Materials Group "Guidelines for the Safe Production of Phenolic Resins".

Report Profile

Identification of Report:

country: FA ident key: 1800_009_04

reported under Seveso I directive as major accident reports: SHORT+FULL

Date of Major Occurrence: Time of Major Occurrence

start: 1995-03-01 start: 15:30:00

finish: 1995-03-01 finish: 15:35:00

Establishment:

name:

address:

industry: 2003 plastics and rubber manufacture

Seveso II status: not applicable: Yes art. 6 (notification): No

art. 7 (MAPP): No

art. 9 (safety report): No

Date of Report:

short: full:

Authority Reporting:

name:

address:

Authority Contact:**rep_cont_name:****rep_cont_phone:****rep_cont_fax:****Additional Comments:**

a) - not applicable -

b) - not applicable -

c) - not applicable -

d) - not applicable -

e) - not applicable -

Short Report

country: FA **ident key:** 1800_009_04**Accident Types:****release:** No **explosion:** Yes**water contamination:** No **other:** No**fire:** No**description:**

Unexpected raise of pressure due to closure of venting system. The formation of phenol-formaldehyde resins in batch reactors is known for potential runaway reactions.

Substance(s) Directly Involved:**toxic:** Yes **explosive:** No**ecotoxic:** No **other:** No**flammable:** No**description:**

-Paraformaldehyde 100 tonnes

-Phenol 200 tonnes (C.A.S. Number 108-95-2)

Immediate Sources of Accident:**storage:** No **transfer:** No**process:** No **other:** Yes**description:** not given**Suspected Causes:****plant or equipment:** No **environmental:** No**human:** Yes **other:** No**description:**

An operator error due to user unfriendliness components and insufficient training lead to unexpected reaction and emission of resins (runaway reactions).

Immediate Effects:

material loss: Yes

human deaths: No

human injuries: Yes **community disruption:** No

other: No

ecological harm: Yes

national heritage loss: No

description:

5 people of the establishment were injured, 1 woman of the off-site population.

Establishment losses = 2 millions of BF

Off-site losses: > 10 millions of BF

Emergency Measures taken:

on-site systems: Yes **decontamination:** No

external services: No **restoration:** Yes

sheltering: No **other:** Yes

evacuation: No

description:

Legal actions: Unknown. By different parties different legal actions are asked, but the result of these actions are still unknown.... see Appendix Short Report / description of emergency measures taken

Immediate Lessons Learned:

prevention: Yes **other:** No

mitigation: No

description:

Better education, instructions plus evaluation systems. - Measures to prevent and to detect early stages of runaway reactions. New blow down system.

A Occurrence Full Report

country: FA **ident key:** 1800_009_04

1 Type of Accident

remarks: Unexpected raise of pressure due to closure of venting system. The formulation of phenol-formaldehyde resins in batch reactors is known for potential runaway reactions

2 Dangerous Substances

remarks: Phenol is stored in an atmospheric storage tank at 60°C. Paraformaldehyde is stored in a silo or in sacs.

3 Source of Accident

illustration: - not applicable -

remarks: The reactor is more than 30 years old. No design standards are available. Modifications in order to clean reactor more easily and to clean condensers after longer run times. Most of the operations occur manual. No containment system to prevent... see Appendix Full Report A / source of accident - remarks

4 Meteorological Conditions

precipitation none: fog: rain: hail: snow:

Yes No No No No

wind speed (m/s): 10

direction (from): SW-W

stability (Pasquill): S

ambient temperature (°C): 13

remarks: Good weather for the period of the year.

5 Causes of Major Occurrence

main causes

technical / physical 5101 operation: vessel/container/containment-equipment failure

5106 operation: runaway reaction

- not applicable -

- not applicable -

- not applicable -

human / organizational 5301 organization: management organization inadequate

5303 organization: organized procedures (none, inadequate, inappropriate, unclear)

5304 organization: training/instruction (none, inadequate, inappropriate)

5308 organization: design of plant/equipment/system (inadequate, inappropriate)

5309 organization: user-unfriendliness (apparatus, system, etc.)

remarks: An operator error due to user unfriendly components and insufficient training lead to unexpected reaction and emission of resins.

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA **ident key:** 1800_009_04

event:

major occurrence 1101 release: gas/vapour/mist/etc release to air

initiating event - not applicable -

associated event - not applicable -

Dangerous substances

country: FA **ident key:** 1800_009_04

a) total establishment inventory

CAS number: 108-95-2 **identity:** Phenol

name from Seveso I Directive: - not applicable -

name from Seveso II Directive: - not applicable -

category from Seveso II: - not applicable -

other hazards (1): - not applicable -

other hazards (2): - not applicable -

maximum quantity (tonnes): 200

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 2,5 **potential quantity:** 3,5

c) substance belongs to relevant inventory indirectly involved: Yes

actual quantity: 200 **indir_pot_quant:** -1

a) total establishment inventory

CAS number: identity: Paraformaldehyde 305 25-89-4

name from Seveso I Directive: - not applicable -

name from Seveso II Directive: - not applicable -

category from Seveso II: - not applicable -

other hazards (1): - not applicable -

other hazards (2): - not applicable -

maximum quantity (tonnes): 100

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 1 **potential quantity:** 1,5

c) substance belongs to relevant inventory indirectly involved: Yes

actual quantity: 100 **indir_pot_quant:** -1

Source of Accident - Situation country: FA **ident key:** 1800_009_04

situation

industry

initiating event 2003 plastics and rubber manufacture

associated event - not applicable -

activity/unit

major occurrence 3101 process: chemical batch reaction

initiating event 3101 process: chemical batch reaction

associated event - not applicable -

component

major occurrence 4002 reaction vessel; pressurised

initiating event 4002 reaction vessel; pressurised

associated event - not applicable -

B Consequences Full Report

country: FA **ident key:** 1800_009_04

1 Area concerned

affected

extent of effects installation: Yes

establishment: Yes

off-site; local: Yes

off-site; regional: No

off-site; transboundary: No

illustration of effects - not applicable -

remarks Annex 2 indicate the most affected regions by the resin. Several cars and houses... see Appendix Full Report B / area concerned - remarks

2 People

establishment popul. emergency personnel off-site population

total at risk -1 -1 -1

immediate fatalities 0 0 0

subsequent fatalities 0 0 0

hospitalizing injuries 0 0 0

other serious injuries 5 0 0

health monitoring 0 0 1

remarks The one of the off-site population affected was a women of a nearby company.... see Appendix Full Report B / people

3 Ecological Harm

pollution/contamination/damage of:

- **residential area (covered by toxic cloud)** not applicable
- **common wild flora/fauna (death or elimination)** Suspected
- **rare or protected flora/fauna (death or elimination)** Suspected
- **water catchment areas and supplies for consumption or recreation** Suspected
- **land (with known potential for long term ecological harm or Suspected preventing human access or activities)**
- **marine or fresh water habitat** Suspected
- **areas of high conservation value or given special protection** Suspected

remarks - not applicable -

4 National Heritage Loss

effects on:

- **historical sites** Suspected - **historic monuments** Suspected
- **historic buildings** Suspected - **art treasures** Suspected

remarks On the site there are some classified buildings of late 19th century - early 20t... see Appendix Full Report B / national heritage loss

5 Material Loss

establishment losses off site losses

costs (direct costs to operator) (social costs)

in ECU BF ECU BF

material losses 49000 2000000 0 0

response, clean up, restoration 246000 1E+07 0 0

remarks Reactor 2 will be cut of order during 2,5 months. So there will anso be producti... see Appendix Full Report B / material loss

6 Disruption of Community Life

establishment/plant evacuated disabled/unoccupiable destroyed

- **nearby residences/hotels** No No No

- **nearby factories/offices/small shops** No No No

- **schools, hospitals, institutions** No No No

- **other places of public assembly** No No No

interruption of utilities etc. no / yes duration

- **gas** No

- **electricity** No

- **water** No

- **sewage treatment works** No

- **telecommunications** No

- **main roads** No

- **railways** No

- **waterways** No

- **air transport** No

significant public concern none local level national level

- **off site populations** No No No

- **media interest** No No No

- **political interest** No No No

remarks - not applicable -

7 Discussion of Consequences

Ecological Components involved

country: FA **ident key:** 1800_009_04

type: 6101 inland: metropolitan development

threatened: not applicable **affected:** not applicable

C Response Full Report

country: FA **ident key:** 1800_009_04

1 Emergency Measures

taken - on site - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

- **off site** - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

still - on site - not applicable - - not applicable -

required

- not applicable - - not applicable -

- not applicable - - not applicable -

- **off site** - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

continuing contamination or danger

-on site not applicable

-off site not applicable

remarks - not applicable -

2 Seveso II Duties

pre-accident evaluation

Article item not due yet not done done/submitted evaluated

6 notification No No No No

7 policy (MAPP) No No No No

9 safety report No No No No

9, 10, 11 update No No No No

11 internal plan No No No No

11 external plan No No No No

13 informing public No No No No

9, 12 siting policy No No No No

post-accident evaluation

Seveso II duty was actual were actual compared with actual

contingency consequences consequences, the

addressed? addressed? predicted extent was?

Article item

7 policy (MAPP) not applicable not applicable not applicable

9 current safety report not applicable not applicable not applicable

11 internal plan not applicable not applicable not applicable

11 external plan not applicable not applicable not applicable

13 informing public not applicable not applicable not applicable

9, 12 siting policy not applicable not applicable not applicable

evaluation of safety organisation

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- written policy objectives No

- specified management No

structure

- specified responsibilities No

- specified working procedures No

- specified procedures for No

assessment/auditing of

management system

- specified procedures for No

review and update of

management policy

- specified general training No

procedures

- specified emergency No

training procedures

evaluation of ecological impact control

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- ecological status review No

before incident

- potential ecological No

consequences assessment

- ecological impact review No

after incident

- ecological restoration No

procedures

- subsequent review of No

restoration success

remarks - not applicable -

3 Official Action Taken

legal action

- not applicable -

other official action

- not applicable -

4 Lessons Learned

measures to prevent recurrence

-Better education, instruction... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

Installation of catchment tank

useful references:

The British Plastics Federatio... see Appendix Full Report C / lesson learned - references

5 Discussion about Response

- not applicable -

Appendices for the FA / 1800_009_04 report

Appendix Short Report / description of emergency measures taken:

Legal actions:Unknown. By different parties different legal actions are asked, but the result of these actions are still unknown.

Other official actions:A very rigorous examination will be performed. Different modifications on reactor, safety procedures shall be superimposed on establishment.

Appendix Full Report A / source of accident - remarks:

The reactor is more than 30 years old. No design standards are available. Modifications in order to clean reactor more easily and to clean condensers after longer run times. Most of the operations occur manual. No containment system to prevent release of toxic material to environment no interlocks. Settings rupture disc: 3 bar. T-profile during reaction : from 50oC to 140oC:Annex 1 & 2:Map environment. Annex 3: Detail plant:Vyncolit was a division of Vynckier.

Appendix Full Report B / area concerned - remarks:

Annex 2 indicate the most affected regions by the resin. Several cars and houses were affected. The day of the incident no detection was done. The following day the concentration was less than 1ppm.

Appendix Full Report B / people:

The one of the off-site population affected was a women of a nearby company.

Appendix Full Report B / national heritage loss:

On the site there are some classified buildings of late 19th century - early 20th century. The wind direction blew away from these buildings.

Appendix Full Report B / material loss:

Reactor 2 will be cut of order during 2,5 months. So there will also be production losses.

Appendix Full Report C / lesson learned - prevent:

-Better education, instructions plus evaluation systems. - Measures to prevent and to detect early stages run-away. -New blow down system.

Appendix Full Report C / lesson learned - references:

The British Plastics Federation.- Thermosetting Materials Group "Guidelines for the Safe Production of Phenolic Resins".