

European Commission  
DG Enterprise and Industry, Unit G2  
Att. Mrs. Giuseppina Luvará  
Rue de la Loi 200, (N105 01/07)  
B-1049 Brussels  
Belgium

17 September, 2007

**Re: Why did RPA disregard 1 fatal and 541 non-fatal incidents in Europe?**

Dear Mrs. Luvara,

The comprehensive data collection on DCM paint stripping and related incidents by the RPA was extremely impressive, but perhaps the analysis of these incidents was somehow misinterpreted in the conclusions.

In their executive summary (page xi) RPA state "It is therefore possible that DCM based paint stripper have been involved in a total of 25 fatalities and 72 non-fatal injuries in Europe to date (1930 – 2007). They consider reporting since 1980 as more consistent and complete and the total number of fatalities in the EU is 19 and the number of non fatal injuries is 45.

No wonder the British HSE and ECSA opposed The RPA views; they consider DCM paint stripping as safe since they have not seen any new information that would change their point of view.

When we studied the report and especially the Annex E we struggled over some facts which raised some important questions:

- Why are 541 non-fatal and 1 fatal incidents disregarded from Annex E1?

Annex E1 "Information on accidents in EU member states" contains from page E3 – E40 collected data by individual member states on accidents associated with the use of DCM paint strippers. All member states made an effort to provide existing - often very detailed – information that has not been used in the RPA analysis.

The year, age or additional description of the victim avoids possible double-counting.

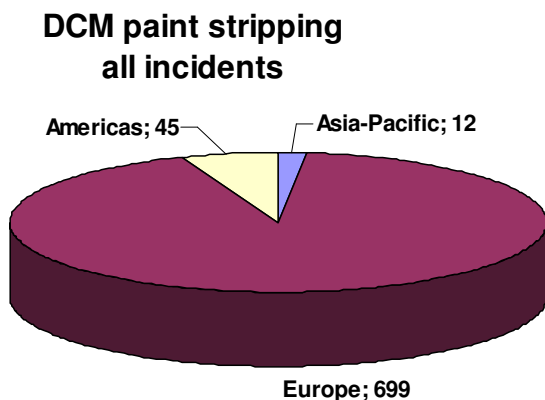
**DCM Paint Stripper Accidents between 1990 and 2006 in Europe**  
New cases collected in the RPA Survey for the EU Commission

	Professional	Consumer	Total	Fatalities
<b>Finland</b>	7	3	10	
<b>France</b>	268	115	383	
<b>Germany</b>	8	6	14	
<b>Ireland</b>	1	16	17	
<b>Italy</b>	5	2	7	
<b>Slovenia</b>	1	0	1	
<b>Spain</b>	9	4	13	
<b>Switzerland</b>	3		3	1
<b>UK</b>	58	35	93	
<b>TOTAL</b>	<b>360</b>	<b>181</b>	<b>541</b>	<b>1</b>

- Why does Annex E2. "Fatalities data for DCM-based formulation" offer in Table E2.1 only an "overview of fatalities involving use of DCM based products" as collection of different applications instead of separating paint strippers from other applications, when the RPA survey focuses on paint removers especially.

In fact this table contains fatalities and incidents and is therefore even more confusing. It adds up 64 fatalities and 151 incidents globally but without analysis it does not really offer anything new, because approximately 95% of the content was already available from or provided by other sources to RPA in a more differentiated form.

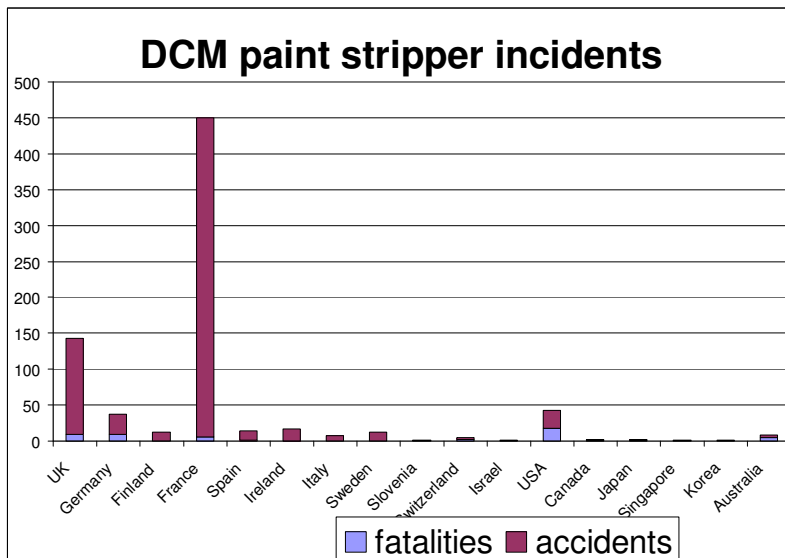
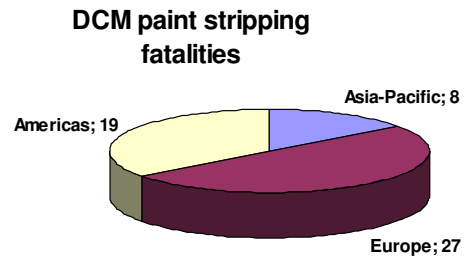
EASCR took the liberty to analyse all data from Annex E1 of the RPA Report, checked for possible double-counts and collated them in a way that allowed adding them to existing data to improve the understanding of reality. How this was done by member state can be found in the attachment to this letter.



If one adds these 542 additional cases to the ones already listed by EASCR and other institutions, Europe is the region with the majority of incidents. But this impression may be very misleading and in general it may be even the safest region, because the collection of data is better and more accurate than in any other region outside Europe and led to an increased

sensitivity and awareness about this application, creating the desire to improve.

The comparison of fatality brings it into a better perspective. It is only logical that fatal incidents happen in an unsafe environment or not knowing the risk involved. They typically go in line with a multiple of non-fatal incidents as this is the case for Europe. It also demonstrates that we only see a small part of the tip of the ice-berg because control or reporting systems are not good enough or of different quality in different member states so that we are partially blinded to understand what is really happening.



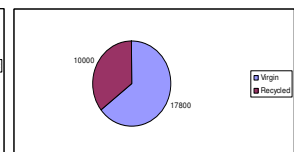
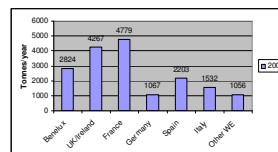
	<b>fatalities</b>	<b>accidents</b>
UK	9	134
Germany	9	28
Finland	0	12
France	6	444
Spain	1	13
Ireland	0	17
Italy	0	7
Sweden	0	12
Slovenia	0	1
Switzerland	2	3
Israel	0	1
USA	18	25
Canada	1	1
Japan	1	1
Singapore	1	0
Korea	1	0
Australia	5	3
<b>Total</b>	<b>54</b>	<b>702</b>
Europe, Middle East	27	672
Americas	19	26
Asia-Pacific	8	4

Why would one believe that in the UK and Germany there are less non-fatal incidents than in France when in the UK approximately 500 tons more DCM paint removers are sold per year (4779 tons versus 4267 in 2002 according to CEFIC)?

The more logical conclusion would be that France is more effective in their reporting and analysis of incidents than in the UK. In the UK probably more incidents are happening than in France but they are not registered because UK fatalities are

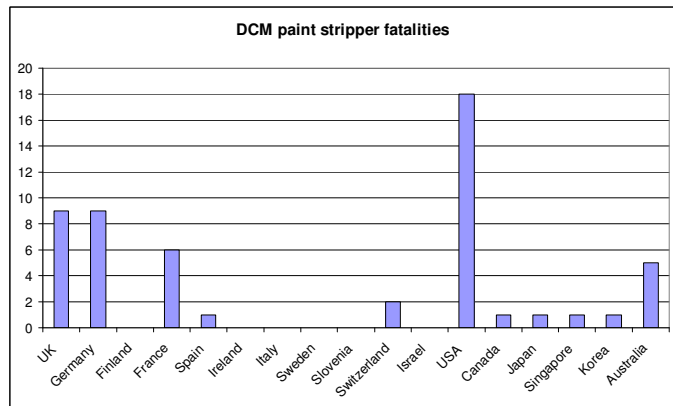
**BiPRO report to DG ENTR (2003)**

- Same data as Cefic for 2002 for virgin DCM: **17,860 t virgin DCM** → **22-24,000 t paint strippers**
- In addition, **8-12,000 tonnes of recycled DCM** → **10-15,000 t paint strippers**
- Total: **32,000-39,000 t DCM-based paint strippers**

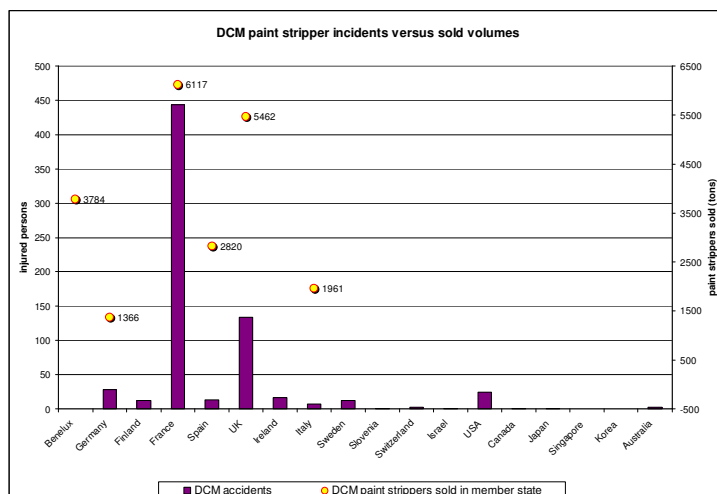


150% of France but with far less accompanying incidents. This point of view would be supported by the findings of a recent BBC report on HSE Failures dated 27 July 2007.

The same logic would create severe doubt in the reported tonnages of DCM paint strippers in Germany (1067 tons in 2002, 22% of UK volume) because the registered 9 fatalities (same as UK) would make Germany the most dangerous country to work with such paint removers.



Following the conclusions of RPA's opinion on decorator's education and knowledge, one could equally assume that German professionals are working more often illegally than others in the EU and infringe existing regulations more often and related incidents are not registered by inefficient German reporting systems.



The left graph with non-fatal accidents in relation to sold paint stripper volumes is therefore probably only helping the imagination of how many incidents are not counted in other member states, if we believe that France is probably functioning more correctly and is a more realistic case example (DCM paint stripper volumes are calculate from CEFIC's

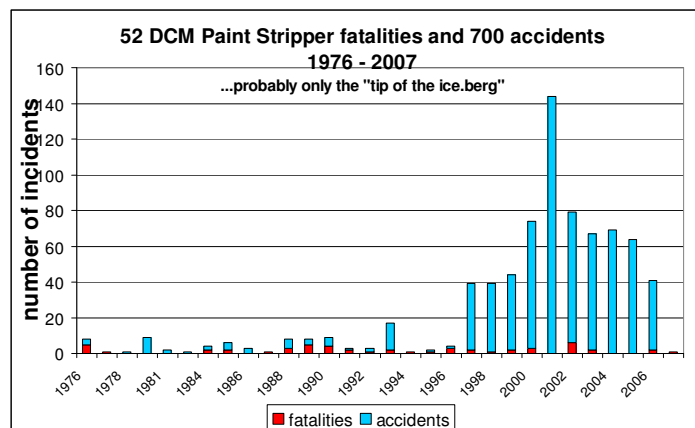
DCM volumes and an assumed 80% content of DCM in a paint remover. CEFIC only offered combined volumes for UK/Ireland which we counted for simplicity only for UK)

Another area of doubt is the belief that 37% of the DCM paint strippers are manufactured from recycled DCM. When it was true that "the total production of DCM-based paint removers is some 45.000 tpa (some 30.000 tpa DCM)" and "that some 150 - 180 people in Europe are directly involved in the formulation of DCM paint removers" (quote from page 65 of the TNO Report for

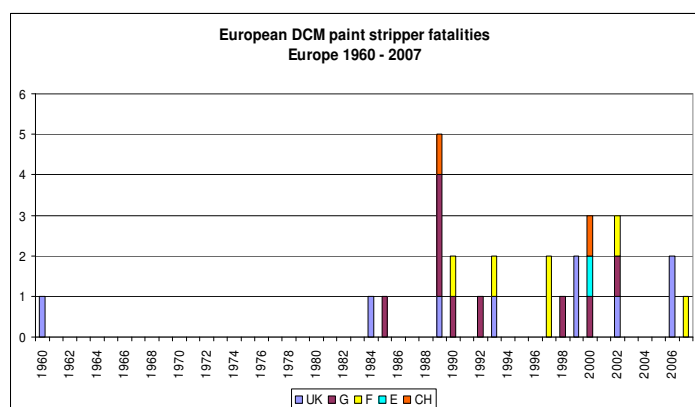
the EU Commission dated November 1999 by Dr. A. Tukker and Ir. L. Ph. Simons) one can probably speak of a consolidated industry and similar volumes of DCM sold (some 30.000 tpa in 1995 versus 28.000 tpa in 2002).

One could also ask why it is not possible to identify more than 22-24.000 tons of DCM paint strippers out of a total market of 32-39.000 tons in an industry that employed only 150 – 180 people in Europe in 1999 and in 2002 probably less. So when RPA was only able to detect a very small amount of the said recycled DCM, perhaps there is no more and all incidents are based on a much smaller volume of DCM paint strippers currently sold.

If we look at all the incidents (collected by RPA) then we may also have difficulties in following their assumption that "reporting since 1980 is more consistent and complete". EASCR would conclude that data are only more realistic for some member states during the last decade since 1997. But this is obviously only true for non fatal incidents.



If we look at fatalities in Europe we get the impression that this is been followed with more awareness and intensity by institutions over the last 2 decades in Europe. But also here interesting and alarming observations can be made.



When in France and Germany Ministries and Institutions are very active and

interested in registering and informing about fatal incidents in DCM paint stripping with the aim to improve safety at paint stripping workplaces and have already notified the EU Commission about their strong concern, other member states may have a different point of view.

In the UK databases (e.g. HASS/LASS in 2002) have since been discontinued, and 7 out of 9 British fatalities have been registered by different parties only based on reports picked up in the daily press. The RPA Report, page E-39, shows the last available database for the UK. In addition, it is based on submissions from 16 – 18 UK Accident & Emergency Departments of Hospitals, and not on the full 200 A&E Hospital departments.

The UK HSE reporting systems seem to raise many concerns in their own country – in particular – recently on the BBC Radio 4 programme (Friday 27th July 2007) it was reported “HSE failing to probe 100s of serious accidents every year” and alleged that the HSE was “financially strangled” and unable to investigate all accident cases. In addition, workplace fatalities in the year 2006/7 were the highest in the UK for 5 years.

[http://www.bbc.co.uk/print/radio4/facethefacts/transcript\\_20070727.shtml](http://www.bbc.co.uk/print/radio4/facethefacts/transcript_20070727.shtml)

In fact HSE reported also in the July workgroup meeting 2007 about limitations in respect to available personal and financial budgets.

When we recall the statement of the unchanged UK position of being against any restrictions, put forward by HSE immediately after the RPA report presentation at the last Limitations Workgroup Meeting and before any comments from other member states could be offered, one must ask where they get their confidence to convince others of a more relaxed attitude when those are highly sensitized by their own comprehensive available data and experiences.

We leave it now to the careful readers to draw their own conclusions and we would very much appreciate if someone has an answer to our questions and/or a better understanding of why RPA was not using all available data that have been made available to them by member states and their poison centres in order to support their work and recommendations.

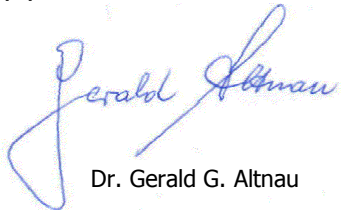
For comparison:

	<b>fatalities</b>	<b>incidents in Europe</b>
RPA executive summary:	25	72
All available data:	28 (+12%)	672 (+833%)

EASCR will soon update their table on our homepage to inform about the reality because the RPA report certainly lifted the existing knowledge onto a higher level, if one is willing to use the data.

We would recommend making this information available to all members of the Limitations Workgroup to allow them to build an own opinion.

Sincerely yours



Dr. Gerald G. Altnau  
Chairman

**Proverb:** "In the country of the blind the one-eyed man is king"  
***What advice can a blind man give to those which see?***

***Close your eyes?***

.cc Dr. Stephen Pickering, DG Enterprise and Industry, European Commission  
Dr. Klaus Berend, DG Enterprise and Industry, European Commission

- *Attachement*
- *BBC Radio 4 programme (Friday 27th July 2007) "HSE failing to probe 100s of serious accidents every year"*

# ATTACHEMENT

## Collection of not counted incidents from the RPA report Annex E

### Accident data from Finland

RPA report Annex from page E-4 to E-5

#### Table E1.1 Finnish Poison Information Centre

The brain damage case will not be considered. Out of 10 cases during 2003 – 2005 30% will be designated to consumer applications as calculated from averages from other member states: 2003 with 1 professional and 1 consumer incident and 2004 & 2005 with 3 professional and 1 consumer incident each;  
No double-count possible because of no earlier entries from Finland.

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

### E1.5 Accident Data from Finland

Based on data from consultation (2002-2005), the number of calls related to human exposure to DCM (suspected or real exposure) to the Finnish Poison Information Centre in the years 2003-2005 is detailed in Table E1.1.

Additional information from the Finnish Institute of Occupational Health provided to RPA by the Finnish National Product Control Agency for Welfare and Health (2006), suggests that the Finnish Register of Occupational Diseases includes 4 relevant incidents during 1998 – 2002, of which one was a severe brain damage in the furniture industry (most probably caused by DCM-based paint stripping).

Year	Number of calls	Routes of exposure (more than one possible)
2005	9 calls (4 definitely related to DCM paint strippers) 6 with reported symptoms	Inhalation: 3 Eye: 5 Dermal: 1
2004	8 calls (4 definitely related to DCM paint strippers) 7 with reported symptoms	Inhalation: 1 Eye: 2 Dermal: 4 Oral: 1
2003	7 calls (2 definitely related to DCM paint strippers) 6 with reported symptoms	Inhalation: 2 Eye: 3 Dermal: 3

Source: Finnish Poison Information Centre, 2006  
Notes: The figures in parenthesis relate to accidents (based on spontaneous calls) involving DCM-based paint strippers as ascertained at the time. Information on hospital attendance is not available.



## Accident Data from France

**Table E1.2** “Accidents related to DCM based Paint Strippers recorded by the Angers Poison Centre (France)” on page E-7 to E11 in the Annex E of the RPA Final Report “Impact of Potential Restrictions on Dichloromethane” listed 24 consumer and 59 professional (workplace) accidents. Consumer incidents represent therefore 28,9 % out of a total of 83 accidents between 1997 and 2001.

For comparison reasons the following **Table E1.5** without differentiation between consumer and professional usage, the split was calculated based on an assumed 30% share for consumer incidents.

Because no French non-fatal incidents have been registered for the years 1999 – 2003 there are no double-counts possible and 383 new non fatal incidents were made known to RPA.

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

Table E1.5: Distribution of the number of people exposed to DCM-based paint strippers containing more than 50% of DCM

Year	CAPTIV Angers	CAPTIV Paris	CAPTIV Nancy
1999	11	12	
2000	29	20	
2001	32	23	
2002	28	24	
2003	37	22	
2004	38	20	2
2005	30	15	5
2006	17	12	3
<b>TOTAL</b>	<b>222</b>	<b>148</b>	<b>10</b>

30% average share of consumer incidents calculated from Table E1.2

Table E1.5 split into consumer and professional incidents based on the calculate average from table E1.2

Year	CAPTV Angers		CAPTV Paris		CAPTV Nancy		Total	
	Professional	consumer	Professional	consumer	Professional	consumer	Professional	consumer
1999	8	3	8	4			16	7
2000	20	9	14	6			34	15
2001	22	10	16	7			38	17
2002	20	8	17	7			37	15
2003	26	11	15	7			41	18
2004	27	11	14	6	1	1	42	18
2005	21	9	10	5	4	1	35	15
2006	12	5	8	4	2	1	22	10
<b>TOTAL</b>	<b>156</b>	<b>66</b>	<b>102</b>	<b>46</b>	<b>7</b>	<b>3</b>	<b>265</b>	<b>115</b>

### Strasbourg Poison Control Centre

- 2001 / one case in 2001 (page E-15)

### Bourdeaux Poison Control Centre

- two incidents, one each in 2001 and 2002 (page E-17)

### French Ministry of Labour

The French Ministry provided RPA (page E-15) with 5 DCM fatalities between 1994 and 1997. Three out of those are listed in the EPICEA database from INRS and already registered. The other 2 cases from 1997 are known from literature: Testud F. et Coll., Arch.Mal.Prof., 2002, 63, no 5, pp 382-387 (44 year old restorator/paint stripper) / Goullé J.-P. et Coll., Analytical Toxicology. Vol. 23, September, 1999. pp. 380-384 (47 year old worker).

**Table E1.2: Accidents related to DCM-based Paint Strippers recorded by the Angers Poison Centre (France)**

1997				
Severity	Sex/age	Products	Symptoms	Remarks
Severe	M / 41y	Decalaminor (DCM + formic acid + phenol). Cutaneous and inhalation	Skin burns 2 <sup>nd</sup> degree 15%, coma, metabolic acidosis. COHb max 6.8% at H8 (non smoker)	Workplace accident. Tracheal intubation, ventilatory support. Hospital stay 20 days
Severe	M / 33y	DCM. Paint remover inhalation. High pressure aerosol	Coma, pulmonary oedema, cardiac arrhythmias, COHb max 17.8%	Workplace accident. Ventilatory support. 4 days in intensive care unit.
Severe	M / 21y	DCM paint remover inhalation high pressure aerosol	Coma, pulmonary oedema, respiratory and cardiac failure, ventricular fibrillation	Workplace accident, death before hospital admission
Moderate	M / 29y	Decalaminor (DCM + formic acid + phenol) Cutaneous and inhalation	Skin burns first degree 25%, keratitis, COHb 2.8% (non smoker)	Workplace accident
Moderate	M / 31y	Decapant surpuissant (DCM 50% + phenol 24%)	Skin burns 20 cm <sup>2</sup>	Workplace accident. hospital stay 2 days
Moderate	M / 26y	Décapant very strong (DCM and hydrofluoric acid 1%)	Finger burns	Workplace accident. Treatment 4 days at home
Moderate	M / 39y	Decapex (DCM 80% and ethanol 10%)	Skin burns first degree	Workplace accident, hospital stay 1 day
Minimal	M / 45y	Paint remover (DCM + methanol 5%)	Dizziness	DIY accident
Minimal	M / 31y	Decapnet (DCM + methanol) inhalation	Throat pain	DIY accident
Minimal	M / 34y	Decapant Diamantine (DCM) inhalation	Minor respiratory symptoms	DIY accident
Minimal	M / 26y	Alrey FC 90 (DCM 28% + isobutyl acetate 5% + white spirit). Ingestion	Dizziness, epigastric pain, COHb 6.8% (smoker)	Workplace accident, hospital stay 1 day
Minimal	M / 53y	Graffiti remover (DCM + phenol + formic acid)	Skin burns 5%, corneal irritation, COHb 1%	Workplace accident
Minimal	F / 44y	Decapex (DCM + methanol)	Dermal irritation	DIY accident
Minimal	M / 24y	Decolpint (DCM + acetic acid + formic acid).	Skin burns of the foot.	Workplace accident.
Minimal	F / 36y	Decap facades (DCM) inhalation without mask	Dizziness, nausea, COHb 3.7 % (non smoker) plasma ethanol = 0	Workplace accident
Minimal	M / 31y	Paint remover (DCM + methanol) inhalation	Dizziness, nausea, abdominal pain	DIY accident

**Impact of Potential Restrictions on Dichloromethane – Final Report – Annex E**

<b>Table E1.2: Accidents related to DCM-based Paint Strippers recorded by the Angers Poison Centre (France)</b>					
Minimal	M / 22y	DCM. Paint remover ocular route	Corneal irritation	Workplace accident	
Minimal	F / 29y	Decapant 255 G (DCM + methanol) cutaneous	Skin irritation	DIY accident	
<b>1998</b>					
<b>Severity</b>	<b>Sex/age</b>	<b>Products</b>	<b>Symptoms</b>	<b>Remarks</b>	
Moderate	M / 24y	DCM inhalation	Dizziness, loss of consciousness, nausea vomiting, COHb 8.4%	Workplace accident. Hospital stay 1 day	
Moderate	M / 27y	EPOXY 30 BS (DCM 71% + formic acid 5% + monochloroacetic acid 11%) cutaneous	Skin burn first degree 1%, keratitis, corneal oedema and ulcerations	Workplace accident. Hospital stay 5 days	
	M / 41y	GELCIM T (DCM + methanol) inhalation of 30 kg used for paint stripping	Headache and inebriation, dizziness, COHb 18.5%		
M / 45y	Headache and inebriation, dizziness, COHb 14%				
M / 24y	Headache and inebriation, dizziness, COHb 11.2%				
M / 44y	Headache and inebriation, dizziness, COHb 12.8%				
Moderate	M / 40y		Headache, COHb 5%		
	M / 35y		Headache, COHb 8.5% (smoker)		
	M / 18y		Skin burn first degree of hands	Workplace accident. Medical consultation	
Minimal	M / 19y	DCM	Skin irritation	DIY accident	
Minimal	M / 24y	Decapex (DCM + methanol) used without gloves	Skin burn forearm 6 cm, secondary infection	Workplace accident	
Minimal	F / 30y	Paint stripper (DCM) brief inhalation	Headache, COHb <2%	Workplace accident. Medical consultation	
Minimal	F / 32y	Paint stripper (DCM) brief inhalation	Nausea, headache, COHb <2%	Workplace accident. Medical consultation	
Minimal	M / 33y	V33 Super décapant, (DCM) gloves with holes	Finger burns	DIY accident	
Minimal	M / 35y	Methoklone (DCM 94%) cutaneous + inhalation	Skin irritation, headache,	Workplace accident. Hospital stay 1 day	

**Table E1.2: Accidents related to DCM-based Paint Strippers recorded by the Angers Poison Centre (France)**

Severity	Sex/age	Products	Symptoms	Remarks
Minimal	F / 37y	Paint stripper (DCM) cutaneous	Skin burn of forearm, Phlyctena	Workplace accident. Medical consultation
Minimal	M / 40y	Condor decapant extra fort (DCM 82% + methanol 12%)	Skin irritation, erythema	Workplace accident
Minimal	M / 44y	Strip iso verre (DCM 60% + phenol 5% + hydrofluoric acid 4%)	Skin burns of fingers	Workplace accident. Treatment by calcium gluconate gel
Minimal	M / 35y	Verittt paint remover (DCM +methanol) ocular	Conjunctivitis	DIY accident
Minimal	M / 10 y	Graffiti remover (DCM) in aerosol, oral route	Vomiting	Home
Minimal	F / 44y	Decapex (DCM + methanol)	Phlyctenas et skin irritation of hands	DIY accident
Minimal	M / 26y	DCM + formic acid + HF. Worn gloves	Finger burns	Workplace accident. Treatment 7 days
Minimal	M / 24y	DCM; high pressure ocular	Ocular pain	Workplace accident
Minimal	F / 22y	V33 superdecapant (DCM). Paint stripping without gloves	Skin irritation	DIY accident
<b>1999</b>				
Severity	Sex/age	Products	Symptoms	Remarks
Moderate	M / 24y	REGOR CAP (DCM + methanol 10%) Inhalation	Headache, dizziness, tinnitus, COHb 2.3% max H6.	Workplace accident. Hospital stay 1 day
Minimal	M / 44y	DCM 90% + HF 2% cutaneous route	Skin burn of fingers	Workplace accident. Medical consultation
Minimal	F / 25y	DCM, short inhalation	Throat irritation	Workplace accident
Minimal	M / 48y	DCM, inhalation	Asthenia, headache, vomiting nauseas, erythema, COHb 1% at day 3	Workplace accident. Hospital stay 1 day
Minimal	M / 50y	DCM + phenol + methanol	Erythema	Workplace accident. Medical consultation.
Minimal	M / 42y			
Minimal	M / 36y	DECAPEX (DCM), cutaneous, right hand	Crumpled skin	DIY accident
Minimal	F / 22y	DCM cutaneous		Workplace accident
Minimal	M / 25y	DCM cutaneous	Skin burn of forearm, erythema	Workplace accident. Medical consultation and decontamination
Minimal	M / 2.5y	DCM + methanol 9%, cutaneous	2 <sup>nd</sup> degree skin burn of chest	DIY. Medical consultation

**Impact of Potential Restrictions on Dichloromethane – Final Report – Annex E**

<b>Table E1.2: Accidents related to DCM-based Paint Strippers recorded by the Angers Poison Centre (France)</b>					
Minimal	M / 25y	DCM cutaneous and inhalation	Erythema face and hair	Workplace accident. Hospital stay 1 day	
Minimal	M / 27y	Décapant super (DCM + HF) Working without gloves	Insomnia, finger burns	Workplace accident. Medical consultation	
Minimal	M / 34y	Décapant super (DCM + HF) Working without gloves	Insomnia, finger burns	Workplace accident. Medical consultation	
Minimal	M / 46y	DCM, inhalation (working without mask)	Inebriation, cough, COHb?	Workplace accident. Medical consultation	
<b>2000</b>					
<b>Severity</b>	<b>Sex/age</b>	<b>Products</b>	<b>Symptoms</b>	<b>Remarks</b>	
Moderate	M / 26y	Decapant 802 (DCM 84%, HF1 %) without gloves	Skin burns of hands	DIY. Medical consultation, calcium gluconate, surgical nail excision	
Minimal	M / 33y	SNODEX (DCM) cutaneous	Erythema	Workplace accident. Medical consultation	
Minimal	M / 18y	DCM + methanol – cutaneous	Phlyctenas	Workplace accident. Medical consultation	
Minimal	F / 34y	Decapant neutre (DCM) ocular	Conjunctivitis	DIY accident	
Minimal	M / 30y	Decapeint (DCM + methanol)	Burns of hands	DIY accident. Medical consultation	
Minimal	F / 50y	Decap'L (DCM) aerosol inhalation	Vomiting, dizziness, COHb 5% H24	DIY. Medical consultation	
Minimal	M / 36y	DCM aerosol ocular	Conjunctivitis	Workplace accident	
Minimal	M / 12y	Decap extra fort (DCM + methanol)	Conjunctivitis	Accident at home	
Minimal	M / 15y	DCM - cutaneous	No symptom		
Minimal	F / 25y	DCM	Conjunctivitis	Medical consultation	
<b>2001</b>					
<b>Severity</b>	<b>Sex/age</b>	<b>Products</b>	<b>Symptoms</b>	<b>Remarks</b>	
Severe	M / 80y	Paint remover (DCM) applied on exterior walls of their house. Pollution of indoor air by mechanical ventilation	Dizziness, nausea, COHb 19.8 %	Air pollution. Hospital stay 1 day. Oxygen therapy	
	F / 80y				
Severe	M / 50y	DCM + methanol + trichloroethylene used in cellar.	Loss of consciousness, inebriation, COHb 25%. Trichloroacetic acid in urine 26 mg/g creatinine	DIY accident. Hospital stay 1 day oxygen therapy. No other cause of CO poisoning in the cellar	
Moderate	M / 40y	Inhalation, DCM + methanol	Skin erythema, dizziness, tachycardia,	Workplace accident, oxygen therapy,	

Table E1.2: Accidents related to DCM-based Paint Strippers recorded by the Angers Poison Centre (France)			
			inebriation, excitement, COHb 21%
Moderate	M / 21y	Tecs Vitcap (DCM + formic acid + monochloroacetic acid). No gloves	Skin irritation, headache, paraesthesia. COHb 8%. Non smoker
Moderate	M / 3 y	DCM, eye contact	Conjunctivitis, keratitis; corneal oedema and ulcerations, decreased eyesight
Moderate	M / 25y	DCM, eye contact	Keratitis, corneal ulcerations
Minimal	M / 16y	Paint remover DCM, spilled into the shoe	Phlyctena
Minimal	M / 27y	DCM aerosol, ocular	Conjunctivitis
Minimal	M / 38y	DCM	Conjunctivitis
Minimal	M / 33y	DCM	Conjunctivitis
Minimal	F / 30y	DCM, no gloves	Skin irritation
Minimal	M / 31y	Progal S 88 (DCM + monochloroacetic acid). Short cutaneous contact	1 <sup>st</sup> degree burn of hand
Minimal	M / 41y	Paint remover (DCM 90%+ formic acid 5%)	Skin irritation
Minimal	F / 23y	DCM	Conjunctivitis
Minimal	M / 20y	DCM +phenol	Skin irritation
Minimal	F / 37y	DCM ocular	Conjunctivitis
Minimal	F / 30y	Paint remover DCM + methanol	Conjunctivitis
Minimal	M / 42y	Paint remover (DCM 60% phenol 25%).	Skin irritation, conjunctivitis, COHb 0,3% at H6
<i>Note: See Table E1.4 for a summary of accidents from the Angers Poison Centre for the years between 2002 and 2006.</i>			
			hospital stay 1 day
			Workplace accident. Hospital stay 1 day
			Workplace accident. Several ophthalmologist consultations
			DIY accident. Medical consultation
			Workplace accident
			Workplace accident. Medical consultation
			DIY accident
			Workplace accident. Medical consultation
			DIY accident
			Workplace accident. Medical consultation
			Workplace accident. Medical consultation
			Workplace accident
			workplace accident
			Workplace accident
			DIY accident
			Workplace accident

<b>Table E1.3: Accidents reported by the Angers Poison Control Centre (France, 1997-2001)</b>			
<i>Types of Exposure Associated with Accidents</i>			
<b>Exposure route</b>		<b>Number of cases of intoxication</b>	
Cutaneous		35	
Ocular		15	
Cutaneous + ocular		2	
Inhalation		21	
Cutaneous + inhalation		5	
<i>Chemical Substances Associated with Accidents</i>			
<b>Products</b>		<b>Cases of Intoxication (n)</b>	
DCM		17	
DCM + methanol + paraffin		29	
DCM + ethanol + paraffin		3	
DCM + formic acid		7	
DCM + acetic acid		1	
DCM + phenol		7	
DCM + monochloroacetic acid		6	
DCM + hydrofluoric acid		6	
DCM + white spirit		2	
<i>Types of Symptoms Associated with Accidents</i>			
<b>Symptoms</b>	<b>Frequency (n)</b>	<b>Symptoms</b>	<b>Frequency (n)</b>
Cephalalgias	6	Renal insufficiency	0
Intoxication	8	COHb increase	13
Short loss of consciousness	2	Irritation of throat	3
Coma or convulsions	4	Cutaneous erythema	20
Ear ringing, ataxia	8	1st degree burn	17
Pulmonary oedema	2	2 <sup>nd</sup> degree burn	2
Arrhythmia supraventricular	1	Phlyctens	5
Ventricular arrhythmia, FV	3	Aspect of hardened wrinkled skin	2
Disturbed re-polarisation	2	Conjunctivitis	14
Metabolic acidosis	4	Keratitis, corneal ulcerations disturbed re-polarisation	6
Biological hepatitis	1	Vision reduction	2
<i>Severity of Accidents</i>			
<b>Severity</b>	<b>Cases (victims)</b>	<b>Hospitalisation</b>	
Severe	5 cases (8 victims)	1 to 20 days. <b>1 death</b>	
Moderate	13 cases (15 victims)	1 to 5 days (average 1.8 days)	
Minor	60 cases (65 victims)	2 hospitalisations for 1 day; consultations for the others	
<i>Source: French Ministry of Labour, 2006a</i>			

Table E1.3 also shows the substances associated with different cases of intoxication and the severity of the accidents. DCM is associated with alcohols, acids or solvents in more than 75% of the cases. The symptoms experienced by the victim depended on the exposure route. Generic symptoms were only observed in inhalation or massive cutaneous exposures. There were no cases of ingestion among the data presented by the Angers Poison Control Centre. Five example cases are discussed in the boxes below.

*Example case 1: File 98-13335*

Six builders aged 24 to 45 years were made responsible for stripping the paint off a large room in a building and coat the walls with a brush. They were in an enclosed space and were protected by masks made from cardboard. After having used 30kg of the GELCIM T gel (DCM, methanol), they showed signs of cephalalgias, instability, and intoxication. Three hours after admission into hospital, their proportions of venous COHb varied between 8.5% and 18%. The builders were all given a 24 hours oxygen treatment; they were cured.

*Example case 2: File 97-12337*

Two workmen aged 21 and 33 years were made responsible for paint stripping the interior of a water tower using a product containing DCM and a hydrocarbon type white spirit by karsher pulverisation. The masks they were using were not functioning very well, which caused them to remove them on several occasions. 30 minutes into their job, the workmen felt faint and so they went to get some air at the top of the water tower, after which they went back to work. 30 minutes later they were found unconscious by another worker. The doctor detected convulsions, a state of shock, and a bilateral OAP in both victims. Both patients were incubated and given oxygen. The 21 year old died of an OAP, shock, circulatory arrest and recurring ventricular fibrillations. The 33 year old showed signs of re-polarisation problems at the ECG (myocardic ischaemia), coma and disturbed ventricular rhythm. There was a metabolic acidosis, COHb 6% at admission then 18% with H6 in pure oxygen ventilation then 6% with H24. Within three days he recovered without any hepatic or renal complications.

*Example case 3: File 97-2903*

Two workmen aged 41 and 29 years were victim of projectile release from a product in a tank (Decalaminor DCM 65%, phenol 23%). They were immediately showered and decontaminated by firemen without any ocular rinsing. They had 2<sup>nd</sup> degree burns on approximately 15% of the body surface, especially around the face and chest, an obnubilation, laryngeal ailments and coughing from one of the workmen who was incubated. A cutaneous decontamination by PEG 4000 was carried out at the hospital because of the presence of phenol in the stripping solution. Keratitis was observed on both victims. On a biological level, there was a minor metabolic acidosis and the carboxyhaemoglobin was at 8% of the maximum; this is considering the fact that early on they were given an oxygen treatment (non smokers). No hepatic or renal complications were observed over the course of the three days these patients were treated with N-acetylcysteine. The treatment for burns required 8 and 10 days of hospitalisation.

*Example case 4: File 32109*

An 80-year-old couple asked an approved company to repaint the external wooden walls of their house. The walls were stripped in a day with DCM in gel form; the couple remained in the house with all doors and windows closed. That evening they showed signs of nauseas and asthenia. The next morning, when they woke up, they showed signs of cephalalgias, ataxia, asthenia, and confusion; it was at this point that the painter discovered them and could sense a strong smell of solvent odour in the house. That same morning at the hospital, their proportions of COHb were 18% and 19%, and no signs of clinical or electric coronary signs were shown. They left the hospital after 24 hours of oxygen treatment. The medical investigation of the residence did not find any source of CO or any apparatus with combustion. The only assumption was that they were intoxicated by DCM, which would have diffused into the inside of the house.

*Example case 5: File 39219*

A builder from a small company was given the task of stripping pieces of wood by dipping them into a bath of DCM and methanol. Although he performed this job for several years on a regular basis, one morning he worked



without his mask. This caused him to faint around midday and receive a projection on the face. He was admitted to hospital around 2pm by which point he was agitated, had tachycardia, and an erythema on the chin and cheekbones. There were no signs of coronary defects. A COHb test was performed, which came back as 21% positive; this level remained stagnant for the following four hours. The next day at midday, the level had decreased by 4% after 24 hours of oxygen treatment, which then decreased to 4% the following day at midday after 24h from oxygenation. An air vent has since been installed.

Source: French Ministry of Labour, 2006a

### Discussion of Statistical Analysis of Results

An analysis made available to RPA by the French Ministry of Labour (2006a) emphasises the fact that intoxications from DCM are not a rare occurrence. The data from Angers show that the majority of accidents are predominantly of minor severity, in both DIY and professional/industrial accidents. On the other hand, moderate or severe accidents caused by direct or indirect (air pollution) exposures were more predominant in cases of professional (occupational) activities rather than DIY use of DCM-based paint strippers.

***Skin exposure:*** The majority of accidents in this research are skin burns. Their severity is mainly linked to the spread of the burn on the injured surface and to the timing at which rinsing with clear water took place. Although the lesions last less than 10 days, they can be very painful for the first few days. The paraffin in certain stripper gels can limit the effectiveness of rinsing with clear water, thus prolonging the rinsing time. A particular aspect of wrinkled skin on an erythema was observed twice, but this could be the result of a mistaken diagnosis between the burns caused by dimethylformamide or N-methyl-2-pyrrolidone. Topical burns on hands or small surfaces do not result in systemic symptoms. Only two victims from this data series that incurred burns from DCM covering 15% of their body surface had obvious signs of intoxication. The risk of general intoxication via the percutaneous way was recently reinstated, although the associated inhalation or ingestion cannot be conclusively excluded (Weber *at al*, 1990).

***Ocular exposure:*** Ocular projections result in conjunctivitis, which can be quickly treated but cause corneal ulcerations. An oedema of the cornea can be observed as well as a decrease in vision in the event of delayed rinsing. An ophthalmologic consultation is advised if the ocular signs persist after rinsing or if there is a decrease in vision.

***Inhalation exposure:*** The accidents by prolonged inhalation, especially in an enclosed atmosphere and without a suitable mask are the main reasons for the most severe systemic intoxications. Inhalation is a very good way for absorbing DCM; this also quickly sets off systematic symptoms from the solvent such as giddiness, nausea etc. The neurological signs of a severe intoxication include the loss of consciousness, confusion, coma and convulsions. These neurological signs are caused by the solvent but are also the result of its metabolite, carbon monoxide.

***Metabolism issues:*** The biological marker of this intoxication can result from the doses of DCM detected in the blood, but is predominantly due to the levels of carboxyhaemoglobin. The work of Stewart in 1972 was the first to acknowledge that the

effects of DCM are metabolised into carbon monoxide by the P450 cytochrome; carbon monoxide concentrations increase during the 4<sup>th</sup> and 8<sup>th</sup> hour in the event of important exposure. The consequences of this endogenous production of CO are more important than those of the traditional intoxications with carbon monoxide for the same oxycarbonaemia. This is because the tissues produced from CO concentrations have a higher significance than the carboxyhaemoglobin doses. Moreover, the cytosolic metabolism also leads to formaldehyde and the formic acid as well as intermediary metabolites that are capable of nucleophilic acylation. This would explain the acidosis and the visceral neurological, hepatic, pancreatic or renal attacks (Ahmed *et al*, 1980).

### ***Strasbourg Poison Control Centre***

According to the results of the ECSA survey (2002a), this Poison Control Centre reported two observations:

- ***in 2000***: man - 28 years old - inhalation and dermal exposure to DCM in a coffee production industry - consciousness loss - recovery - Blood concentration of DCM : 24mg/l - Carbon monoxide in blood : 0%; and
- ***in 2001***: man -17 years old - consciousness loss after one hour of utilisation of a paint stripper (methanol and DCM). Recovery - COHb on admission in the intensive care unit: 1.7% (H2). COHb 8 hours after exposure: 6.6%.

## **E1.6.2 Data from Consultation with the French Authorities**

### ***Overview of Data Collected in August-September 2006***

The French Ministry of Labour has provided an overview of data on accidents from a wider area rather than just for the Angers Poison Control Centre discussed in the ECSA report. Since 1990, at least 5 fatalities of employees involved in professional uses have been described in France (French Ministry of Labour, 2006a):

- in 1990: a 38-year old painter found dead after applying a stripping gel with hand brush inside a water tower;
- in 1992: a 55-year old man in charge of applying water-tightness product inside an indoor swimming pool;
- **in 1994: a 44-year old paint stripper found lying over a tank of liquid containing more than 50% of DCM;**
- **in 1997: a 47 year old man after an overflow of a tank; and**
- in 1997: a 35-year-old paint stripper lying near an open stripping fluid storage (200 litres container).

Seven other serious accidents are recorded in the EPICEA database. The common factor of these casualties seems to be a lack of aeration of the room or a massive exposure (overflow, large storage tank, etc.).

***Detailed Analysis of Data Collected in August-September 2006***

The French Ministry of Health organised the collection of information on accidents relating to exposure to DCM-based paint strippers following a request from RPA. Furthermore, on 24 August 2006, the French Directorate-General of Health solicited the co-ordinating committee of toxicovigilance as a means of obtaining data on the number of cases of intoxications related to the use of paint strippers containing DCM received by Poison Control Centres (centres of anti-poison and toxicovigilance - CAPTV).

An analysis of the national database of the products and compositions (BNPC) of the Information System of the Poison Control Centres (Système d'information des centres antipoison - SICAP) was carried out in order to obtain the list with the composition for the preparations containing DCM that were available in the BNPC on the 31/08/2006. From this list, a cross-examination of the intoxication cases from the national database (BNCI) of the SICAP was performed on the 13th September 2006 to help identify the number of people exposed to, and the deaths related to paint strippers containing DCM.

The BNCI currently includes data from the CAPTV of Paris and Angers dating back to July 1999 and from the CAPTV of Nancy from 2004. All in all, the files which were dealt with by the anti-poisons centres of Angers, Nancy and Paris represent approximately a third of all the notifications in the ten French anti-poisons centres.

As the Ministry has advised, as a result of the relatively short time for response, a cross-examination was not performed on all the local databases from anti-poison centres.

The number of people exposed to paint and varnish strippers containing DCM per annum and for each of the three Poison Control Centres for which the BNCI had data for is presented in Table E1.4 below. In addition, Table E1.4 also comprises the total number of cases per annum per Poison Control Centre.

<b>Year</b>	<b>CAPTV Angers</b>	<b>CAPTV Paris</b>	<b>CAPTV Nancy</b>	<b>No. of DCM cases</b>	<b>Total no. of cases</b>
1999	11	12	-	<b>23</b>	<b>22,201</b>
2000	29	21	-	<b>50</b>	<b>53,118</b>
2001	33	23	-	<b>56</b>	<b>52,224</b>
2002	28	24	-	<b>52</b>	<b>54,459</b>
2003	37	22	-	<b>59</b>	<b>52,823</b>
2004	38	20	2	<b>60</b>	<b>56,280</b>
2005	30	15	5	<b>50</b>	<b>60,544</b>
2006	18	12	3	<b>33</b>	<b>35,740</b>
<b>Total</b>	<b>224</b>	<b>149</b>	<b>10</b>	<b>383</b>	<b>387,389</b>

*Source: French Ministry of Labour, 2006a*

Table E1.5 below indicates the number of people exposed to paint and varnish strippers containing more than 50% DCM, per annum and for each of the three Poison Control Centres; only three cases of intoxication were listed for paint removers containing less than 50% DCM (one case <10%; and two cases between 10 and 50%). **Two deaths** were reported by the Poison Control Centre of Angers in 2002 and 2005 relating to paint removers containing more than 50% DCM.

Year	CAPTIV Angers	CAPTIV Paris	CAPTIV Nancy	No. of DCM cases
1999	11	12	-	23
2000	29	20	-	49
2001	32	23	-	55
2002	28	24	-	52
2003	37	22	-	59
2004	38	20	2	60
2005	30	15	5	50
2006	17	12	3	32
<b>Total</b>	<b>222</b>	<b>148</b>	<b>10</b>	<b>380</b>

*Source: French Ministry of Labour, 2006a*  
*Note: We assume that the term "people" refers to both consumers and occupational users.*

***Data from the Bordeaux Poison Control Centre***

Following direct communication with the Bordeaux Poison Control Centre, data were collected for the years 2000 to 2005; the Centre covers 4.6 million inhabitants (Bordeaux Poison Control Centre, 2006). Among the recorded accidents there are the following two cases of severe intoxication:

- in 2001, a 45-year-old man had undertaken paint stripping for 3 months without particular protection. He complained for respiratory problems and gastric burns; medical consultation followed as well as symptomatic treatment and cure after introduction of personal protection measures; and
- in 2002, a 34-year-old man used a DCM-based paint stripper without a protective mask during a whole day. He was hospitalised for 48 hours in the Pneumology Department with a feverish pneumonopathy; recovery ensued.

## Accident data from Germany

RPA report Annex from page E-18 to E-23

### Table E1.6 GIZ-Nord Poison Centre

All 4 DCM paint stripper cases b, c, d and g are not covered by existing protocols or article. No consumer or professional incidents for Germany have been collected in these years until today. There is no overlapping with the cases from the Bau-BG for the years in question.

### Table E1.7 Federal Institute for Risk Assessment

For the years 1990 and 1992 1 fatality per year has been registered already. The two consumer incidents from this table are new information.

The DCM paint stripper fatality in 2002 is already documented and registered.

This table doesn't provide any further new information based on the lack of information.

There is no overlap with the Bau-BG data.

### Table E1.8 Bau-BG

All incidents are known and part of existing overviews and offer no new information.

### Table E1.9 Erfurt Poison Centre

All 6 professional cases are well described and identify DCM paint strippers as route course. Because the year is not defined and the period covers ranges from 1996 – 2005 all 6 incidents will be registered in 2005.

All 6 cases don't fit to the few known professional cases (e.g. severances of symptoms, number of people, sex, or working time) in this time period (or region from the Bau-BG cases) and will be counted as new ones.

Sydow et al (2006) report on a 2 year old boy trying to drink from a container with DCM paint remover he found in the professional workshop of his parents. This info was provided by GIZ-Nord Poison Centre (page E-23)

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

#### New cases from German Poison Centres and the Federal Institute for Risk Assessment

Year	GIZ-Nord table E1.6		Erfurt table E1.9		Fed.Inst. table E1.7		Total		BAU-BG
	Professional	consumer	Professional	consumer	Professional	consumer	Professional	consumer	
1990					1		0	1	
1992					1		0	1	
1993					1		0	1	
1996	1						1	0	
1997		2					0	2	2 Hannover
1998	1						1	0	
2005			6				6	0	2 Hannover + Wuppertal
2006		1					0	1	2 Hessen
<b>TOTAL</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>8</b>	<b>6</b>	

## E1.7 Accident Data from Germany

### E1.7.1 Data from the ECSA Survey (ECSA, 2002a)

#### *Göttingen Poison Control Centre*

Information provided by the University of Göttingen for North Germany is presented in Table E1.6.

Year	Symptom severity					Number of DCM-related cases	Number of all cases
	Severe	Moderate	Minimal	No symptoms	Unknown		
1996	2 (a)	1 (b)	6	1	4	14	14,034
1997	1 (c)	3 (d, e, f)	4	3	4	15	18,065
1998	1 (g)	0	5	1	2	9	20,080
1999		0	0	1	2	15	22,393

*Source: ECSA, 2002a*

*Remarks on severe or moderate cases:*

- a) DCM as extraction medium for coffee production, inhalation, 2 adult men at workplace: strong COHb, HBO therapy (no data on symptoms);
- b) paint stripper inhalation, adult man: vomiting, headache, breast pain;
- c) paint stripper inhalation at home: throat pain, dyspnoea 33 h after use, tracheotomy;
- d) paint stripper inhalation, adult man at home: patient found comatose, paint stripper spilled on floor, healing without residual damage;
- e) unknown product type, man 27 yr at workplace: DCM spilled on floor, adult patient, weakness, headache, vertigo;
- f) unknown product type, DCM high pressure injection into hand, man 41 yr at workplace: pain, inflammation; and
- g) paint stripper, inhalation, man 53 yr at workplace: cardiac arrest, reanimation, brain oedema.

#### *Berlin Poison Control Centre*

Berlin is the largest poison centre of Germany (48,000 calls yearly) and has the most cases with paint strippers (few cases related to adhesives and aerosols). Due to restrictions in the use of chlorinated solvents, the number of cases has fallen dramatically in recent years and represents only a fractional amount of the total number of calls. The centre actively promotes the substitution of hazardous products.

#### *Bonn Poison Control Centre*

No cases involving DCM-based paint strippers.

#### *Mönchengladbach Poison Control Centre*

No incidents reported.

**E1.7.2 Data from Consultation (1984 – 2006)**

Information on accidents (including fatal ones) in Germany has been submitted from a variety of sources and is presented below. It is possible that there is some overlap in this information.

***Information from the Bundesinstitut fur Risikobewertung (Federal Institute for Risk Assessment)***

The Bundesinstitut fur Risikobewertung has registered information about accidents caused by chemicals or chemical products in a database since 1990. Under the keyword “paint strippers”, there are cases collected not only related to DCM but also to different chemicals or the toxicological relevant substance may be unknown. The Bundesinstitut fur Risikobewertung has provided a list with all available detail and this is reproduced as Table E1.7.

The key points made by the Bundesinstitut fur Risikobewertung include the following:

- exposure to **DCM in general** without mentioned relation to paint strippers included 68 cases in the years 1990 to 2006;
- there are 104 cases registered in the period 1990 to 2006 as paint strippers in general; in these cases, the toxicologically relevant substance is mentioned but is mostly different from DCM (for example, formic acid or hydrofluoric acid) or it is unknown;
- out of these 104 registered accidents, there are 6 cases with paint strippers in which DCM is exactly notified as the toxicologically relevant substance. This information is mostly based on the relevant medical reports, so the Bundesinstitut fur Risikobewertung holds limited details about the circumstances under which the accidents occurred;
- the Bundesinstitut fur Risikobewertung registered one fatality caused by a DCM-based paint stripper (**workplace related**) in the year 2002; and
- in general, the reported accidents **are mainly workplace-related**. Out of the 104 accidents linked to paint strippers, **only 4 cases are consumer-related**.

<b>Year of registration</b>	<b>Number of cases</b>	<b>Degree of symptoms</b>	<b>Tox. relevant substance</b>	<b>Way of intoxication</b>	<b>Type of use</b>
1990	1	1 moderate	DCM	Inhalation	Consumer
1992	1	1 severe	DCM	Inhalation	Consumer
1993	1	1 moderate	?	Inhalation	Consumer
1996	2	1 light, 1 severe	Hydrofluoric acid	Symptoms: skin/eye	Workplace
2000	10	5 light, 5 moderate	1 light: DCM - others: ?	Skin	Workplace

<b>Table E1.7: Data on Accidents related to “Paint Strippers” in Germany (1990-2006)</b>					
<b>Year of registration</b>	<b>Number of cases</b>	<b>Degree of symptoms</b>	<b>Tox. relevant substance</b>	<b>Way of intoxication</b>	<b>Type of use</b>
2000			1 mod: formic acid,	Skin	Workplace
2001	27	24 light, 3 moderate	1 light: DCM - others: ?	Inhalation	Workplace
2002	19	17 light, 1 moderate, <b>1 fatal</b>	1 light: DCM - others: ?	Inhalation	Workplace
2002			<b>Fatal:</b> DCM	Skin/inhal.	Workplace
2003	10	9 light, 1 moderate	?	Mod.: inhal.	Workplace
2004	9	9 light,	?	Inhalation	1 x consumer
2005	15	15 light	?	?	Workplace
2006	9	8 light, 1 moderate	?	Mod: eye	Workplace
<p><i>Source: Bundesinstitut für Risikobewertung, 2006a</i></p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>- <i>light symptoms: remitting spontaneously;</i></li> <li>- <i>moderate symptoms: longer lasting and need of medical care but no lasting defect;</i></li> <li>- <i>severe: life-threatening symptoms and or lasting defects;</i></li> <li>- <i>fatal: fatality.</i></li> </ul>					

With regard to the severity of the accidents, the following information has been provided:

- within the total number of 104 registered accidents, 75 cases were associated with **light symptoms**. In these cases, the toxicological relevant substance is not obvious by searching the Bundesinstitut für Risikobewertung database. It can be assumed that among those there are cases related with DCM-based paint strippers, so the total amount of registered accidents related to DCM paint stripper would be higher than the above shown number of six;
- details about the **severe accidents** related to the use of DCM-based paint strippers are available:
  - 1990: 32 year old man, consumer, inhaling of DCM fumes; symptoms: difficulty in breathing, headache, eye irritation; restitution without lasting defect; and
  - 1992: 31 year old man, consumer, inhalation; symptoms: headache, nausea, vomiting; neuropathy as lasting defect; and
- the only one **fatal accident** is reported in the box below as a special case report, published in the annual brochure of the Bundesinstitut für Risikobewertung in 2002 “Cases of Poisoning Reported by Physicians”.



**Example case: Fatal Accident reported by the Bundesinstitut für Risikobewertung in 2002**

In the context of his occupation as a painter, a patient aged 66 had been using a paint stripper containing 92% DCM and <10 % formic acid over periods of several hours for more than three days in an unventilated room (ca. 15 x 25 x 5 m). During such work, he did not continuously wear a protective mask. After a period of 11 days, the patient developed a global respiratory insufficiency with a lethal outcome. The safety at work regulations had not been adhered to since the accident investigation report stated that although the patient had received a protective mask, he did not always wear it. In addition, the safety regulations require wearing of a self-contained respirator in case of exposure over extended periods. The protective gloves, which the worker had received, were replaced with leather gloves after a very short period. Therefore, it has been assumed that the total exposure had exceeded the (then) fixed limit concentration of the substance in workplace air (100 ppm = 350 mg/m<sup>3</sup>).

**Information from the Berufsgenossenschaft der Bauwirtschaft**

We have been provided with an account of fatal and non-fatal accidents in the workplace that have occurred between 1984 and 2006 in Germany and which have been associated with the use of DCM-based paint strippers. These are presented in Table E1.8.

<b>Composition of paint stripper</b>	<b>Victims</b>	<b>Year</b>	<b>Source</b>
70% DCM, 10% methanol, 10% xylene	1 injured	1984	Bau BG, Frankfurt
70% DCM, 10% methanol, 10% xylene	1 injured	1985	Bau BG, Frankfurt
Contains DCM (unknown concentration)	1 injured	1985	Württ. Bau BG
Over 70% DCM	<b>1 fatality</b> , 1 injured	1985	BG Glas und Keramik
Contains DCM (unknown concentration)	2 injured	1988	Südwestl. Bau BG
77% DCM, 8% isopropyl alcohol, 5% benzyl alcohol, others	<b>1 fatality</b>	1989	Bau BG Hannover
	<b>1 fatality</b>		
90% DCM, 5% methanol	<b>1 fatality</b>	1990	Literature
Contains DCM (unknown concentration)	<b>1 fatality</b>	1992	Masch BG
50–100% DCM, 10–25% ethanol, butyl alcohol	1 injured	1997	Bau BG Hannover
50–100% DCM, 10–25% 2-propanol, butyl alcohol	1 injured	1997	Bau BG Hannover
50–100% DCM, 10–25% 2-propanol, butyl alcohol	<b>1 fatality</b>	1998	Bau BG Hannover
50–100% DCM	1 injured	1999	BG Bau Frankfurt
84% DCM and alcohol	<b>1 fatality</b>	2000	Literature
92% DCM, 1–10 % formic acid	<b>1 fatality</b>	2002	Tiefbau-Berufsgenossenschaft
Over 70% DCM	2 injured	2004	Bau BG Rheinland und Westfalen
Over 70% DCM	1 injured	2004	Bau BG Hamburg
Contains DCM (unknown concentration)	1 injured	2004	RP Kassel
85–95% DCM, 4–5% methanol, 1–2 % butyl glycol	1 injured	2005	BG Bau, Hannover
Contains DCM (unknown concentration)	1 injured	2005	BG Bau, Wuppertal
Contains DCM (unknown concentration)	2 injured	2006	Sozialministerium Hessen

*Source: Berufsgenossenschaft der Bauwirtschaft, 2006a*

We have enquired about the possible links between the data presented by the Bundesinstitut für Risikobewertung and the Berufsgenossenschaft der Bauwirtschaft. It appears that each institution has its own database without direct connection to each other. The reasons for the four fatalities presented above not appearing in the Bundesinstitut für Risikobewertung data is that from the beginning of compulsory notification introduced by legislation in 1990 (first amendment to the Chemicals Act (ChemG)) until the year 2000, the Bundesinstitut für Risikobewertung did not regularly receive information on workplace-related accidents. However, from year 2000 onwards, the number of notifications has increased. This was due to an agreement with the Berufsgenossenschaften der Bauwirtschaft (the professional insurance bodies in Germany responsible for occupational safety, health protection and accident insurance). According to this agreement, the Berufsgenossenschaften der Bauwirtschaft directly report all notifications on cases of acute health impairment after contact with chemicals or chemicals products to the Bundesinstitut für Risikobewertung (Bundesinstitut für Risikobewertung, 2006b).

***Information from the Erfurt Poison Control Centre***

In the last ten years (1996-2005), the Erfurt Poison Control Centre collected data for six incidents in which exposures to DCM from the use of DCM-based paint strippers occurred. No fatalities have been registered in that period. The total number of exposures registered in our poison centre is 88,100 for the years 1996 to 2005 (GGIZ Erfurt, 2006). The relevant information is presented in Table E1.9.

<b>Medical History</b>	<b>Clinical Features</b>	<b>Advices of the PIC</b>	<b>Outcome</b>
Painter; he worked few days for 8 h everyday; airway protection is unknown	During working nausea, headache, giddiness; normally symptoms were disappeared after the end of exposure until the next morning; at the time of call weakness and giddiness lasting longer than 24 h	Stop of exposure; fresh air and oxygen; control of carboxyhaemoglobin, methanol, and formic acid plasma levels; control and correct acid-base balance	Sequelae possible
Handyman; he worked for short time; contamination of the mouth, no ingestion	Burning sensation (oral mucosa)	Decontamination of mucosa; ingestion of indifferent fluid for washing-up and dilution	Unknown
Handyman; she worked two times (day 1 -7h; day 2 - 3h; interval 7 days) indoor (with open windows); she developed disease 12 day after the second exposure	Initial no symptoms; later (day 12 after last exposure) collapse caused by biliary colic; diarrhoea, hepatomegalia, metabolic acidosis, ammoniaemia, and increase of transaminases	Causality uncertain; symptomatic measures as in toxic hepatic injury	Unknown
Handyman; he worked outdoor without airway protection 3 hours before	Headache, irritation of airways	Stop of exposure; fresh air; no further measures	Unknown
Handyman; he worked for undefined times at weekend two days before	General malaise	Fresh air; symptomatic measures if necessary	Unknown

**Table E1.9: Data on Accidents involving DCM-based Paint Strippers registered by the Erfurt Poison Control Centre (Germany, 1996-2005)**

Medical History	Clinical Features	Advices of the PIC	Outcome
Painter; he worked without airway protection the day before	During working nausea, giddiness, oppressive feeling, cardiac palpitation; symptoms disappeared after exposure spontaneously	Fresh air; symptomatic measures if necessary	Unknown

*Source: GGIZ Erfurt, 2006*

***Information from the Göttingen Poison Control Centre***

During the years 1996-2005, the GIZ-Nord Poisons Centre in Göttingen was consulted in 85 cases regarding exposure to DCM, including 25 cases at the workplace. To put this into context, a total of 250,000 consultations were conducted within that period. No fatalities were reported and no further detail is available on the circumstances of the accidents (Giz-Nord, 2006).

***Information on an Accident involving DCM and Formic Acid***

During consultation with GIZ-Nord, information was supplied on an accident involving a DCM-based paint stripping formulation.

As reported by Sydow *et al* (2006), a healthy two-year-old boy intended to drink from an almost empty 10-litre container of a paint remover for professional use in his parents' professional workshop. According to label and safety data sheet the product contained 3.6% formic acid and 85% DCM. The boy tipped it over, thus contaminating the chest, the front side of arms and legs, lips, parts of the throat, nose and neck, but not the eyes. Only minutes after exposure clothes have been removed and the skin was carefully decontaminated using a shower. The patient was treated at the University Hospital of Göttingen. Within the next 24 hours, skin irritation developed on 40 percent of the body surface but neither signs of metabolic acidosis nor any toxic organ damage were observed. The boy was transferred to the burn injury treatment unit for children at Children's Hospital Park Schönfeld in Kassel. Clinical observation and histological analysis of a skin sample from day 2 showed epidermic necrosis but no damage of the dermis. Within a three-month treatment period at the hospital the patient received two split skin transplants. No severe complications developed during the treatment and one year of follow up observation.

The authors note that the labelling of the container was confusing (although they do not specify in which particular regard) and emphasise that simultaneous dermal exposures to 5.6% formic acid and DCM have caused severe skin corrosion without signs of systemic intoxication; synergistic toxic effects of the ingredients (and maybe the absence of water) may have caused severe symptoms (Sydow *et al*, 2006).

### **Accident data from Ireland**

RPA report Annex from page E-24 to E-27

#### Table E1.11 Irish Health & Safety Authorities

All 17 are identified as DCM paint stripper incidents.

#### Table E1.10 Irish Health & Safety Authorities

All 148 incidents with DCM containing products listed in this table do not identify what kind of product it was and were therefore not counted.

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

Year	Irish H&S Auth. Table E1.11	
	Professional	consumer
1999		4
2000	1	7
2001		4
2002		1
<b>TOTAL</b>	<b>1</b>	<b>16</b>

## **E1.8 Accident Data from Greece**

### **E1.8.1 Data from Consultation**

No accidents or fatalities have been reported and no exposure risk (allergy, asthma) appears when used under adequate ventilation. These products are mainly used between March and October, period of time where the weather in Greece is good and users can work with open windows (Greek General Chemical State Laboratory, 2006b).

## **E1.9 Accident Data from Hungary**

### **E1.9.1 Data from Consultation**

Although cases of intoxications by chemical agents are collected by the Hungarian National Institute of Chemical Safety, categories are wider than only one substance. DCM is in the category of organic solvents among several similar substances. Therefore, information specifically related to DCM cannot be derived (Hungarian National Institute of Chemical Safety, 2006).

## **E1.10 Accident Data from Iceland**

### **E1.10.1 Data from Consultation**

There were two reported incidents (accidents) in 2003 (one reported involving DCM, the other involving an unspecified paint stripper). One incident in 2004 involving DCM was also reported. No fatalities have ever been known (Icelandic Environment and Food Agency, 2006a).

## **E1.11 Accident Data from Ireland**

### **E1.11.1 Data from the ECSA Survey (ECSA, 2002a)**

Table E1.11 shows a summary of all cases relating to DCM-based paint strippers and to DCM more generally for the years 1999-2002. ECSA notes that most cases involving paint strippers relate to minor exposure in a domestic setting. Cases relating to DCM of unknown source tend to occur in the workplace. In both cases, symptoms are usually mild. The Dublin Poison Control Centre does not routinely follow up enquiries relating to this product so there is no information as to the outcome of the cases.

### **E1.11.2 Data from Consultation (2002-2005)**

Consultation with the Irish Health and Safety Authority provided data that expand the list of observations presented in **Table E1.11**. Table E1.10 covers the remainder of 2002 and reaches up to September 2005.

<b>Table E1.10: Data on Exposure to Products containing DCM in Ireland (2002-1995)</b>						
<b>Date</b>	<b>Product</b>	<b>Age</b>	<b>Circumstances</b>	<b>Location</b>	<b>Severity</b>	<b>Outcome</b>
23/03/02	DCM	?	Accidental Inhalation	Home	Minor	Not followed up
25/03/02	DCM	38	Accidental Inhalation	Home	Minor	Not followed up
06/03/03	DCM	15	Intentional Inhalation	Residential Care	Unknown	Not followed up
12/08/04	DCM	Adult	Inhalation	Workplace	Minor	Not followed up
16/07/04	DCM	16	Inhalation	Workplace	Unknown	Recovered
03/11/04	DCM	37	Inhalation	Home	Minor	Not followed up
04/03/05	DCM +acid + Et <sub>3</sub> N	19	Inhalation	School	Minor	Not followed up
13/09/05	Renovic (DCM)	22	Skin Contact	Workplace	Minor	Not followed up
<i>Source: Irish Health and Safety Authority, 2006a</i>						

Ireland's main manufacturer of DCM-based paint strippers operates a Technical Support Line and has indicated that no health and safety issues have been reported to him in relation to his DCM-based paint stripper products.

Overall, there have been no reported fatalities associated with the consumer use of DCM in paint strippers on the Irish market. Also, the Irish Health and Safety Authority does not have any reported fatalities due to DCM-based paint strippers in their database of workplace fatalities (Irish Health and Safety Authority, 2006a).

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Table E1.11: Incidents relating to DCM (Ireland, 1999-2002)				
Incidents relating to DCM-based Paint Strippers				
Year	Age	Sex	Circumstance	Symptoms
<b>1999</b> (4 cases out of 14,654)	Adult	F	Domestic use. Small amount splashed onto hand.	Temporary paraesthesia on hand
	Unknown	F	Domestic use. Splashed into eye	Asymptomatic
	13mths	F	Domestic use. Skin contact	Redness on skin, no discomfort
	Adult	M	Domestic use. Splashed into eye	Slightly red but not causing pain
<b>2000</b> (8 cases out of 14,389)	Adult	F	Domestic use. Splashed onto skin	Mild irritation soon after use
	13mths	F	Domestic use. Child licked paintbrush	Asymptomatic
	18yrs	M	Domestic use. Splashed onto hand	Stinging, red spots on hand
	13mths	F	Domestic use. Ingested “a few mls”	Redness around mouth, otherwise clinically well
	Adult	M	Used in workplace and splashed into eye	Asymptomatic
	Adult	M	Domestic use. Dripped onto hand from paintbrush	Open cuts on hand stinging. Asymptomatic after irrigation
	2yrs	M	Decanted into 7-Up bottle. Unknown amount ingested	Nausea, vomiting, abdominal pain
	1yr	M	Domestic use. Ingested “a few ml”	Patient admitted for 24 hr observation, COHb 1.3%
<b>2001</b> (4 cases out of 16,241)	19yrs	M	Decanted into coke bottle in workplace. 5-10mls ingested	Tummy upset 3 days but otherwise well
	3yrs	M	Domestic use. Ingested “a few drops”.	Vomited immediately afterwards, otherwise well
	Adult	F	Domestic use. Splashed into eye	Crying but no irritation seen
	Adult	F	Domestic use. Splashed onto eyelid	Asymptomatic
				Eyelid is red but irrigated and no irritation in eye

Table E1.11: Incidents relating to DCM (Ireland, 1999-2002)				
Incidents relating to DCM-based Paint Strippers				
Year	Age	Sex	Circumstance	Symptoms
<b>2002</b>				
-	18mths	F	Toothbrush was used for painting; child licked off residue	Asymptomatic
<b>Incidents relating to General Exposure to DCM</b>				
<b>1999</b>				
<i>(3 cases out of 14,654)</i>				
	27yrs	F	Domestic use. Splashed into eye.	Asymptomatic
	21 yrs	M	“Anti-splatter liquid” used in work. Splashed into eye	Eye is red but not painful
	35yrs	M	Teacher in school lab. Splashed into face and eye	Blistering on skin and pain in eye
<b>2000</b>				
<i>(4 cases out of 14,389)</i>				
	24yrs	M	Accidentally inhaled in workplace	Chest-tightness but CXR clear
	11yrs	M	Using science kit and it splashed onto hand. Licked it off	Asymptomatic
	25yrs	F	Unknown circumstance. Eye contact	Conjunctival spotting
	23yrs	M	Splashed onto skin in workplace	Coma initially, then agitation & thrashing around
<b>2001</b>				
<i>(2 cases out of 16,241)</i>				
	Adult	M	Accidental inhalation in workplace	Neutropenia (but patient has haemochromatosis).
	Adult	M	Splashed onto skin in workplace	Irrigated immediately and asymptomatic
<b>2002</b>				
-	Adult	F	Querying effects of long-term occupational exposure	Chronic headache and nausea
	27yrs	M	Exposure to “Tar Dust” in workplace	URT irritation and persistent coughing for 2 days; put on steroids; asymptomatic at 4 days post exposure
<i>Source: ECSA, 2002a</i>				



### **Accident data from Italy**

RPA report Annex from page E-28 to E-30

#### Table E1.12 Bergamo Poison Control Centre

All 6 DCM paint stripper cases from 2002 – 2006 are not covered by existing protocols or articles. No consumer or professional incidents for Italy have been collected in these years until today.

Between 2000 – 2002 one more incident was reported that is not included in above table. It was counted for 2001 as professional.

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

#### **New cases from Bergamo Poison Control Center**

<b>Year</b>	<b>Bergamo Table E1.12</b>	
	<b>Professional</b>	<b>consumer</b>
<b>2001</b>	1	
<b>2002</b>		1
<b>2003</b>	1	1
<b>2004</b>	1	
<b>2005</b>	1	
<b>2006</b>	1	
<b>TOTAL</b>	<b>5</b>	<b>2</b>

## **E1.12 Accident Data from Italy**

### **E1.12.1 Data from the ECSA Survey (ECSA, 2002a)**

#### ***Milan Poison Control Centre***

In 1997-1998, 220 phone calls related to suspected exposure to DCM, mainly in paint strippers. Detailed information was not obtained.

#### ***Rome Poison Control Centre***

Among 13,125 phone calls in 2001, 42 were related to paint removers. Among them:

- 38 involved products with unknown name and composition (*acqua regia minerale*<sup>1</sup>/solvents/nitrocellulose thinners):
  - 20 cases concerned children: 18 ingestion of small quantities, generally without or with very mild symptoms; 2 inhalation with mild symptoms; and
  - 18 cases concerned adults: 10 ingestion of small quantities, of which 5 did not complain of symptoms and 5 of oesophagus burn, cough, dyspnoea, headache, tremors; 5 inhalation without or with very mild symptoms; 3 cutaneous contact with erythema; and
- only 4 involved products containing DCM:
  - 1 man, 30 years old, inhalation: dyspnoea;
  - 1 man, 48 years old, cutaneous and eye contact: erythema and ocular burn;
  - 2 men, 40 years old and 45 years old, inhalation: tremors; and
  - 1 man, 40 years old, inhalation: ocular burn.

#### ***Bergamo Poison Control Centre***

Between 2000 and the middle of 2002, there were only two cases of incidents involving DCM:

- male, 31-year-old, accidental splash in one eye of paint stripper with DCM; symptoms: conjunctival hyperaemia, irritation; no corneal damage; treatment: ocular wash with normal saline, antibiotic cream; and
- male, 26-year-old, 3-hour inhalation exposure of paint stripper with DCM during normal use; symptoms: confusion, dizziness, nausea, vomiting, mild acidosis, low carboxyhaemoglobin (6.4%) in non-smoking patient; electrocardiogram, thorax radiography and laboratory analyses were normal; treatment: oxygen by mask, fluid

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<sup>1</sup> Aqua regia, literally, “royal water”, is an acid “capable of dissolving gold” which is prepared today by mixing a three-to-one ratio of hydrochloric acid and nitric acid.

infusion; spontaneous resolution of acidosis; discharged in good conditions after 3 days.

The year when these accidents took place is unknown, however, on the basis of the information that was obtained through consultation and is presented in Table E1.12, the second accident (involving the 26 year old male) could have been the accident referred to at the top of the table.

*Trieste Poison Control Centre*

No incidents with DCM or with any other type of paint stripper have been recorded.

**E1.12.2 Data from Consultation**

*Bergamo Poison Control Centre*

More recent information has been provided during consultation on eight incidents recorded by the Poison Control Centre of Bergamo and is presented in Table E1.12.

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Table E.1.12: Accidents from the Poison Control Centre of Bergamo									
Date	Age/ gender	Hospitali- sation	Type of product	Relevant	Location	Exposure type	Symptoms	Description	
03/03/2002	26, M		Paint remover	DCM	At home	Inhalation		Patient exposed to the vapours of DCM and MeOH	
06/03/2002	27, M	Yes		DCM and mineral oils	Other	Inhalation		Pulmonary exam presently referred to as negative	
10/01/2003	17, M		DCM	DCM	At home	Ocular	Minor cutaneous irritation	Affected the face from liquid paint remover when opening the packaging; washed the skin with water and soap, and washed abundantly the eye as well; irritation regressed already; further wash and application of chamomile eye drops	
29/08/2003	31, F (preg- nant)		Paint remover	DCM+ trichloroethylene	Industrial	Multiple	Cutaneous and otolaryngological irritation	3-month pregnant, she splashed her face and eyes while unscrewing the lid of the product; possible inhalation is mentioned. Advised to wash abundantly with running water and go for a visit to doctor del	
04/05/2004	65, M	Yes	Paint remover	DCM	Industrial	Cutaneous	Burning of the eyelid	Splashed a drop of the product on upper eyelid warning with immediate burning. No ocular lesions.	
27/04/2005			Hatron 3cl	Fluorinated hydrocarbons+D CM	Industrial	Inhalation	Oculist noticed: light lesion from corneal causticity Light hyperaemia in the affected area	Inhaled and splashed himself while decanting the product. Undressed immediately and decontaminated according to the indications seen on the cover of the product. At present asymptomatic, light hyperaemia in the affected cutaneous area.	
26/07/2005	48, M	Yes	Paint remover semi-fluid	Methanol+ DCM	Industrial	Ocular	Hyperaemia	Advised to visit the oculist. Result: no corneal lesions, Tobradex therapy	
06/06/2006	54, M	Yes	Paint remover	DCM	Industrial	Cutaneous	Irritation of face	When opening the packaging splashed the face with a few ml of the product; immediately washed	

Source: Italian Ministry of Health (information submitted to DG Enterprise and Industry)

## **Accident data from Slovenia**

RPA report Annex from page E-33

The below incident was counted for the year

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

### **E1.19 Accident Data from Slovenia**

#### **E1.19.1 Data from Consultation**

In years between 2000 and 2005, five accidents involving DCM were reported in Slovenia. These accidents happened at work (one female, two males), with symptoms: nausea, unconsciousness, headache, vomiting, skin burn, 8-10 % of COHb. Another two poisonings happened accidentally to consumers. One person accidentally drunk up preparation with DCM, while another person (a painter) was poisoned due to inhalation. He was in a small closed room, while the container with DCM was opened. There were no severe consequences (Slovenian National Chemicals Bureau, 2007a).

## Accident Data from Spain

**Table E1.14** “Incidents involving DCM (Spanish National Institute of Toxicology) on page E-33 in the Annex E of the RPA Final Report “Impact of Potential Restrictions on Dichloromethane” lists 12 accidents for DCM paint strippers in the period from 1991 – mid 2000.

The Barcelona Poison Control Centre registered on 1 incident between 1994 and mid 2002.

As consumer incidents typically represent 30 % out of a total of 13 cases 4 will be designated to consumer and 9 to professional usages for the period between 1991 and mid 2002.

For simplicity these cases will be counted in the year 1998.

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

## E1.20 Accident Data from Spain

### E1.20.1 National Institute of Toxicology

The Spanish National Institute of Toxicology registered 198 relevant calls from 1991 to mid-2000. These are described in Table E1.14.

Relevant products	Total number of cases	Exposure type (number of cases and symptoms)
Paint strippers	12	- Accidental ingestion of the product (3 cases, gastrointestinal irritation); - inhalation (2 cases, respiratory disease accompanied by headaches and general indisposition); - eye contact (3 cases, ocular irritation, pain, conjunctivitis; and - contact with skin (4 cases, burns)
Adhesives	1	- Inhalation (neurological alterations characterised by ataxia, paraesthesia, obtundation and unresponsive pupils)
Aerosols (with DCM being the active ingredient)	27	- Inhalation (respiratory and neurological problems characterised by irritation of the respiratory tract, dyspnoea, headaches, dizziness, nausea, ataxia, paraesthesia, sensation of inebriation); and - oral, skin or eye contact (symptoms limited to the contact area, which can result in burns in case of persistent exposure)
Aerosols (DCM is associated with other active ingredients)	Unknown	- Respiratory and neurological symptoms, but no further information available, because toxicity could be due to the associated ingredients

Source: ECSA, 2002a

### E1.20.2 Barcelona Poison Control Centre

Only one incident with DCM between 1994 and mid-2002: eye contact resulting in irritation and ocular anaesthesia.

## Accident data from Switzerland

RPA report Annex from page E-35

SUVA is the compulsory accident insurance company in Switzerland.

There is no double counting of already registered incidents because the only known case is a fatality from 1989 before the period from 1993 until 2003.

For the statistics the Swiss incidents will be designated to the year 2000.

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

### E1.22.2 Data from Consultation

Information has been received from SUVA in the form of a leaflet titled "Dichloromethane (DCM), Paint strippers, Accidents" and dated 21 December 2004 (SUVA, 2004). According to the leaflet, in Switzerland, there are documented cases of acute specific damage caused by "halogenated organic compounds" with regards to the Guidelines for the Prevention of Accidents (UVV), Article 14, Appendix 1.1. Between 1993 and 2003, SUVA recorded 181 accepted cases (132 occupational diseases, 49 acute injury), of which 35 (20 occupational, 15 acute) were directly attributed to DCM. The number of DCM cases has stayed relatively constant for the last ten years.

In the same period, SUVA's Chemistry section dealt with 15 cases caused by "halogenated organic compounds". In five cases, DCM was the cause of the accidents (four cases involving paint stripping in the painting and decorating industry, one case in the metal processing industry). One of these accidents was fatal (SUVA, 2004). On this accident, we received further detail by SUVA (2007). It appears that a painting and decorating firm was contracted to carry out renovations in bathrooms and kitchens in flats. The complete removal of old paint was carried out using a product that contained mainly DCM and up to 8% methanol. The victim, an experienced male painter and decorator, started work in the bathroom in the morning. At approx 1pm, his boss found him lying dead in the bathtub. The following relevant conditions were observed and later documented: (a) the door to the bathroom was closed; (b) the window was only half open; (c) all the walls had been treated with DCM-based formulation; (d) respiratory protection mask with active carbon filter was lying unopened and unused in the hall; (e) the day of the accident was an unusually hot summer's day.

## Accident data from UK

RPA report Annex from page E-36 to E-40

### Table E1.16 Edinburgh (Scotland) National Poisons Information Centre

The 17 incidents in the table were not differentiated between professional and consumer and so a split was calculated base on the assumption that 30% of the incidents are typically consumer related.

### Table E1.17 Birmingham (England) Poison Control Centre

18 "None"-classified incidents in this table were not included in the collection and only the "Minor" to "Severe" cases were counted and split according to the 30% consumer rule. Because only a period from 2000 – 2002 was given all cases were counted for the year 2001.

### Table E1.18 Belfast (Northern Ireland) Poison Control Centre

All cases were disregarded

### Table E1.20 HASS/LASS Database

All 10 cases during 1997 and 2002 are identified as incident with Nitromors® from Henkel. In 2003 the UK Department of Trade and Industry (DTI) announced the discontinuation of this database. Therefore it has not received any new information since then.

### Table E1.21 SWORD/OPRA Database

Only 2 incidents were in 2001 were taken into account. The 2 fatalities from 1999 have been already registered in existing tables.

In total 93 new incidents have been identified for the UK.

No double-count with existing incidents possible because none have been registered for the UK between 1997 and 2002. In this period only 3 DCM paint stripper fatalities have been registered.

Source: [http://ec.europa.eu/enterprise/chemicals/studies\\_en.htm](http://ec.europa.eu/enterprise/chemicals/studies_en.htm)

New cases from British Poison Control Centres and Databases

Year	Edinburgh table E1.16		Birmingham table E1.17		Nitromors table E1.20		SWORD/OPRA table E1.21		Total	
	Professional	consumer	Professional	consumer	Professional	consumer	Professional	consumer	Professional	consumer
1997	3	1				1			3	2
1998	1	0				5			1	5
1999	4	2				1			4	3
2000	1	1				1			1	2
2001	2	1	46	20			2		48	21
2002	1	0				2			1	2
<b>TOTAL</b>	<b>12</b>	<b>5</b>	<b>46</b>	<b>20</b>	<b>0</b>	<b>10</b>	<b>2</b>	<b>0</b>	<b>58</b>	<b>35</b>

When in the UK databases have been discontinued, information on fatalities are only available from the press. Non fatal incidents are hard to track and therefore the picture becomes increasingly unclear for the UK for the last 4 years and will stay so for the future. There is the danger that lack of data catalyzes the belief of improved safety in this member state.



## **E1.23 Accident Data from the United Kingdom**

### **E1.23.1 Data from the ECSA Survey (ECSA, 2002a)**

#### *Edinburgh (Scotland) National Poisons Information Service*

Table E1.16 details the telephone enquiries to National Poisons Information Service, Edinburgh concerning DCM-based paint strippers from 1997 to mid-2002. Out of a total number of 36,257 telephone enquiries in that period, 17 (0.05%) involved DCM-based paint strippers. ECSA notes that all the incidents were minor.

<b>Date</b>	<b>Age, gender</b>	<b>Route of exposure</b>	<b>Features</b>
Mar 1997	62, M	Eye contact	Red, cloudy, painful
Mar 1997	47, F	Inhalation	Throat and mouth irritation
Sep 1997	NK	Skin contact	Not known
Sep 1997	M	Eye contact	Not known
Apr 1998	33, F	Skin contact	Very cold tight hands
Jan 1999	36, M	Eye contact	Discomfort
Mar 1999	28, F	Ingestion	None
May 1999	25, M	Ingestion	Nausea, vomiting short of breath
Jun 1999	24, F	Skin contact	Superficial burns on buttocks and legs
July 1999	80, F	Inhalation	Sore throat, chest discomfort
Oct 1999	28, M	Eye contact	None
May 2000	30, M	Eye contact	Pain
May 2000	60, F	Eye contact	Stinging
Aug 2001	21, F	Inhalation	Headache, vomiting, rash, feels unwell
Aug 2001	42, M	Inhalation	Dry throat
Oct 2001	F	Multiple	Rash
Jun 2002	3, M	Skin contact	Redness

*Source: ECSA, 2002a*

#### *Birmingham (England) Poison Control Centre*

The Poison Control Centre supplied to ECSA detailed information on incidents relating only to DCM in paint strippers, from January 2000 to September 2002. Table E1.17 presents only the publicly available data (the rest is not provided in the ECSA report for confidentiality reasons). ECSA notes that the detailed information shows that, most cases were benign with the only two severe cases were both due to ingestion.

Exposure route	None (0)	Minor (1)	Moderate (2)	Severe (3)	Fatal (4)	Unknown	Total
Ocular	6	22	2	0	0	1	31
Dermal	3	14	1	0	0	2	20
Inhalation	3	10	1	0	0	5	19
Ingestion	6	13	1	2	0	4	26
All routes	18	59	5	2	0	12	96

*Source: ECSA, 2002a*  
*Poisoning Severity Score (PSS) - IPCS/EC/EAPCCT:*  
*None (0): No symptoms or signs related to poisoning*  
*Minor (1): Mild, transient, and spontaneously resolving symptoms*  
*Moderate (2): Pronounced or prolonged symptoms*  
*Severe (3): Severe or life-threatening symptoms*  
*Fatal (4): Death*

***Belfast (Northern Ireland) Poison Control Centre***

A few incidents with paint strippers in general were reported in the years 2000-2002, according to the following Table E1.18.

Date	Chemical	Symptoms	Adult/child	Information source
3 Aug 2001	DCM	Had been feeling dizzy but feeling better soon after	Unknown	Toxbase
10 Aug 2001	Strypit paint remover (DCM)	Unknown	Adult	Toxbase
13 Feb 2002	Dulite paint stripper (DCM 80%)**	None (caller concerned about using the product because of the warnings on the label – but had not been exposed)	Unknown	Toxbase

*Source: ECSA, 2002a*

***Cardiff (Wales) Poison Control Centre***

With regard to telephone enquiries to the Cardiff Poison Control Centres, the numbers for those related to DCM-based paint strippers are presented in Table E1.19. Symptoms were only recorded if the patient was very ill and was followed up closely by this department. This is rare and there are no such reports involving DCM (or its alternatives).

<b>Year</b>	<b>Number of enquiries related to unspecified DCM-based paint strippers</b>
1997	26
1998	27
1999	22
2000	32
2001	20
2002	9 (part of the year)

*Source: ECSA, 2002a*

### **E1.23.2 Data from Consultation**

#### ***Consumer Accidents – HASS/LASS Database***

Some information on accidents involving paint strippers in the UK has been made available through the Home and Leisure Accident Surveillance System (HASS/LASS) database. This database is sample data collected from a sample of 16-18 UK hospitals. The HASS/LASS database is not specific enough to provide details on specific types or products neither does it specify whether the product involved in the accidents had DCM in it. It also does not contain fatalities and the latest data available is for 2002<sup>2</sup>.

A total of 183 accidents were recorded in this database between 1996 and 2002. These were related to paint strippers without necessarily relating to the actual use of paint stripping products or indeed to the use of chemical paint strippers. The accidents described in Table E1.20 are most certainly related to DCM-based paint strippers since the name of specific commercial products that contain the substance were named by the patient or their representative at the time of attending the hospital. It is likely that other accidents may well have been the result of the use of DCM-based formulations, however, we cannot be sure of their relevance.

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<sup>2</sup> On 2nd May 2003, it was announced that the UK Department of Trade and Industry (DTI) would no longer fund the collection and publication of HASS/LASS data. Therefore, the database has not received any new information since the end of 2002.

<b>Accident</b>	<b>Year</b>	<b>Mechanism</b>	<b>Outcome</b>	<b>Sex</b>	<b>Age</b>	<b>Activity</b>	<b>Location</b>
Chemical burn to forearm -v- Nitromors paint stripper	1997	Corrosion, chemical burn by liquid	Referred to any outpatient clinic	F	31	Unknown activity	Unspec. home location (in/outdoor)
Stripping down a pine painted chair - Nitromors gel flicked off brush and went into eye	1998	Corrosion, chemical burn by liquid	Referred to other hospital	F	35	Walking/ moving about home/garden	Kitchen/utility room
Stripping down a pine painted chair - Nitromors gel flicked off brush and went into eye	1998	Corrosion, chemical burn by liquid	Referred to other hospital	F	35	Stripping pine chair	Kitchen/utility room
Going to clean paint brushes - no sense of smell using Nitromors and inhaled fumes	1998	Inhalation of fumes	Referred to GP (doctor)	M	52	Cleaning paint brushes	Garage
Contact with Nitromors paint remover -feeling unwell	1998	(Suspected) poisoning by liquid	Examined but no treatment given	M	30	Unknown activity	Unspec. home location (in/outdoor)
Using Nitromors paint stripper on door-it flicked off paint brush into eye	1998	Corrosion, chemical burn by liquid	Referred to any outpatient clinic	M	34	Decorating	Yard/driveway /path/hard surface
Mother picked him together with a tin of Nitromors paint stripper, which spilled on to his leg.	1999	Corrosion, chemical burn by liquid	Examined but no treatment given	M	1	Unknown activity	Unspec. home location (in/outdoor)
Stepped on paint scraper that had pointed tip - injury to foot - scraper also had Nitromors paint stripper on it and flecks of paint	2000	Skin puncture by foreign body/spike/shot	Treated; no more treatment required	M	5	Children playing (exclude sport)	Unspec. home location (in/outdoor)
Patient stripping paint off door using Nitromors, overcome by fumes - fell as a result to wooden floor	2002	(Suspected) poisoning by liquid	Treated; no more treatment required	F	53	Other DIY/carpentry/repairing/ decorating	Lounge, study, living/dining/ play area
In garden opening Nitromors tin for paint stripping. Seal still left on lid after removing cap - liquid exploded into pts face.	2002	Foreign body in eye	Treated; no more treatment required	F	40	Other DIY/carpentry/repairing/ decorating	Yard/driveway /path/hard surface

Source: ROSPA, 2006

***Workplace Accidents – RIDDOR Data***

The UK HSE Statistics Branch has suggested that during the years 1996/7 to 2004/05, there were 11 accidents found on the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) database. None of the accidents were fatal (UK Department of Trade and Industry, 2006)

***Occupational Diseases – SWORD/OPRA Data***

A search for relevant cases reported to the Surveillance of Work-related and Occupational Respiratory Disease system (SWORD) and Occupational Physicians Reporting Activity (OPRA) for the period 1998-2005<sup>3</sup>, revealed 9 actual cases of respiratory diseases that have been attributed to DCM exposure. Chest physicians reported five of these and HSE medical inspectors reported the remaining four. More detailed information is provided in the Table E1.21.

<b>Diagnosis</b>	<b>Job</b>	<b>Age/sex</b>	<b>Year of reporting</b>	<b>Reporting physicians</b>
Asthma	Coppersmith in dockyard	M /50+	1998	Chest phys. (Sample)
Asthma	Laser cutter in electronic industry	F /50+	1999	Chest phys. (Core)
Asthma, due to sensitisation	Welder	M /40+	2000	Chest phys. (Sample)
Inhalation accidents	Manager in electrical industry	F /45+	1999	Chest phys. (Core)
Inhalation accidents (death)	Paint stripping operator	M /20+	1999	HSE medical inspector
Inhalation accidents (death)	Paint stripping operator	M /40+	1999	HSE medical inspector
Inhalation accidents	Operator in paint manufacturing	M /30+	2001	HSE medical inspector
Inhalation accidents	Operator in paint manufacturing	M /20+	2001	HSE medical inspector
Other respiratory disease	Filler in glue manufacturing	F /45+	2001	Chest phys. (Core)

*Source: UK Department for Environment, Food and Rural Affairs, 2006 (based on data from the UK HSE)*

Five of the above cases were reported on SWORD. On the basis of this number a total of 27 estimated cases of respiratory disease has been calculated (estimated cases = (cases reported on a monthly basis) + cases reported by sample reporters during a single randomly allocated month per year x 12) (HSE, 2007a).

<sup>3</sup> Originally this information was provided for the years 1998-2002, however, HSE (2007) advised us that it applies to the years until 2005. It should be noted that the two inhalation accidents that appear in Table E1.21 for the year 2001, were not included in the most recent communication with the HSE (2007).