



## Cultural heritage fire statistics

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*ICCROM*

# Heritage on fire in the news - Brazil



# Heritage on fire in the news - worldwide



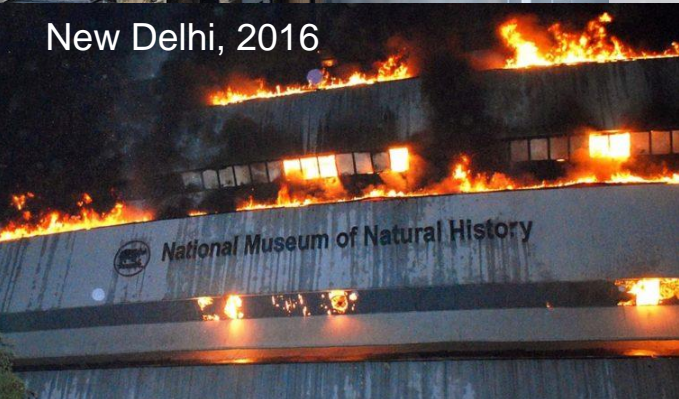
Glasgow, 2014



Moscow, 2015



Mzuzu, 2015



New Delhi, 2016



New York, 2016



Jakarta, 2018



Glasgow, 2018



Rio de Janeiro, 2018



Paris, 2019

## How often does heritage burn?



# How often does heritage burn?



## Japan

Year	Number of cultural properties	Number of fires
2008	7500	4
2009	7439	5
2010	7827	5
2011	8703	1
2012	8164	3
2013	8365	6
2014	8484	5
2015	8590	2
2016	8639	5
2017	8721	1
2018	8809	1

Probability of fire per cultural property: ~ 1% every 30 years

# How often does heritage burn?

Year	Number of museums	Number of fires
1994	799	7
1995	1052	13
1996	1085	4
1997	1283	9
1998	1648	12
1999	1677	6
2000	1697	8
2001	1715	12
2002	1732	15
2003	1829	13
2004	1900	1



## Canada

Probability of fire per museum:  
~ 20% every 30 years

# How often does heritage burn?



## Canada

5 years (1998 - 2002)

13 fires in libraries

~ 1000 libraries

3 fires per year on average

Probability of fire per library: ~ 10% every 30 years

*Fire risk assessment for collections in museums*

*J.ACCR, vol. 33, 2008, p. 3-21*

*J. Tétreault, Canadian Conservation Institute*

# How often does heritage burn?



## Sweden

Year	Number of fires in buildings with cultural value
2005	5
2006	4
2007	6
2008	7
2009	5
2010	4
2011	4
2012	6
2013	4
2014	8
2015	6
2016	4
2017	9

Population of buildings with cultural value: 14335

Probability of fire per building: ~ 1% every 30 years

*Swedish Civil Contingencies Agency (MSB)*

*Swedish National Heritage Board Data Base of Built Heritage*



# How often does heritage burn?



## Brazil

Year	Number of fires in museums (SP)
1999	12
2000	9
2001	9
2002	9
2003	11
2004	7
2005	16
2006	6
2007	4
2008	3

Population of museums (SP): 660

Probability of fire per museum: ~ 40% every 30 years

# How often does heritage burn?



## China

10 years (2009 - 2018)

45 fires in cultural relics sites

*National Administration of Cultural Heritage*

5 fires per year on average

Population of cultural relics sites\*: 4296

Probability of fire per site: ~ **3% every 30 years**

# How often does heritage burn?



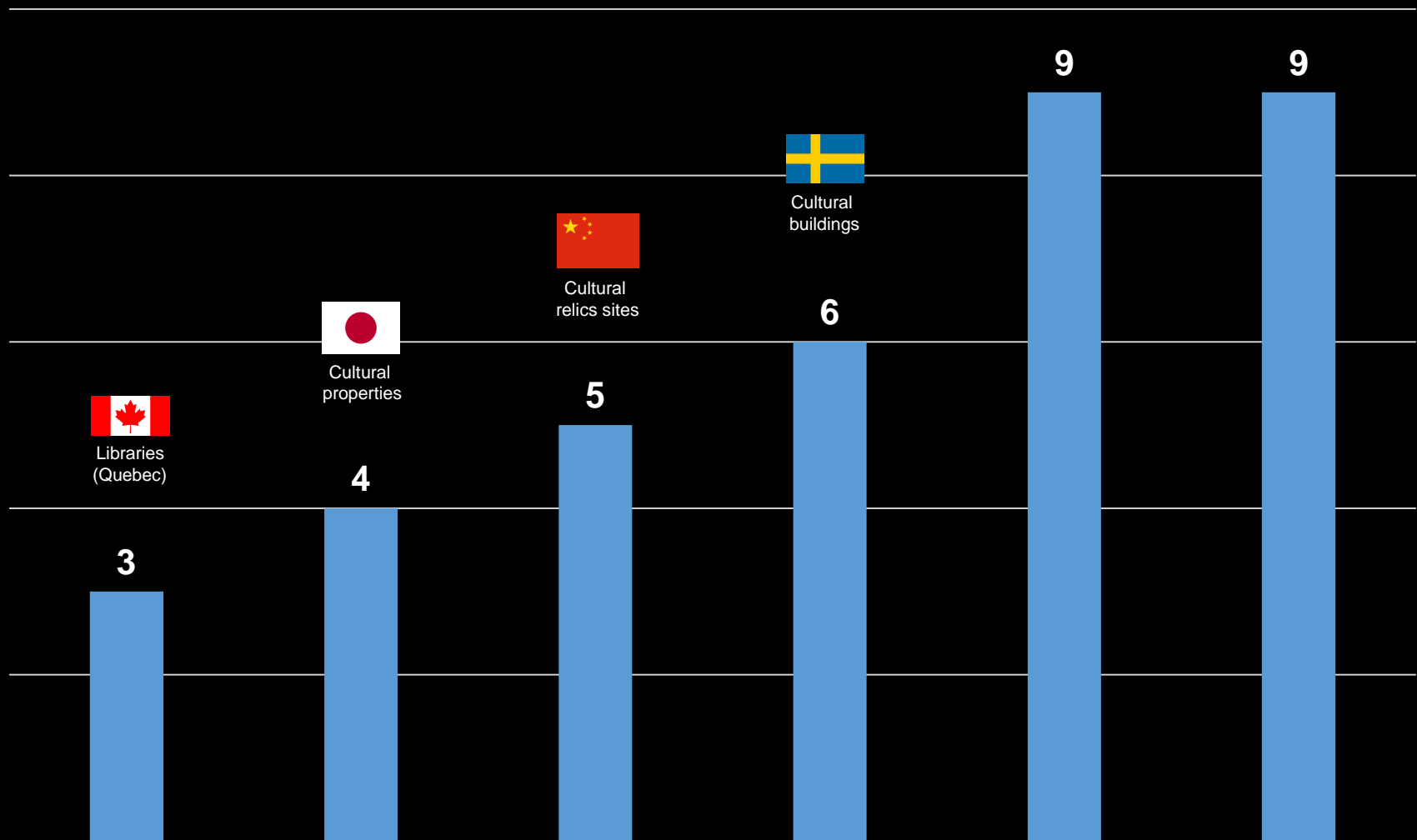
## Average number of fires per year



Museums (SP)



Museums



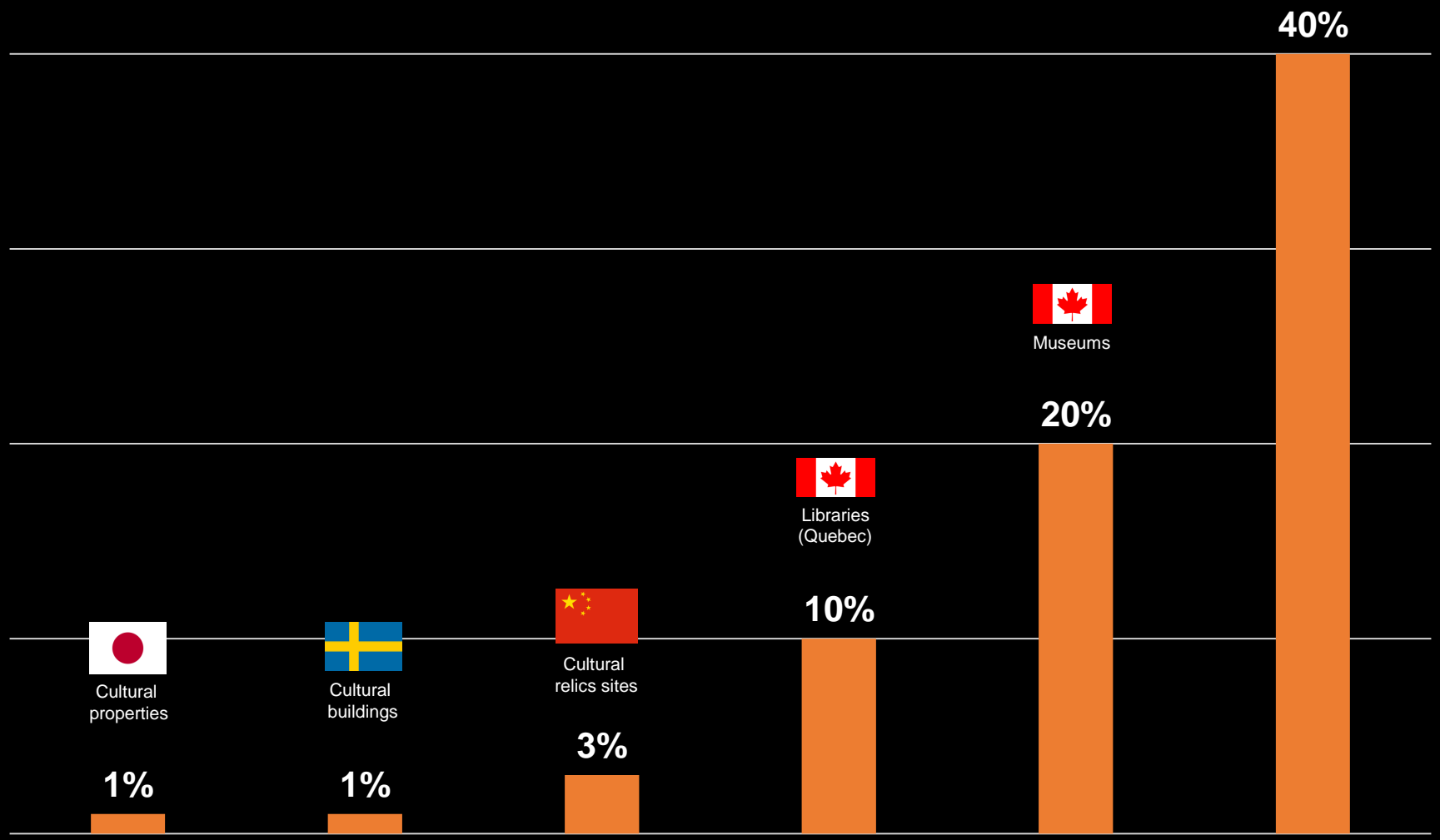
# How often does heritage burn?



## Probability of fire each 30 years per heritage asset



Museums (SP)



How bad are the fires?

# How bad are the fires?

Year	Population of cultural properties	Number of fires	Burned area (m <sup>2</sup> )
2008	7500	4	0
2009	7439	5	521
2010	7827	5	933
2011	8703	1	0
2012	8164	3	269
2013	8365	6	1
2014	8484	5	733
2015	8590	2	0
2016	8639	5	1
2017	8721	1	0
2018	8809	1	644



Japan

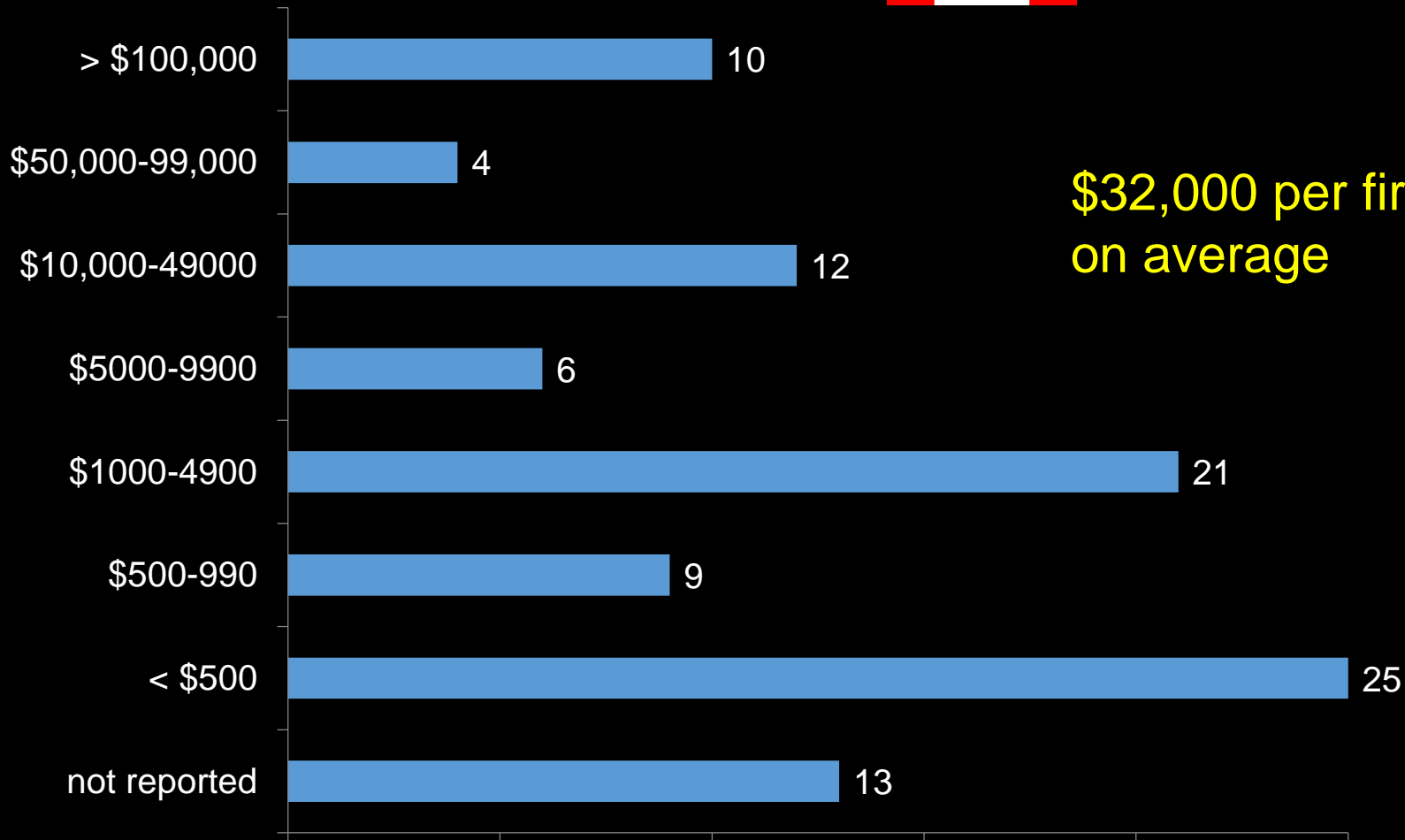
82 m<sup>2</sup> burned per fire  
on average

# How bad are the fires?

## Economic losses



# Canada





## Canada

### Fire spread x control level

Fire control level (CL)	% of fires confined to			
	Material of origin	Room	Floor	Building
CL1	28	29	17	26
CL2	28	34	19	19
CL3	42	56	2	0.07
CL4	53	46	1	0.01
CL5	68	31	1	0.006
CL6	99	1	0.02	0.001

*Fire risk assessment for collections in museums, 2008  
Jean Tétreault, Canadian Conservation Institute*



# How bad are the fires?



Sweden

13 years (2005 - 2017)

72 fires in buildings with cultural value

37 with property damage

8 spread beyond the initial fire cell, contained in initial building

1 spread to another building



## China

10 years (2009 - 2018)

45 fires in cultural relics sites

20 'brought severe damage'

17 with burned area  $> 100 \text{ m}^2$

5 with burned area  $\geq 500 \text{ m}^2$

2 with burned area  $> 5000 \text{ m}^2$

1 with burned area  $> 50000 \text{ m}^2$

What are the causes?

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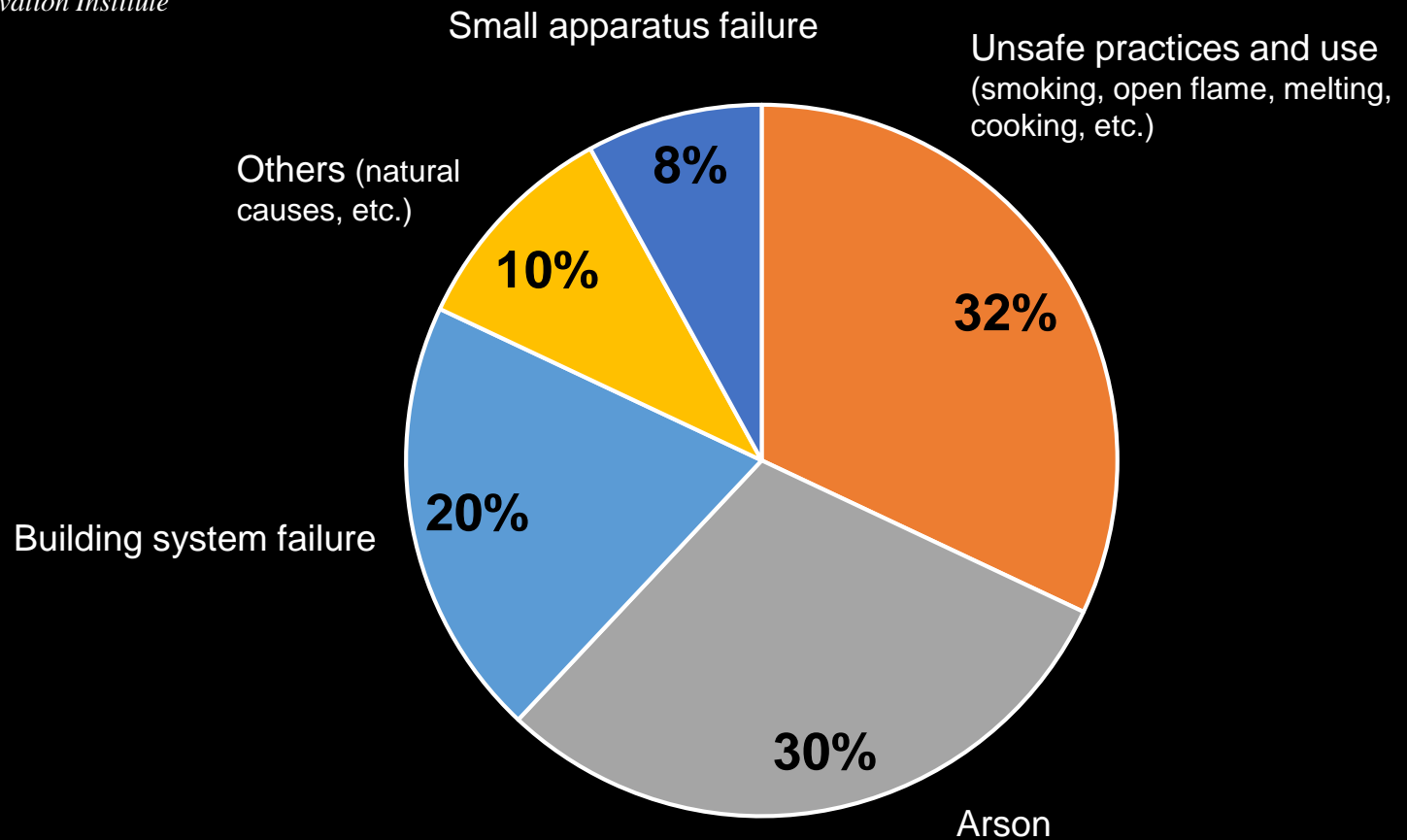
11 years (1994 - 2004)

100 fires in museums



## Canada

*Fire risk assessment for collections in museums, 2008*  
*Jean Tétreault, Canadian Conservation Institute*



# What are the causes?

13 years (2005 - 2017)

72 fires in buildings with cultural value



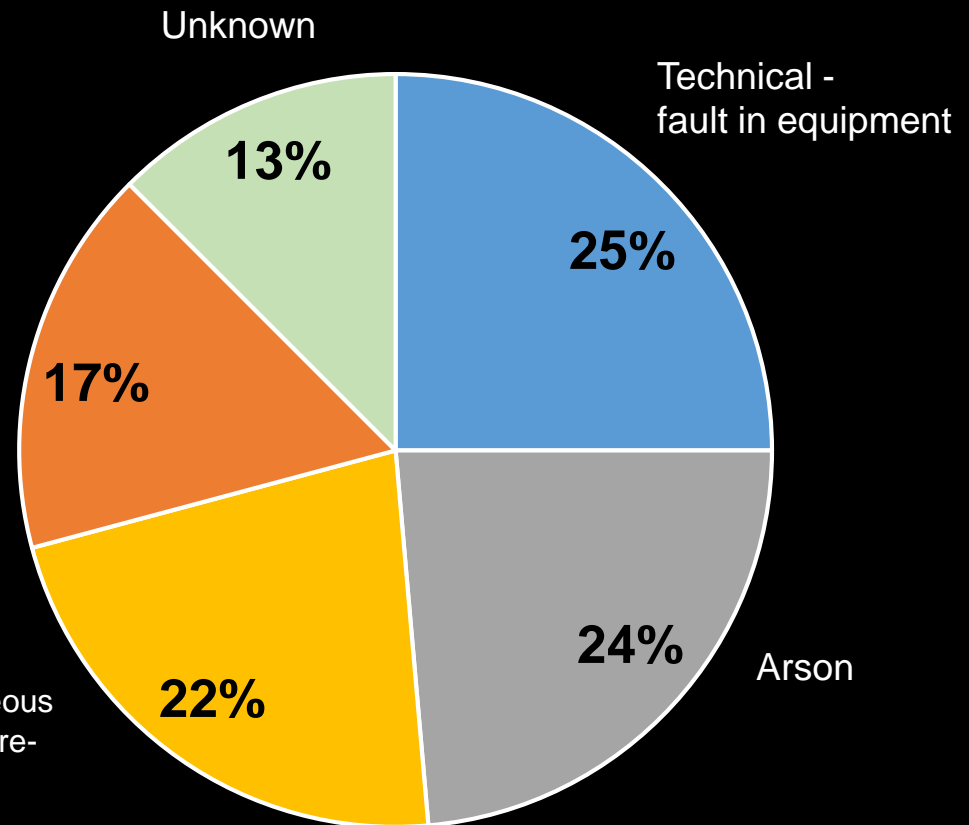
## Sweden

*Swedish Civil Contingencies Agency (MSB)*

*Swedish National Heritage Board Data Base of Built Heritage*

Unsafe practices and use  
(hot work, cooking, smoking,  
candles, playing with fire, etc.)

Other (lightning, spontaneous  
combustion, heat-transfer, re-  
ignition, etc.)



# What are the causes?

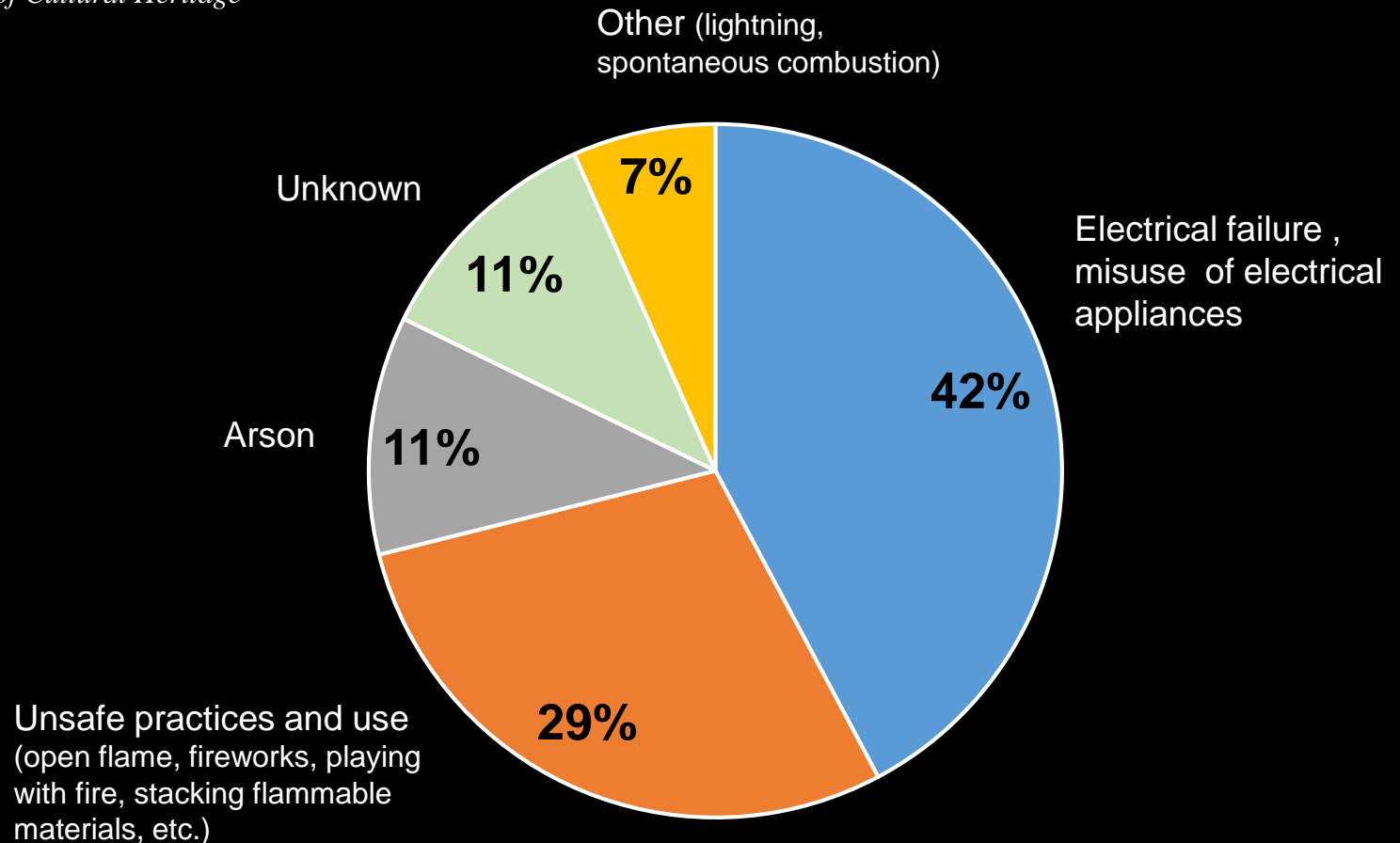
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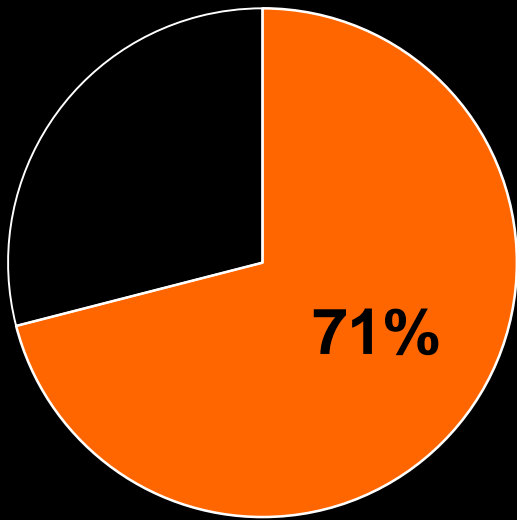
*National Administration of Cultural Heritage*



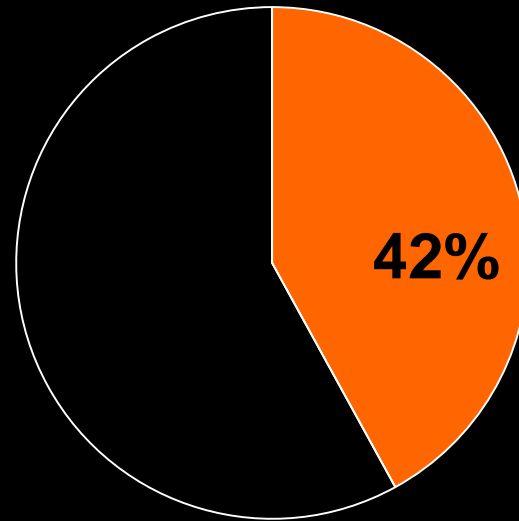
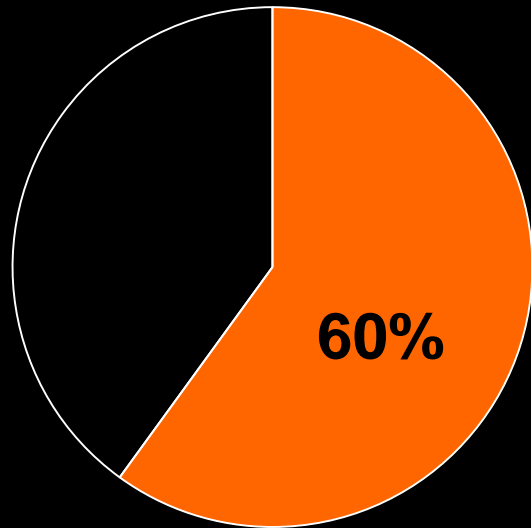
## China



# What are the causes?



Electrical / technical failure  
Unsafe practices



Where does it start?



# Where does it start?

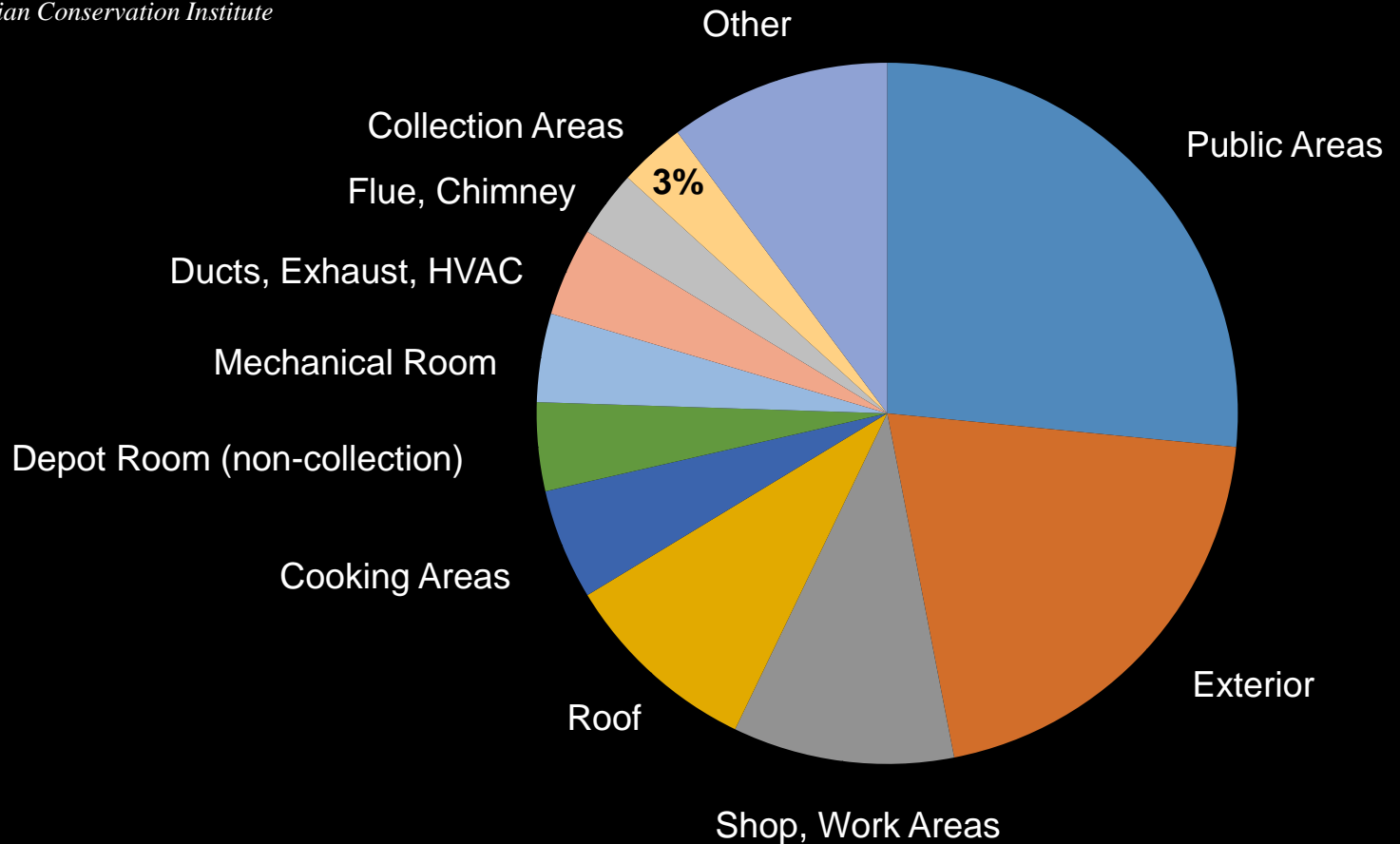
11 years (1994 - 2004)

100 fires in museums



## Canada

*Fire risk assessment for collections in museums, 2008*  
*Jean T treault, Canadian Conservation Institute*



## Why statistics?

# Why fire statistics?

<b>How often?</b>	Frequency / probability estimates	Quantitative risk analysis
<b>How bad?</b>	Most likely impact (severity estimates)	
<b>Causes?</b>	Improve prevention	Risk reduction
<b>Origin?</b>	Improve prevention + mitigation	

1. Cultural heritage around the world is continually affected by fire
2. A significant fraction of these fires has severe impact
3. A significant fraction of these fires can be prevented through proper maintenance and security measures
4. Systematic data collection for effective risk analysis and mitigation strongly needed