Lessons learned from fires in historic buildings

The following statistics are extracts from NFPA-CRC data
(Data base: NFIRS (National Fire Incidents Reporting System))
Data are available in more details, but this extract is supposed to serve for first comparison approaches with existing European data provided within COST C17 member countries.
(comment: Are there any statistic informations within the project FIRE-TECH provided?)

These statistics also should serve as a starting point developping first conclusions on European data via STMS within COST C17.
In case these STMS will bring up useful additional informations a second phase looking at NFPA data will be done.

Looking at the lessons learned my first approach was in terms of management decision making: When planning high investment it would be useful to know the main causes for fires in historic buildings in order to prioritise investment and training facilities.
Within the following statistics "causes of fires (in %)" I tried to cover appr. 80% of all causes given, which not always is the case.
To come near to the 80% I had to take 5 causes in general.

According to the different statistics provided similar data are available for the period 1994-1998 and for 1980-1998. with slight changes of definition of categories.

In addition to the category "major causes" informations are given on fire events by time of day, but only for structure fires in libraries.

At the same time political messages regarding the use of automatic fire alarm and automatic fire suppression systems will be helpful in case data are evident.

Regarding the main causes of fire one special aspect is turning up:
According to our practical experience one of the most likely causes for fires in historic buildings would be **'hot building works'**.
According to the statistics of NFPA this cause does not exist!
What is the lesson to learn?

Within NFPA statistics there was a change of systems in 1999.
Therefore data provided for 1999 (and later) are not fully comparable with earlier data and are provided in separate statistics.

First stastical conclusions drafted from NFPA - CRC data

Data base: NFIRS (National Fire Incidents Reporting System)

Libraries	# of fires average per year	causes	in %	smoke alarm status	in %	sprinkler status	in %
	146	intentional	36,30	existing and operating	30,00	present	31,00
		electr. distribution	17,40	damage	23,70	damage	4,20
		other equipm.	11,10				
		open flame, ember		none present	28,20	none present	67,40
		or torch	9,00	damage	69,40	damage	95,70
		heating equipm.	7,00				

statistical data from 1994 - 1998

Museums and Art Galleries	# of fires average per year	causes	in %	smoke alarm status	in %	sprinkler status	in %
	61	electr. distribution	30,40	existing and operating	40,20	present	32,80
		other equipm.	16,00	damage	8,60	damage	11,50
		cooking equipm.	10,90				
		heating equipm.	9,00	none present	32,00	none present	67,20
		open flame, ember		damage	74,50	damage	88,50
		or torch	8,60				

statistical data from 1994 - 1998

First stastical conclusions drafted from NFPA - CRC data

Data base: NFIRS (National Fire Incidents Reporting System)

Historic Buildings	# of fires average per year	causes	in %	smoke alarm status	in %	sprinkler status	in %
	35	intentional	29,70	existing and operating	15,20	present	9,00
		electr. distribution	16,60	damage	34,20	damage	5,10
		heating equipm.	11,60				
		other equipm.	8,60	none present	57,70	none present	91,00
		natural causes	8,40	damage	33,40	damage	94,90

statistical data from 1994 - 1998

Places of Worship	# of fires average per year	causes	in %	smoke alarm status	in %	sprinkler status	in %
	1735	intentional	20,40	existing and operating	14,90	present	4,4
		electr. distribution	19,80	damage	9,30	damage	2,3
		open flame, ember or torch	14,70	none present	62,00	none present	94,7
		heating equipm.	11,10	damage	73,90	damage	97,4
		cooking equipm.	10,60				

statistical data from 1994 - 1998

Lessons learned from fires in historic buildings

Data base: NFIRS (National Fire Incidents Reporting System)

Libraries	# of fires average per year	causes	in %
	195	incenidiary or suspicious	40,00
		electr. distribution	19,60
		other equipm.	8,30
		open flame, ember or torch	6,20
		smoking materials	5,90

statistical data from 1980 - 1998

Museums and Art Galleries	# of fires average per year	causes	in %
	86	electr. distribution	24,60
		incendiary or suspicious	18,30
		other equipm.	10,90
		open flame, ember or torch	9,10
		heating equipm.	8,00

statistical data from 1980 - 1998

Places of Worship	# of fires average per year	causes	in %
	1580	incendiary or suspicious	32,30
		electr. distribution	14,80
		heating equipm.	11,70
		open flame, ember or torch	7,30
		other equipm.	7,10

statistical data from 1980 - 1998

Structure Fires in Libraries by Time of Day
(1980 - 1997, Annual Averages)

time of Day	# of fires
Midnight to 1:00am	3
1:00 - 2:00 am	3
2:00 - 3:00 am	5
3:00 - 4:00 am	2
4:00 - 5:00 am	2
5:00 - 6:00 am	2
6:00 - 7:00 am	3
7:00 - 8:00 am	4
8:00 - 9:00 am	8
9:00 - 10:00 am	10
10:00 - 11:00 am	11
Noon	11
Noon - 1:00 pm	12
1:00 - 2:00 pm	13
2:00 - 3:00 pm	11
3:00 - 4:00 pm	15
4:00 - 5:00 pm	21
5:00 - 6:00 pm	14
6:00 - 7:00 pm	13
7:00 - 8:00 pm	9
8:00 - 9:00 pm	10
9:00 - 10:00 pm	6
10:00 - 11:00 pm	5
11:00 - midnight	6
Total	198
Hourly average	11

Source: National estimates based on NFIRS and NFPA survey

Fire Protection Features
in Religious and Funeral Property Structure Fires
1994 - 1998 Annual Averages

Conclusions made by NFPA Fire Analysis and Research, Quincy, MA

	in %
Percent of fires in buildings with smoke or other fire alarms present	39,1
Percent of fires in buildings having smoke or other fire alarms in which devices were operational	75,1
Percent of fires in buildings with operational smoke or other fire alarms (product of first two statistics)	29,4
Percent of fires in buildings with automatic suppression systems	4,6
Deaths per 1.000 fires with automatic suppression systems present	0
Deaths per 1.000 fires with no automatic suppression systems present	0,8
Reduction in deaths per 1.000 fires when automatic suppression systems were present	100
Average loss per fire when automatic suppression system was present	$ 17.210
Average loss per fire with no automatic suppression system	$ 32.276
Reduction in loss per fire when automatic suppression systems were present	46,7

Source: National estimates based on NFIRS and NFPA survey