

Development of a Risk-Based Decision Support Tool to Assist Fire Departments in Managing Unwanted Alarms

Task 3 Deliverable – Local Data Collection Form

Final Report

Prepared by:

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FOREWORD

From 1980 to 2009, the number of fire department emergency responses more than doubled, from 10.8 million to 26.5 million, primarily driven by the more than tripling of medical aid calls, from 5.0 million in 1980 to 17.1 million in 2009. Fire department budgets have not kept pace with this rising volume of workload, and particularly in recent years, there has been increased concern about the cost of unnecessary responses. From 1980 to 2009, the number of emergency responses to fires fell by more than half, from 3.0 million to 1.3 million, and the number of emergency responses for fires or mutual aid fell by about one-fifth, from 3.3 million to 2.6 million, but emergency responses to “false” alarms more than doubled, from 0.9 million to 2.2 million. The unwanted alarm issue changed over the past third of a century from a problem of malicious false alarms to an issue of non-fire activations of automatic detection and alarm systems.

From the point of view of the fire department, a response to a condition that does not need fire department action in order to avoid loss is both a waste of resources and a needless risk of injury during the response. Response to unwanted alarms is an issue that is receiving increasing attention at the community level.

On May 3, 2011, the U.S. Fire Administration, National Fire Protection Association and International Association of Fire Chiefs co-sponsored a national Summit to initiate a dialogue on this issue. Stakeholders representing alarm design, manufacture, and installation, standards development, and emergency responders from a range of communities were present. Design and manufacturing, installation and maintenance, and enforcement issues were discussed.

The Summit identified a number of possible approaches to the issue, including a greater understanding of the sources of unwanted alarms, deeper knowledge of how the provisions in the National Fire Alarm and Signaling Code can assist enforcement, and best practices for emergency response. Also identified was the value of a tool which can be used at the community level to assess risks, and cost/benefit of strategies to reduce these risks, including appropriate emergency response protocols, enforcement of inspection and maintenance requirements, community education, etc.

This project was initiated by the Fire Protection Research Foundation to develop and implement this tool. The goal of this project was to develop a practical, model-based tool that can be used by local fire departments with local data (to the extent possible) when deciding among courses of action to deal with unwanted alarms. The tool uses a generic model, combined with local data when available and national data when necessary, to estimate costs, fire losses and other impacts of strategies.

This report describes the local data form that was developed to collect data for use in the tool. The tool and the underlying model that estimates costs, losses and other impacts for alternative strategies are described in a separate report.

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The content, opinions and conclusions contained in this report are solely those of the author.

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**Unwanted Alarm Project – Task 3 Deliverable
Form for Local Users to Collect Needed Data**

Project for the Fire Protection Research Foundation

John R. Hall, Jr.

January 17, 2013



**National Fire Protection Association
Fire Analysis and Research Division**

**Local Data Collection Form
for Use With
NFPA Tool for Assessment of Alternative Strategies
for Dealing With Unwanted Alarms**

Introduction

You will need data on **all** calls you have received from a commercial alarm system.

For analysis purposes, you will want to be able to identify calls by the property use (such as school, hotel, factory) where the call originated, using these groupings:

- Property Use 100-199, 500-599 (**commercial and business** occupancies)
- Property Use 200-299 (**educational** occupancies)
- Property Use 300-399 (**institutional** occupancies)
- Property Use 420-489 (**residential** occupancies excluding dwellings)
- Property Use 600-799 (**industrial** and manufacturing occupancies)
- Property Use 800-899 (**storage** occupancies)

For analysis purposes, you will want to exclude calls from or about certain property uses:

- a) Exclude one- or two-family dwellings (Property Use 410-419 in NFIRS), because their alarm systems should not be considered commercial alarm systems, and exclude Property Use 400 because you don't know whether that residential property is a dwelling or not.
- b) Exclude calls where the originating property use is not identified (Property Use 000, NNN, UUU, blank) or is not a building (Property Use 900-999).
- c) Exclude properties if you know you will not make any changes in response or verification, regardless of the results of the analysis. Examples would include educational properties (Property Use 200-299) or institutional properties (health care or correctional, Property Use 300-399), both properties whose occupants are unusually vulnerable. These properties were exempted from the changes in Las Vegas, for example.

Calculating what percentage of commercial alarm system calls turn out to be building fires.

After these exclusions, you will need to have data on at least 5,000 calls. That will probably mean at least 5 years of data from a community of 250,000 population, for example. If you cannot assemble data on this many calls, then use the default estimates in the model.

You can calculate separate estimates for different property use groups if you have at least 5,000 calls in the database for each property group you want to analyze separately. For example, you can calculate separate estimates for (i) commercial and business properties, (ii) residential properties excluding dwellings, and (iii) all other included properties combined. If you do not have enough data to make any separate calculations by property use group, then use your calculated overall estimate for all property use groups.

Block 1: Fill this block with local data. [Enter X in cells for property use groups you are excluding from the analysis.] Calculate the entries in the last column and last row, and enter them as percentages expressed to one decimal point (for example, 0.7%).

Property use group	All calls originating from commercial alarm systems	Commercial alarm system calls that were structure fires Incident Type 110-129	Estimated percentage of calls that are building fires
Commercial and business (Property Use 100-199 or 500-599)	a.	b.	=b/a
Educational (Property Use 200-299)	c.	d.	=d/c
Institutional (Property Use 300-399)	e.	f.	=f/e
Residential excluding dwelling (Property Use 420-499)	g.	h.	=h/g
Industrial (Property Use 600-799)	i.	j.	=j/i
Storage (Property Use 800-899)	k.	l.	=l/k
Overall/total (Add up the rows above)	m.	n.	=n/m
"All the rest" [If you use some but not all of the estimates by property use group, you will need an estimate for all the other property use groups combined]	o. Subtract cell entries above for any row where you will use a separate estimate for that property use group	p. Subtract cell entries above for any row where you will use a separate estimate for that property use group	=p/o

Calculating what percentage of building fires need extinguishment.

You can calculate separate estimates for different property use groups if you have at least 25 fires in the database for each property group. If you do not have enough data to make separate calculations by property use group – and you probably will not – then use the indicated adjustment multipliers as shown to calculate estimates for each property use groups.

Block 2: Fill this block with local data. [Enter X in cells for property use groups you are excluding from the analysis.] Calculate the entries in the last column and enter them as percentages expressed to zero decimal points (for example, 21%).

Property use group	All structure fires Incident Type 110-129	All structure fires where extinguishment was performed Action Taken 11	Estimated percentage of fires that need extinguishment
Commercial and business (Property Use 100-199 or 500-599)	a.	b.	= $(a-b)/a$ OR = $1.11 \times (m-n)/m$
Educational (Property Use 200-299)	c.	d.	= $(c-d)/c$ OR = $0.69 \times (m-n)/m$
Institutional (Property Use 300-399)	e.	f.	= $(e-f)/e$ OR = $0.58 \times (m-n)/m$
Residential excluding dwelling (Property Use 420- 499)	g.	h.	= $(g-h)/g$ OR = $0.85 \times (m-n)/m$
Industrial (Property Use 600- 799)	i.	j.	= $(i-j)/i$ OR = $1.36 \times (m-n)/m$
Storage (Property Use 800- 899)	k.	l.	= $(k-l)/k$ OR = $1.75 \times (m-n)/m$
Overall/total (Add up the rows above)	m.	n.	= $(m-n)/m$

Calculating how many calls received delayed response because of call volume and resulting gaps in coverage

Block 3: Fill this block with local data. Calculate the entries in the last row, and enter them as percentages expressed to zero decimal points (for example, 9%).

Coverage vs. lack of coverage status	All emergency calls	Fire calls
All calls	a.	b.
How many calls were not sent first due response because the call arrived while response to another call was still underway?	c.	d.
Lack of coverage penalty %	=c/a	=d/b

Estimating cost per call

Block 4: Fill this block with local data. Use one form for each Property Use group Enter calculated entries as percentages expressed to zero decimal points (for example, 9%).

Apparatus Type 1 will normally capture data on all fire engines and pumpers.	Structure fire where extinguishment was performed					
	Any emergency response	Any fire	Confined fire or fire confined to object of origin	Fire confined to room of origin	Fire confined to floor of origin	Fire extended beyond floor or beyond building of origin
Apparatus Type 1 – total number of responses	a.	b.	c.	d.	e.	f.
Apparatus Type 1 – total response/return miles at such responses	g.	h.	X	X	X	X
Apparatus Type 1 – total hours at such responses, from start of response to end of return	i.	X	j.	k.	l.	m.
Apparatus Type 1 – average miles per call	=g/a	=h/b	X	X	X	X
Apparatus Type 1 – average hours per call	=i/a	X	=j/c *	=k/d	=l/e	=m/f

*Use this figure also for fires not needing extinguishment.

Apparatus Type 2 will normally capture data on all ladder trucks.	Structure fire where extinguishment was performed					
	Any emergency response	Any fire	Confined fire or fire confined to object of origin	Fire confined to room of origin	Fire confined to floor of origin	Fire extended beyond floor or beyond building of origin
Apparatus Type 2 – total number of responses	a.	b.	c.	d.	e.	f.
Apparatus Type 2 – total response/return miles at such responses	g.	h.	X	X	X	X
Apparatus Type 2 – total hours at such responses, from start of response to end of return	i.	X	j.	k.	l.	m.
Apparatus Type 2 – average miles per call	=g/a	=h/b	X	X	X	X
Apparatus Type 2 – average hours per call	=i/a	X	=j/c*	=k/d	=l/e	=m/f

*Use this figure also for fires not needing extinguishment.

	Structure fire where extinguishment was performed					
Apparatus Type 3 will normally capture data on all ambulances, chief's cars and like vehicles.	Any emergency response	Any fire	Confined fire or fire confined to object of origin	Fire confined to room of origin	Fire confined to floor of origin	Fire extended beyond floor or beyond building of origin
Apparatus Type 3 – total number of responses	a.	b.	c.	d.	e.	f.
Apparatus Type 3 – total response/return miles at such responses	g.	h.	X	X	X	X
Apparatus Type 3 – total hours at such responses, from start of response to end of return	i.	X	j.	k.	l.	m.
Apparatus Type 3 – average miles per call	=g/a	=h/b	X	X	X	X
Apparatus Type 3 – average hours per call	=i/a	X	=j/c*	=k/d	=l/e	=m/f

*Use this figure also for fires not needing extinguishment.

Block 5: Fill this block with local data. Use one form for each Property Use group Enter calculated entries as percentages expressed to zero decimal points (for example, 9%).

What is included in a response? Indicate the number sent.	Standard/larger response	Reduced/smaller response
Apparatus Type 1 (e.g., fire pumpers)	a.	b.
Apparatus Type 2 (e.g., ladder trucks)	c.	d.
Apparatus Type 3 (e.g., ambulance, chief's car)	e.	f.
Resource Type 1 (e.g., SCBA needing refilling)	g.	h.
Resource Type 2 (e.g., personal protective clothing)	i.	j.
Resource Type 3:	k.	l.
Resource Type 4:	m.	n.
Resource Type 5:	o.	p.
Resource Type 6:	q.	r.
Resource Type 7:	s.	t.