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Four Years Later –
A Second Needs Assessment of the U.S. Fire Service

FA-303/October 2006

"*Used vehicles accounted for an average of 40% of apparatus purchased by or donated to departments protecting communities with less than 2,500 population.*"

"*In communities with less than 2,500 population, 21% of fire departments, nearly all of them all- or mostly-volunteer departments, deliver an average of 4 or fewer volunteer firefighters to a mid-day house fire. Because these departments average only one career firefighter per department, it is likely that most of these departments often fail to deliver the minimum of 4 firefighters recognized by national standards as the necessary minimum for interior fire attack.*"

"*An estimated 79,000 firefighters serve in fire departments that protect communities of at least 50,000 population and have fewer than 4 career firefighters assigned to first-due engine companies. It is likely that, for many of these departments, the first arriving complement of firefighters often falls short of the minimum of 4 firefighters needed to initiate an interior attack on a structure fire, thereby requiring the first-arriving firefighters to wait until the rest of the first-alarm responders arrive.*"

"*An estimated 214,000 firefighters, most of them volunteers serving in communities with less than 2,500 population, serve in departments that are involved in structural firefighting but have not formally trained all involved firefighters in those duties.*"

"*An estimated 128,000 firefighters, most of them volunteers serving in communities with less than 2,500 population, serve in departments that are involved in structural firefighting but have not certified any firefighters to Firefighter Level I or II.*"

"*An estimated 737,000 firefighters serve in fire departments with no program to maintain basic firefighter fitness and health, most of them volunteers serving communities with less than 5,000 population.*"

"*Roughly 17,300 fire stations (36% of the estimated 48,400 total fire stations) are estimated to be at least 40 years old.*"

"*Using maximum response distance guidelines from the Insurance Services Office and simple models of response distance as a function of community area and number of fire stations, developed by the Rand Corporation, it is estimated that three-fifths to three-fourths of fire departments have too few fire stations to meet the guidelines.*"

"*Roughly 14,000 fire engines (pumpers) (17% of all engines) are 15 to 19 years old, another 15,700 (19%) are 20 to 29 years old, and 10,900 (13%) are at least 30 years old. Therefore, roughly half (49%) of all engines are at least 15 years old.*"

"*An estimated 65% of fire departments do not have enough portable radios to equip all emergency responders on a shift. The percentage of departments that cannot provide radios to all emergency responders on a shift is highest for communities under 2,500 population.*"

"*An estimated seven-tenths to three-fourths of fire departments have at least some portable radios that are not water-resistant. An estimated three-fourths to four-fifths of fire departments have at least some portable radios that lack intrinsic safety in an explosive atmosphere. The percentages are higher for small, rural communities.*"

"*An estimated 60% of fire departments do not have enough self-contained breathing apparatus (SCBA) to equip all firefighters on a shift.*"

"*Three-fifths (59%) of fire departments have at least some SCBA units that are at least 10 years old.*"

"*An estimated half (48%) of fire departments do not have enough personal alert system (PASS) devices to equip all emergency responders on a shift.*"

"*An estimated 8% of fire departments do not have enough personal protective clothing to equip all firefighters, most of them departments protecting communities with less than 2,500 population.*"

"*An estimated two-thirds (66%) of departments have at least some personal protective clothing that is at least 10 years old.*"

"*The national results presented in this report are based on 4,709 fire departments, or 30% of the sample, that responded to the 2005 Fire Needs Assessment Survey. The overall total response was sufficient for reliable results at the national and state levels, overall and by community size. Total national results in the survey report were made by summing up the weighted estimates for each stratum, and the stratification methodology adjusted for response rates by community size.*"

"*Structural Fire Fighting. The activities of rescue, fire suppression, and property conservation in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency situation.* [from NFPA 1500, ***Standard on Fire Department Occupational Safety and Health Program***, 1997 edition.]"

"*Roughly three of every four US fire departments (73%) are all-volunteer fire departments, but only one of every four US residents (23%) are protected by such a department. Only one in 15 fire departments is all-career, but roughly two of every five US residents (43%) are protected by such a department. Fire departments split roughly 7.5-to-1 between the all- or mostly-volunteer departments vs. the all- or mostly-career departments, but population protected splits roughly 3-to-2 the other way.*"

"*Volunteers are concentrated in rural communities, while career firefighters are found disproportionately in large communities. The all- or mostly-career departments account for all of the fire departments protecting communities of at least 1 million population and for more than 90% of the fire departments protecting communities of 250,000 to 999,999 population. All- or mostly-career departments still account for a majority of departments down to communities of at least 25,000 population.*"

"*Even a rural community can have a large factory complex, a large stadium, or even a high-rise building, with all the technical complexities and potential for high concentration of people or valued property that such a property entails.*"

"*In any community, fire burns the same way in open or in enclosed spaces. Fire harms people and property in the same ways. And the resources and best practices required to safely address the fire problem – or any other major emergency – tend to be the same everywhere. What may differ is the defined scope of responsibility of the local fire department and the quality and quantity of resources available to the department to perform those responsibilities.*"

"*. . . . above a population of 25,000, which is the dividing line for the majority of departments being all- or mostly-career vs. all- or mostly-volunteer . . . .*"

"*Table 6 shows that the smaller communities, with less certain sources of revenue, are more likely to obtain their apparatus either used or converted from a non-fire-department design and use. Vehicles that were purchased or, less often, donated used accounted for an average of 6% of apparatus for departments protecting communities with at least 25,000 population but an average of 40% of apparatus for departments protecting communities with less than 2,500 population.*"

Table B. Average Number of Career/Paid Firefighters per Department on Duty Available to Respond to Emergencies, by Size of Community (Q. 9)

1,000,000 or more	387.4
500,000 to 999,999	221.6
250,000 to 499,999	105.6
100,000 to 249,999	55.3
50,000 to 99,999	26.0
25,000 to 49,999	12.5
10,000 to 24,999	5.5
5,000 to 9,999	2.0
2,500 to 4,999	0.8
Under 2,500	0.5

"*NFPA 1720, **Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments**, calls for a minimum of 4 firefighters on-site before an interior attack on a structure fire is begun. There are difficulties in applying these standards to Table 7. As noted, responding career firefighters from mostly-volunteer departments are not shown, the statistics shown are average numbers responding rather than minimum numbers responding, and the threshold number of 4 is combined with averages from 3 to 4 in the questionnaire. Nevertheless, some limited observations are possible.*"

"*Table 8 provides statistics for only the all- or mostly-career fire departments in communities with 10,000 or more population, on the number of career firefighters assigned to an engine or pumper. Note that a "mostly career" department might also respond with some volunteers, and those numbers are not reflected in Table 8. NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, requires a minimum of 4 firefighters on an engine or pumper.*"

"*The percentage of departments with fewer than 4 career firefighters assigned to an engine or pumper is 75% for departments protecting 10,000 to 24,999 population, 77% for departments protecting 25,000 to 49,999 population, 71% for departments protecting 50,000 to 99,999 population, 59% for departments protecting 100,000 to 249,999 population, 44% for departments protecting 250,000 to 499,999 population, 27% for departments protecting 500,000 to 999,999 population, and 10% for departments protecting at least a million population.*"

Table C. Estimated Percentage of Fire Departments That Are Involved in Structural Firefighting But Where Not All Involved Firefighters Have Formal Training by Size of Community Protected (Q. 13b)

Population Protected	Not All Involved Firefighters Have Formal Training	Only Some or None of Involved Firefighters Have Formal Training
1,000,000 or more	0%	0%
500,000 to 999,999	0%	0%
250,000 to 499,999	4%	2%
100,000 to 249,999	3%	1%
50,000 to 99,999	7%	1%
25,000 to 49,999	12%	1%
10,000 to 24,999	21%	4%
5,000 to 9,999	39%	7%
2,500 to 4,999	49%	14%
Under 2,500	71%	31%
Total	**53%**	**20%**

"*An estimated 128,000 firefighters are estimated to serve in fire departments where no certification of firefighters as Firefighter Level I or II has taken place. . . . .None of these firefighters were in fire departments protecting populations of 250,000 or more. Most of the firefighters in departments with no certification for structural firefighting were in rural fire departments and so were almost certainly volunteer firefighters.*"

. . .

Population Protected	Estimated Firefighters Lacking Certification
1,000,000 or more	0
500,000 to 999,999	0
250,000 to 499,999	0
100,000 to 249,999	3,000
50,000 to 99,999	2,000
25,000 to 49,999	3,000
10,000 to 24,999	6,000
5,000 to 9,999	10,000
2,500 to 4,999	20,000
Under 2,500	84,000
Total	**128,000**
Percent of total firefighters	**12%**

"*In the largest communities, those with populations of 500,000 or more, only 13% of firefighters are estimated to work in fire departments without programs to maintain basic firefighter fitness and health. In the smallest communities, those with populations of less than 5,000, at least four-fifths of firefighters are estimated in serve in fire departments without such programs.*"

"*Because such a large share of total firefighters serve as volunteers in smaller communities, which are the same communities where most fire departments do not have programs to maintain basic firefighter fitness and health, the estimated total of 792,000 firefighters without such programs represents roughly two-thirds of the estimated total number of firefighters.*"

Table I. Estimated Number of Firefighters in Fire Departments With No Program to Maintain Basic Firefighter Fitness and Health by Size of Community Protected (Q. 18)

Population Protected	Estimated Firefighters Without Program to Maintain Fitness
1,000,000 or more	4,000
500,000 to 999,999	5,000
250,000 to 499,999	10,000
100,000 to 249,999	17,000
50,000 to 99,999	23,000
25,000 to 49,999	34,000
10,000 to 24,999	85,000
5,000 to 9,999	97,000
2,500 to 4,999	130,000
Under 2,500	331,000
Total	**737,000**
Percent of total firefighters	**67%**

Table 7

For All- or Mostly-Volunteer Departments
Average Number of Volunteer Firefighters Who Respond to a Mid-Day House Fire
Percent of Departments by Community Size
(Q. 10)

Population of Community	Average Number of Volunteer Firefighters Responding						
	1-2	3-4	5-9	10-14	15-19	20 or More	Total
25,000 to 49,999	6.5%	10.1%	29.7%	24.7%	10.9%	18.1%	100.0%
10,000 to 24,999	5.1%	14.8%	31.8%	26.8%	11.2%	10.5%	100.0%
5,000 to 9,999	3.3%	11.6%	40.7%	27.9%	10.6%	6.0%	100.0%
2,500 to 4,999	3.3%	13.5%	43.9%	26.6%	9.3%	3.5%	100.0%
Under 2,500	3.3%	17.9%	46.4%	22.9%	7.8%	2.3%	100.0%

Table 8

For All- or Mostly-Career Departments
Number of Career Firefighters Assigned to an Engine/Pumper Apparatus
Percent of Departments by Community Size
(Q. 11)

Population of Community	Number of Career Firefighters Assigned to Engine/Pumper				
	1-2	3	4	5 or More	Total
1,000,000 or more	0.0%	10.0%	80.0%	10.0%	100.0%
500,000 to 999,999	0.0%	26.9%	65.4%	7.7%	100.0%
250,000 to 499,999	7.7%	35.9%	53.8%	2.6%	100.0%
100,000 to 249,999	5.1%	54.1%	38.7%	1.9%	100.0%
50,000 to 99,999	7.1%	63.8%	26.8%	2.4%	100.0%
25,000 to 49,999	14.8%	62.5%	19.8%	2.8%	100.0%
10,000 to 24,999	32.7%	42.7%	20.6%	3.9%	100.0%

Plans Review

Population Protected	Number of Departments Without Program	Population Protected by Departments Without Program
1,000,000 or more	5	9,500,000
500,000 to 999,999	3	1,800,000
250,000 to 499,999	1	400,000
100,000 to 249,999	17	2,600,000
50,000 to 99,999	26	1,800,000
25,000 to 49,999	115	4,000,000
10,000 to 24,999	644	10,300,000
5,000 to 9,999	1,415	10,200,000
2,500 to 4,999	2,638	11,800,000
Under 2,500	8,690	14,700,000
Total	**13,553**	**67,000,000**
Percent of US total	**50%**	**23%**

Routine Testing of Active Systems (e.g., sprinkler, detection/alarm, smoke control)

Population Protected	Number of Departments Without Program	Population Protected by Departments Without Program
1,000,000 or more	5	9,500,000
500,000 to 999,999	5	3,500,000
250,000 to 499,999	12	4,100,000
100,000 to 249,999	67	10,400,000
50,000 to 99,999	126	8,800,000
25,000 to 49,999	376	13,000,000
10,000 to 24,999	1,593	25,500,000
5,000 to 9,999	2,627	18,900,000
2,500 to 4,999	3,778	16,900,000
Under 2,500	10,863	18,400,000
Total	**19,451**	**128,900,000**
Percent of US total	**72%**	**44%**

"*The **Fire Suppression Rating Schedule** of the Insurance Services Office includes a number of guidelines and formulas to use in performing a complete assessment of the adequacy of fire department resources, but for this simplified calculation on adequacy of number of fire stations, Item 560 has a basis: "The built-upon area of the city should have a first-due engine company within 1-1/2 miles and a ladder-service company within 2-1/2 miles."* For this simplified calculation, we can use these two numbers as a range for the maximum distance from any point in the community to the nearest fire station.*"

"*NFPA 1710 states its requirements in terms of time, specifically, a requirement that 90% of responses by the initial arriving company shall be within 4 minutes. If the first response area is considered as a circle with the fire station in the middle, and if emergency calls are evenly distributed throughout the response area, then 90% of responses will be within 95% of the distance from the fire station to the boundary of the response area.** If the average speed of fire apparatus is 21 mph, as it might be in the downtown area of a city, then the 4-minute requirement corresponds to a 1.5-mile requirement. If the average speed of fire apparatus is 36 mph, as it might be in a suburban or rural area, then the 4-minute requirement corresponds to a 2.5-mile requirement. In a very rural community, the average speed could be even higher, and the allowable distance would be even greater.*"

"*Figure 4 indicates that in larger communities, those with at least 50,000 population, one-sixth to one-fourth (17-25%) of engines are at least 15 years old, except for communities of 500,000 to 999,999 population, where the percentage is only 12%. In smaller communities, those with less than 5,000 population, roughly one-half to two-thirds (52-65%) of engines are at least 15 years old. Table M indicates there are more than 40,000 engines in use that are at least 15 years old, including nearly 11,000 that are at least 30 years old. Most of these engines aged 15 years old or more are in use in smaller communities, with less than 5,000 population, but hundreds are in use in departments for every community size.*"

Table M. Number of Engines in Service, Limited to Engines At Least 15 Years Old by Age of Equipment and Size of Community Protected (Q. 24)

	Total Number of Engines in Service of This Age in Fire Departments Protecting Communities of This Population Size		
Population Protected	**15 to 19 Years Old**	**20 to 29 Years Old**	**30+ Years Old**
1,000,000 or more	135	131	2
500,000 to 999,999	166	18	0
250,000 to 499,999	141	47	15
100,000 to 249,999	523	109	61
50,000 to 99,999	511	202	22
25,000 to 49,999	1,073	579	139
10,000 to 24,999	2,057	1,470	588
5,000 to 9,999	2,033	2,108	1,129
2,500 to 4,999	2,142	2,775	1,606
Under 2,500	5,225	8,250	7,288
Total	**14,006**	**15,688**	**10,851**
Percent of US total	**17%**	**19%**	**13%**

"*For communities with at least 50,000 population, at most 5% of departments do not have enough SCBA units to equip all emergency responders on a shift. This percentage rises to three-fourths for departments protecting communities with less than 2,500 population.*"

"*For larger communities, roughly one-fourth to one-third of departments have at least some SCBA units that are at least 10 years old. For smaller communities, the percentage rises to two-thirds. Overall, the percentage of departments with at least some SCBA units that are at least 10 years old is three-fifths (59%).*"

Table P. Departments Where Not All Firefighters on a Shift Have SCBA and Where At Least Some SCBA Units At Least 10 Years Old, by Size of Community (Q. 28a, 28b)

Population Protected	Departments Where Not All Firefighters on a Shift Are Equipped With SCBA	Departments Where At Least Some SCBA Units Are At Least 10 Years Old
1,000,000 or more	0%	27%
500,000 to 999,999	0%	18%
250,000 to 499,999	4%	26%
100,000 to 249,999	2%	31%
50,000 to 99,999	5%	32%
25,000 to 49,999	11%	40%
10,000 to 24,999	23%	45%
5,000 to 9,999	47%	53%
2,500 to 4,999	67%	60%
Under 2,500	77%	67%
Total	**60%**	**59%**

"*For communities with populations of 50,000 or more, at most 5% of departments have insufficient PASS devices to equip all emergency responders on a shift. This rises to one in five for communities with 10,000 to 24,999 population, one-third for communities with 5,000 to 9,999 population, over half for communities with 2,500 to 4,999 population, and three-fifths in the departments protecting communities with less than 2,500 population.*"

"*For communities with at least 10,000 population, 3% or less of departments are estimated not to have personal protective clothing for all firefighters. For communities of less than 2,500 population, the percentage is 16%.*"

"*Nearly all of the firefighters in departments estimated not to have personal protective clothing for all firefighters serve in fire departments that protect communities with less than 10,000 population. Seven out of ten are in communities with less than 2,500 population.*"

"*Two-thirds of departments have at least some personal protective clothing that is at least 10 years old. (See Table R.) For departments protecting at least 25,000 population, fewer than half of departments have at least some personal protective clothing that is at least 10 years old.*"

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