Attachment C

FIRE DEPARTMENT

CIP Committee Report to Select Board:
Fire Department Ladder Truck / Quint

including

Documents, Research Study & Articles

2014 Oct

Report to Select Board: Fire Department Ladder Truck/Quint

In January 2014 the Select Board authorized the CIP Committee to study the possibility of replacing the ladder truck and the pumper truck (Engine No. 2) with a single, multi-purpose vehicle, commonly called a Quint. The committee, with Chief Dennis Cote's input and assistance, spent numerous hours learning about and assessing the uses of the department's equipment, mutual aid given and received, and the Town's infrastructure relevant to the department's services. All the written information we requested and/or received during our study is attached. Individual members also observed some residential driveways and access issues and viewed online videos of fire responses.

The town has had a ladder truck since the 1960s and bought the current ladder truck in 1994. It was 10 years old at the time and had been a Boston Fire Department vehicle. It must pass an annual certification inspection and several years ago required $12,000 worth of repairs. It passed this year's certification in September without major expense. The committee does not question the need to replace this aging vehicle now scheduled for FY2018.

Committee members also recognize the need for an aerial device. Some in the community may see two-story residences and wonder why the town needs a ladder truck. It is unfortunate the terms aerial or ladder are part of the name, since it frequently is not the height but the reach the vehicle provides that is critical. The ladder truck is used for fires, rescues, and, in the "other" category, such activities as inspections of commercial buildings' snow loads. It's also used to block accident scenes on I-95.

The Committee was divided regarding replacing the ladder truck with a Quint. The vote to replace the ladder truck and eventually the pumper with a Quint was a tie, and the motion failed. Some of the Committee members' discussion points and opinions follow.

First, what is a Quint? It is a vehicle that combines an aerial ladder, water tank, fire pump, hose, and ground ladders. There are neighboring departments that have Quints, and Fire Chief Cote, when with the Newington Fire Department, was the lead in purchasing a Quint for that community.

A Quint is versatile, but it can be.heavier, higher, and perhaps wider than the current ladder truck. Although it is a multi-function vehicle, only one function can operate at a time, i.e., if the water operation is in use, the ladder cannot also be used. The aerial device will extend 75 or 85 feet, not the 110 feet now available with the ladder truck. The water tank is typically 300 gallons, not the 1000 gallons carried by a pumper.

Even though a Quint is more expensive than a ladder truck, if the Quint also reduces the need for a pumper (Engine 2), the town might save several hundred thousand dollars by replacing two vehicles. Typically, the Fire Department Equipment and Apparatus Fund, comprised of ambulance fees, pays for all or a portion of the department's vehicle purchases. In this case, it might be apportioned between withdrawal from the fund and a lease/purchase agreement.

The 2008 MRI [Municipal Resources Inc.] report included among its many recommendations replacing the ladder truck with a Quint. Unfortunately, there was little explanation accompanying the recommendation. The Town Administrator contacted MRI and spoke with one of the principals. His memorandum of that conversation is attached. MRI offered to do an equipment analysis and report at the cost of $12,500. At least one committee member noted that not all of the MRI recommendations have been enacted, notably the one relating to having four, not three, career staff on duty around the clock.

The crux of the matter is community needs. North Hampton is a residential community with two major highways within its town lines, one major commercial area, and an airfield. Of the residences, most on the west side of I-95 do not have hydrants. Hydrants in town are 1500 feet apart, not the standard 500 feet. Aquarion Water owns the hydrants which cost the Town approximately $260,000 last year.

The committee also learned there are residences in town where access to the buildings as well as access to water is impeded by long, sometimes sharply curving driveways made narrower because of granite posts, boulders, and trees. Trees grow, branches bend down from the weight of snow or ice, and access becomes difficult. The Fire Chief provided examples of driveways east of Lafayette Road that pose such problems (see attached). The Planning Board representative to the CIP Committee has informed the Planning Board of the access problems.

Gaining access to water quickly in fighting a fire is crucial. A Quint as a first responder would provide limited water, and it would be necessary for other pumping equipment from the department or *via* mutual aid to arrive promptly so that sufficient equipment and personnel were on hand. If the Quint or pumper were out for repairs, the tanker would be the only North Hampton apparatus in reserve.

Mutual aid, however, works well. The committee now has a better sense of how it works, the equipment each community has on hand, and the volume and type of mutual aid received and provided by North Hampton. The MRI report's recommendation for a Quint mentions the availability of aerial devices from other mutual aid communities. See the attached inventory of equipment in all neighboring departments. The Chief pointed out the response time, however, can vary. For instance, in the summer months, Hampton's beach population increases dramatically and could slow that department's mutual aid response time to North Hampton.

The 2008 MRI report indicated that North Hampton meets nationally-recognized response times for both EMS and fire and that is due to having career staff on duty 24 hours a day to respond immediately with ambulance or apparatus. The surveys conducted periodically by the Planning Board as part of its Master Plan efforts indicate that residents are satisfied with town services, including those of the Fire Department. The MRI survey in 2008 indicated that more than 73% of respondents considered Fire Department services exceptional or good; and less than 2% thought them deficient. 45% of the respondents had used some form of Fire Department service in the previous four

years.

There are very few structural fires each year in North Hampton. For instance, there have been 15 chimney fires in North Hampton in the last five years, all but one requiring use of the ladder truck. The Ladder Truck has responded to 183 incidents all told during the past five years (see attached list).

Would acquisition of a Quint in place of the ladder truck and pumper result in a diminution of Fire / Rescue services for the town or for property owners in certain parts of town? Is the possible one-time savings of several hundred thousand dollars worth purchasing a Quint?

Committee members now know much more than they did before this assignment. We suggest that the Select Board also become informed about the choices relating to Fire Department apparatus and the impact upon how the Department operates. The MRI report noted the need for better liaison between the Select Board and the Department; and also recommended better community communications. Both will be needed for the town and townspeople to make what the majority thinks is the right choice for the community.

CGS

Attachments

North Hampton Fire / EMS Department

1. Ladder Truck Runs 2009 - 2014 Jun 30 attached to memorandum from Chief Cote 13 August 2014
2. Incident Type Report 2009-2014 Jun 1
3. Mutual Aid Responses by Department 2009 - 2014 Jul 1
4. Local Municipal Inventory of Fire Equipment
5. Ambulance Data 2010 - 2014
6. Partial list of driveways east of Lafayette Road of concern for emergency service
7. Fire Services Organizational Analysis by Municipal Resources, Inc. [MRI] 2008 Only pages mentioning the Ladder truck / Quint
8. Memorandum of Paul Apple telephone conversation with Chief Brian Duggan, an author of MRI Study 30 July 2014
9. Bert J. Garry, D.B. Warlick & Co. response to Paul Apple re ISO ratings

Research Study & Articles

Traditional Aerial Truck versus a Quint: Where do we go from here? by Robert John VonSolkema, Grand Rapids, MI Fire Department 2000 Link http://www.usfa.fema.gov/pdf/efop/efo24633.pdf

The Quint: a unique and still misunderstood fire truck: Neither a jack of all trades nor a master of none, the quint will fill specific needs, by Robert Avsec, 2012. Link http://www.firerescue1.com/fire-products/fire-apparatus/articles/1284742-The-Quint-a-unique-and-still-misunderstood-fire-truck/

The 75-Foot Quint: Know What It Can Do by Bill Adams, 2009 Link http://www.fireengineering.com/articles/print/volume-162/issue-2/features/the-75-foot-quint-know-what-it-can-do.html

Capital Improvement Plan (CIP) for FY2016-2021
Report to Select Board: Fire Department Ladder Truck / Quint

Attachment 1

North Hampton
FIRE & RESCUE
235 ATLANTIC AVENUE
NORTH HAMPTON, N.H. 03862

Dennis P. Cote
CHIEF OF DEPARMENT

TEL: (603) 964-5500
FAX: (603) 964-7249
EMERGENCY: 911

August 13, 2014

CIP Committee

Ref: Ladder 1 Responses

CIP members,

- **I have been asked to provide data that would report the operation of the ladder being used for height and or reach. I have provided as much data as possible for the amount of times the ladder has been used. What is difficult to compile, is what actually duties the vehicle performed at each incident it went to.**

- **Attached you will find the last 5 years of run history for the Ladder truck. In the last 5 years the ladder responded to 183 incidences. This is composed of responses in Town and to mutual aid communities. It has been at all the fires within our community with the exception of two. That is simply because the structures that burned were either a camper or an out building at a local establishment. The need was simply not there for the aerial to be used.**

We have had 15 chimney fires in the last 5 years. I can tell you that the Ladder truck was at all of them. I can only come up with one incident where the ladder truck didn't operate as an aerial. This is because the chimney or flu was accessed safely and directly from the upper deck of the house.

Each vehicle that we have and use, provide many functions and capabilities. For example; the primary function of the ladder truck is certainly for height and reach capabilities. It is also used for elevated water streams, accessing flat roofs in the commercial district, assisting with water removal, vehicle extrication (rescue tools), high angle or below grade rescues, safety blocking at MVA and whatever else may come our way. It is not specific to aerial operations.

The Engines are set up very similar so that when multiple calls occur in town, the capabilities are mirrored. They both carry the same amount of water, same amount of hose, ground ladders etc. They both even have rescue tools set up and ready to operate. There have been several incidences where we have had to have two and even three sets of rescue tools working to extricate patient(s). Some examples are one the fatal accidents on Lafayette Rd, the massive MVA on I95 where we had 3 sets of

tools working on two separate cars. One of the tools came from our ladder truck and engine and the third set came from the Portsmouth Ladder. These are just a few examples of the capabilities.

Our operation is not solely based on trends that we see from year to year. One of the things we cannot control is the frequency and types of emergencies that require specific functions from year to year. What we can do and what we will continue to do, is plan for them as best we can.

Again each major piece of equipment (apparatus) that we have is equipped to perform multiple functions. This is smart planning and essential planning for the future.

If I can be of further assistance please do not hesitate contact me.

Dennis P. Cote

Chief of Department HO/EMD
North Hampton Fire & Rescue

Capital Improvement Plan (CIP) for FY2016-2021
Report to Select Board: Fire Department Ladder Truck / Quint

Attachment 1

Unit Responses by Unit

Alarm Date Between {01/01/2009} And {06/30/2014}
and Unit = "36L1 "

Incident	Alarm Date	Notified	Response Code	Reaction	Response	Hours	Miles	F	M	R	O
36L1 Emergency One Ladder											
09-0000034	01/13/2009	04:06:00	1 Emergency	00:00:00	00:12:00	4.78	12.00				X
09-0000058	01/19/2009	10:40:19	1 Emergency	00:00:41	00:05:41	0.35	4.00	X			
09-0000060	01/19/2009	18:37:34	2 Non-emergency	00:22:26	00:28:26	0.63	4.00	X			
09-0000073	01/25/2009	12:37:00	1 Emergency	00:19:00	00:25:00	0.78	3.00	X			
09-0000098	02/07/2009	01:33:00	2 Non-emergency	00:13:00	00:16:00	0.10	1.00				X
09-0000122	02/19/2009	05:06:00	1 Emergency	00:07:00	00:19:00	0.78	15.00	X			
09-0000171	03/08/2009	18:31:00	1 Emergency	00:12:00	00:24:00	0.20	5.00	X			
09-0000181	03/12/2009	11:26:00	1 Emergency	00:05:00	00:07:00	0.92	4.00	X	X		
09-0000192	03/18/2009	12:19:12	1 Emergency	00:04:48	00:08:48	0.53	3.00		X		
09-0000198	03/21/2009	10:03:00	1 Emergency	00:00:00	00:06:00	1.47	8.00	X			
09-0000206	03/24/2009	12:09:00	1 Emergency	00:09:00	00:12:00	1.20	4.00	X			
09-0000208	03/24/2009	15:43:00	2 Non-emergency	00:03:00	00:13:00	1.87	7.00				X
09-0000210	03/25/2009	05:31:00		00:00:00	00:13:00	0.77	8.00				X
09-0000212	03/25/2009	06:26:00	2 Non-emergency	00:00:00	00:12:00	2.45	13.00				X
09-0000269	04/25/2009	13:45:10	1 Emergency	00:06:50	00:12:50	0.10	7.00	X			
09-0000271	04/25/2009	16:19:00	1 Emergency	00:07:00	00:09:00	0.32	3.00	X			
09-0000279	04/28/2009	20:00:00	1 Emergency	00:00:00	00:06:00	0.90	1.50	X			
09-0000283	04/30/2009	20:40:00	1 Emergency	00:10:00	00:14:00	0.57	2.00	X			
09-0000290	05/05/2009	14:40:00	1 Emergency	00:07:00	00:11:00	0.37	1.00				X
09-0000352	06/06/2009	13:15:00	1 Emergency	00:05:00	00:06:00	0.03	2.00	X			
09-0000404	06/22/2009	16:24:00	1 Emergency	00:07:00	00:08:00	0.82	1.00	X			
09-0000514	08/08/2009	00:52:00	1 Emergency	00:09:00	00:15:00	0.32	4.00	X	X		
09-0000588	08/28/2009	15:09:00	1 Emergency	00:00:00	00:04:00	1.42	5.00	X			
09-0000591	08/29/2009	14:57:00	1 Emergency	00:05:00	00:11:00	0.42	7.00		X		
09-0000626	09/18/2009	13:21:00	1 Emergency	00:00:00	00:13:00	0.57	6.00	X			
09-0000628	09/19/2009	14:21:00		00:00:00	00:05:00	0.38	7.00	X			
09-0000685	10/22/2009	07:43:00	2 Non-emergency	00:09:00	00:12:00	0.80	2.00				X
09-0000686	10/22/2009	08:38:00	1 Emergency	00:00:00	00:06:00	1.05	3.00	X			
09-0000709	10/28/2009	15:51:00	1 Emergency	00:05:00	00:09:00	0.10	4.00	X			
09-0000821	12/16/2009	18:17:00	1 Emergency	00:00:00	00:06:00	0.80	8.00	X			
09-0000829	12/18/2009	17:18:00	1 Emergency	00:00:00	00:05:00	0.82	8.00	X			
09-0000841	12/25/2009	15:49:00		00:02:00	00:14:00	0.32	8.00				X
10-0000010	01/07/2010	11:38:00	1 Emergency	00:00:00	00:08:00	1.18	3.00	X			
10-0000060	01/28/2010	07:21:00		00:00:00	00:05:00	2.00	4.00				X
10-0000076	02/05/2010	20:15:00	1 Emergency	00:06:00	00:07:00	1.55	1.00		X		

Reaction time calculated from time notified to rollout time.
Response time calculated from time notified to arrival time.

North Hampton Fire & Rescue

Unit Responses by Unit

Alarm Date Between {01/01/2009} And {06/30/2014}
and Unit = "36L1 "

Incident	Alarm Date	Notified	Response Code	Reaction	Response	Hours	Miles	F	M	R	O
36L1 Emergency One Ladder											
10-0000079	02/11/2010	17:17:02	M Automatic/Mutua 1 Aid Given	00:00:00	00:10:58	1.43	10.00				X
10-0000115	02/25/2010	22:06:00	1 Emergency	00:00:00	00:09:00	0.50	4.00				X
10-0000116	02/25/2010	22:09:00	1 Emergency	00:27:00	00:31:00	0.32	2.00	X			
10-0000119	02/25/2010	22:50:00	1 Emergency	00:00:00	00:27:00	0.97	4.00				X
10-0000124	02/25/2010	23:17:00	1 Emergency	00:00:00	00:00:00	0.52	3.00				X
10-0000127	02/25/2010	23:22:00	1 Emergency	00:00:00	00:10:00	0.43	2.00				X
10-0000133	02/25/2010	23:48:00	1 Emergency	00:00:00	00:05:00	0.63	7.00				X
10-0000144	02/26/2010	07:56:00	2 Non-emergency	00:00:00	00:02:00	0.65	1.00				X
10-0000149	02/26/2010	08:51:00	1 Emergency	00:00:00	00:21:00	1.28	5.00				X
10-0000148	02/26/2010	08:51:00	1 Emergency	00:00:00	00:04:00	0.40	3.00				X
10-0000153	02/26/2010	10:17:00	2 Non-emergency	00:00:00	00:03:00	0.78	3.00				X
10-0000156	02/26/2010	10:59:00	2 Non-emergency	00:00:00	00:05:00	0.75	3.00				X
10-0000191	03/07/2010	19:14:00	1 Emergency	00:08:00	00:11:00	0.75	5.00		X	X	
10-0000208	03/15/2010	09:30:00	1 Emergency	00:00:00	00:09:00	0.98	3.00				X
10-0000209	03/15/2010	10:29:00	2 Non-emergency	00:00:00	00:07:00	0.68	2.00				X
10-0000212	03/15/2010	11:10:00	2 Non-emergency	00:00:00	00:00:00	0.75	2.00				X
10-0000219	03/15/2010	14:10:00	2 Non-emergency	00:00:00	00:08:00	1.27	3.00	X			
10-0000221	03/15/2010	19:45:00	2 Non-emergency	00:00:00	00:08:00	0.28	2.00	X			
10-0000227	03/16/2010	15:36:00	2 Non-emergency	00:00:00	00:07:00	1.25	5.00				X
10-0000228	03/16/2010	18:01:00	2 Non-emergency	00:00:00	00:04:00	0.83	3.00				X
10-0000249	03/31/2010	08:37:00	2 Non-emergency	00:00:00	00:05:00	1.07	4.00				X
10-0000264	04/02/2010	16:22:00	1 Emergency	00:11:00	00:14:00	0.65	2.00		X		
10-0000281	04/13/2010	07:50:00	1 Emergency	00:00:00	00:05:00	0.62	2.00		X		
10-0000307	04/24/2010	00:53:00	1 Emergency	00:00:00	00:09:00	1.15	8.00	X			
10-0000386	05/21/2010	22:41:00	1 Emergency	00:07:00	00:18:00	0.45	8.00		X		
10-0000389	05/22/2010	23:18:00	1 Emergency	00:00:00	00:09:00	0.43	5.00		X		
10-0000409	05/31/2010	01:36:00	1 Emergency	00:00:00	00:11:00	0.92	16.00		X		
10-0000421	06/02/2010	17:13:00	1 Emergency	00:00:00	00:04:00	0.65	4.00		X		

Reaction time calculated from time notified to rollout time.
Response time calculated from time notified to arrival time.

North Hampton Fire & Rescue

Unit Responses by Unit

Alarm Date Between {01/01/2009} And {06/30/2014}
and Unit = "36L1 "

Incident	Alarm Date	Notified	Response Code	Reaction	Response	Hours	Miles	F	M	R	O
36L1 Emergency One Ladder											
10-0000444	06/08/2010	11:38:00	1 Emergency	00:00:00	00:05:00	0.50	4.00	X			
10-0000526	07/10/2010	08:14:00	2 Non-emergency	00:00:00	00:06:00	1.18	3.00				X
10-0000556	07/23/2010	17:58:00	1 Emergency	00:00:00	00:10:00	0.18	6.00	X			
10-0000578	08/02/2010	15:45:00	1 Emergency	00:01:00	00:06:00	1.00	10.00		X		
10-0000591	08/05/2010	17:08:00	1 Emergency	00:00:00	00:02:00	2.20	1.00	X			
10-0000597	08/07/2010	15:10:00	1 Emergency	00:00:00	00:07:00	1.33	6.00	X			
10-0000610	08/10/2010	23:47:00	1 Emergency	00:07:00	00:14:00	1.68	4.00	X			
10-0000612	08/12/2010	11:38:00		00:00:00	00:09:00	0.97	3.00				X
10-0000613	08/12/2010	17:48:00		00:00:00	00:05:00	0.75	3.00	X			
10-0000619	08/15/2010	22:23:00		00:00:00	00:06:00	1.88	5.00	X			
10-0000705	09/27/2010	21:01:00	1 Emergency	00:00:00	00:06:00	0.47	10.00	X			
10-0000808	11/20/2010	20:32:00	1 Emergency	00:06:00	00:11:00	0.73	4.00	X			
10-0000825	11/28/2010	14:37:00	1 Emergency	00:00:00	00:05:00	0.65	8.00	X			
10-0000844	12/08/2010	19:42:00	1 Emergency	00:00:00	00:07:00	1.07	5.00				X
10-0000851	12/11/2010	06:54:00	1 Emergency	00:00:00	00:07:00	0.27	3.00	X			
10-0000865	12/15/2010	18:38:00	1 Emergency	00:12:00	00:16:00	0.63	2.00	X			
10-0000875	12/19/2010	18:04:00	1 Emergency	00:00:00	00:03:00	1.38	1.00	X			
10-0000877	12/20/2010	20:34:00		00:00:00	00:07:00	0.62	0.00	X			
11-0000010	01/03/2011	14:44:57	1 Emergency	00:06:03	00:09:03	0.35	3.00	X			
11-0000022	01/10/2011	13:00:00	1 Emergency	00:02:00	00:06:00	0.33	4.00	X			
11-0000027	01/11/2011	18:36:00	1 Emergency	00:00:00	00:04:00	0.22	3.00	X			
11-0000048	01/21/2011	12:24:00	1 Emergency	00:21:00	00:36:00	1.80	15.00	X			
11-0000065	01/30/2011	17:45:00		00:00:00	00:07:00	0.35	1.00				X
11-0000071	02/01/2011	16:02:00		00:11:00	00:14:00	0.07	5.00	X			
11-0000080	02/03/2011	21:36:00	1 Emergency	00:00:00	00:04:00	1.25	6.00	X			
11-0000092	02/08/2011	14:04:00	1 Emergency	00:00:00	00:06:00	1.07	4.00				X
11-0000111	02/20/2011	01:33:00	1 Emergency	00:22:00	00:24:00	1.00	4.00	X			
11-0000120	02/25/2011	09:03:00	1 Emergency	00:00:00	00:07:00	0.17	5.00	X			
11-0000122	02/28/2011	15:29:06		00:00:00	00:02:54	1.30	15.00				X
11-0000134	03/07/2011	19:30:19		00:00:00	00:03:41	0.00	4.00	X			
11-0000141	03/12/2011	08:41:00	1 Emergency	00:00:00	00:14:00	0.37	5.00	X			
11-0000142	03/12/2011	10:16:00	2 Non-emergency	00:05:00	00:10:00	0.65	3.00				X
11-0000156	03/20/2011	19:29:00	1 Emergency	00:00:00	00:22:00	0.62	8.00	X	X		
11-0000176	03/30/2011	04:00:00	1 Emergency	00:11:00	00:15:00	3.78	6.00	X			
11-0000187	04/02/2011	10:03:19		00:00:00	00:02:41	0.69	2.00	X			
11-0000200	04/10/2011	11:54:00	1 Emergency	00:00:00	00:00:00	1.53	5.00	X			
11-0000210	04/17/2011	17:25:00	2 Non-emergency	00:02:00	00:21:00	1.77	12.00	X			X

Reaction time calculated from time notified to rollout time.
Response time calculated from time notified to arrival time.

North Hampton Fire & Rescue

Unit Responses by Unit

Alarm Date Between (01/01/2009) And (06/30/2014) and Unit = "36L1 "

Incident	Alarm Date	Notified	Response Code	Reaction	Response	Hours	Miles	F	M	R	O
36L1 Emergency One Ladder											
11-0000238	05/14/2011	18:32:00	1 Emergency	00:00:00	00:08:00	0.35	16.00	X			
11-0000290	06/09/2011	20:43:00	1 Emergency	00:00:00	00:10:00	1.20	7.00				X
11-0000471	08/07/2011	11:10:00		00:00:00	00:02:00	0.30	1.00	X			
11-0000506	08/13/2011	15:12:00	2 Non-emergency	00:01:00	00:06:00	0.60	4.00	X			
11-0000541	08/25/2011	07:22:00		00:00:00	00:09:00	0.98	14.00	X			
11-0000556	08/28/2011	12:49:00	1 Emergency	00:00:00	00:00:00	0.18	4.00				X
11-0000761	11/05/2011	01:32:00	1 Emergency	00:00:00	00:13:00	1.13	6.00	X			
11-0000785	11/15/2011	23:26:00	1 Emergency	00:09:00	00:15:00	1.87	5.00	X			
11-0000796	11/21/2011	21:11:00	1 Emergency	00:09:00	00:10:00	0.78	2.00	X			
11-0000815	11/29/2011	16:57:00	1 Emergency	00:07:00	00:12:00	0.30	4.00	X			
11-0000816	11/29/2011	17:15:00	1 Emergency	00:06:00	00:15:00	0.80	5.00	X			
11-0000831	12/02/2011	16:08:00	1 Emergency	00:07:00	00:08:00	0.77	2.00				X
11-0000863	12/22/2011	08:00:00	1 Emergency	00:04:00	00:07:00	0.95	4.00	X			
12-0000027	01/12/2012	08:09:00	1 Emergency	00:03:00	00:07:00	0.88	10.00		X		
12-0000038	01/16/2012	20:25:00	1 Emergency	00:13:00	00:13:00	1.18	1.00				X
12-0000057	01/28/2012	16:18:00	1 Emergency	00:08:00	00:12:00	0.12	4.00	X			
12-0000195	04/05/2012	21:35:00	1 Emergency	00:08:00	00:11:00	0.33	4.00	X			
12-0000223	04/17/2012	12:16:00	1 Emergency	00:00:00	00:04:00	0.25	1.00				X
12-0000225	04/17/2012	17:35:00	1 Emergency	00:00:00	00:04:00	0.37	5.00	X			
12-0000307	05/20/2012	10:54:00	1 Emergency	00:00:00	00:10:00	0.58	9.00				X
12-0000416	07/10/2012	22:35:00	1 Emergency	00:00:00	00:05:00	2.67	5.00	X			
12-0000443	07/16/2012	10:32:00	1 Emergency	00:00:00	00:02:00	0.32	4.00				X
12-0000452	07/19/2012	07:58:00	1 Emergency	00:02:00	00:04:00	0.28	4.00	X			
12-0000457	07/22/2012	18:42:00	1 Emergency	00:00:00	00:03:00	1.08	3.00	X			
12-0000487	08/01/2012	22:33:00	1 Emergency	00:09:00	00:15:00	0.45	16.00	X			
12-0000528	08/14/2012	16:45:00		00:00:00	00:03:00	0.35	1.00	X			
12-0000531	08/14/2012	21:48:00		00:00:00	00:06:00	0.57	7.00	X			
12-0000601	09/07/2012	21:46:00		00:00:00	00:07:00	1.32	8.00	X			
12-0000697	10/23/2012	11:48:00	2 Non-emergency	00:02:00	00:11:00	3.63	6.00				X
12-0000752	11/09/2012	15:47:00	1 Emergency	00:09:00	00:14:00	0.90	15.00	X			
12-0000787	11/23/2012	06:51:00		00:00:00	00:06:00	1.32	3.00				X
12-0000804	12/01/2012	20:40:00	1 Emergency	00:07:00	00:13:00	1.35	4.00	X			
12-0000821	12/07/2012	16:31:00	1 Emergency	00:07:00	00:17:00	1.15	14.00	X			
12-0000843	12/18/2012	01:24:01	1 Emergency	00:09:59	00:13:59	1.62	5.00	X			
13-0000007	01/04/2013	17:18:00	1 Emergency	00:27:00	00:30:00	1.13	5.00	X			
13-0000026	01/10/2013	00:06:00	1 Emergency	00:10:00	00:16:00	2.40	5.00				X
13-0000040	01/16/2013	13:22:00	1 Emergency	00:00:00	00:07:00	1.88	16.00	X			
13-0000066	01/28/2013	19:19:00	1 Emergency	00:08:00	00:15:00	0.50	10.00	X			

Reaction time calculated from time notified to rollout time.
Response time calculated from time notified to arrival time.

North Hampton Fire & Rescue

Unit Responses by Unit

Alarm Date Between (01/01/2009) And (06/30/2014) and Unit = "36L1 "

Incident	Alarm Date	Notified	Response Code	Reaction	Response	Hours	Miles	F	M	R	O
36L1 Emergency One Ladder											
13-0000077	02/01/2013	18:53:00		00:00:00	00:17:00	5.18	16.00				X
13-0000159	03/15/2013	08:26:41	1 Emergency	00:16:00	00:21:19	0.86	5.00				X
13-0000176	03/24/2013	03:41:00	1 Emergency	00:12:00	00:16:00	2.73	4.00	X			
13-0000222	04/15/2013	07:47:00	1 Emergency	00:07:00	00:14:00	0.15	4.00	X			
13-0000225	04/17/2013	18:12:30		00:00:00	00:05:30	1.38	12.00	X			
13-0000267	05/05/2013	18:37:00	1 Emergency	00:00:00	00:12:00	0.57	10.00	X			
13-0000351	06/19/2013	22:47:00	1 Emergency	00:09:00	00:11:00	0.22	2.00				X
13-0000370	06/26/2013	21:59:42		00:00:00	00:05:18	0.62	5.00	X			
13-0000374	06/30/2013	05:26:00	1 Emergency	00:11:00	00:16:00	0.83	6.00	X			
13-0000375	06/30/2013	16:31:00	1 Emergency	00:00:00	00:12:00	4.05	15.00				X
13-0000380	07/01/2013	15:33:00	1 Emergency	00:00:00	00:03:00	0.48	4.00	X			
13-0000404	07/07/2013	12:32:00	1 Emergency	00:00:00	00:14:00	0.23	12.00				X
13-0000405	07/07/2013	21:17:00	1 Emergency	00:09:00	00:16:00	0.42	10.00	X			
13-0000416	07/10/2013	17:11:00		00:00:00	00:03:00	1.42	4.00	X			
13-0000421	07/12/2013	15:04:00	1 Emergency	00:11:15	00:27:00	0.73	5.00	X			
13-0000422	07/13/2013	08:42:00	1 Emergency	00:00:00	00:12:00	0.25	4.00	X			
13-0000438	07/19/2013	20:00:00	1 Emergency	00:00:00	00:07:00	0.47	2.00	X			
13-0000455	07/23/2013	13:41:00	1 Emergency	00:00:00	00:08:00	0.53	11.00	X			
13-0000479	07/30/2013	20:55:00	2 Non-emergency	00:06:00	00:14:00	3.60	10.00	X			
13-0000485	08/02/2013	20:38:00	1 Emergency	00:00:00	00:04:00	0.80	5.00		X		
13-0000548	08/29/2013	15:56:00	1 Emergency	00:00:00	00:01:00	0.37	2.00	X			
13-0000558	09/02/2013	19:45:00	1 Emergency	00:00:00	00:11:00	0.47	8.00	X			
13-0000567	09/06/2013	22:29:00		00:00:00	00:07:00	1.13	4.00				X
13-0000662	11/08/2013	21:06:00	1 Emergency	00:10:00	00:15:00	0.27	4.00	X			
13-0000711	12/01/2013	07:58:00	1 Emergency	00:00:00	00:07:00	0.37	5.00	X			
13-0000742	12/17/2013	04:58:00	1 Emergency	00:00:00	00:22:00	1.92	7.00	X			
13-0000750	12/20/2013	16:47:00	1 Emergency	00:10:00	00:14:00	0.23	2.00	X			
13-0000751	12/20/2013	17:10:00	1 Emergency	00:01:00	00:04:00	0.60	1.00	X			
13-0000762	12/22/2013	13:56:00		00:00:00	00:05:00	2.15	3.00				X
13-0000769	12/30/2013	01:33:00	1 Emergency	00:19:00	00:24:00	0.50	6.00	X			
14-0000001	01/01/2014	19:03:00	2 Non-emergency	00:00:00	00:04:00	0.20	2.00				X
14-0000012	01/03/2014	18:45:00	1 Emergency	00:00:00	00:08:00	0.92	6.00	X			
14-0000013	01/04/2014	12:46:00	1 Emergency	00:00:00	00:07:00	1.75	6.00				X
14-0000014	01/04/2014	13:34:00	1 Emergency	00:00:00	00:04:00	0.73	6.00	X			
14-0000019	01/05/2014	15:08:00	1 Emergency	00:07:20	00:07:27	0.79	12.00	X			
14-0000024	01/10/2014	07:40:00	1 Emergency	00:00:00	00:12:00	0.73	12.00	X			
14-0000028	01/10/2014	09:05:00	1 Emergency	00:00:00	00:11:00	1.38	6.00	X			
14-0000064	01/25/2014	15:36:00	2	00:17:00	00:20:00	0.80	3.00				X

Reaction time calculated from time notified to rollout time.
Response time calculated from time notified to arrival time.

North Hampton Fire & Rescue

Unit Responses by Unit

Alarm Date Between {01/01/2009} And {06/30/2014}
and Unit = "36L1 "

Incident	Alarm Date	Notified	Response Code	Reaction	Response	Hours	Miles	F	M	R	O
36L1 Emergency One Ladder											
			Non-emergency								
14-0000137	03/01/2014	17:25:00	1 Emergency	00:00:00	00:04:00	0.40	2.00	X			
14-0000186	03/30/2014	07:30:00	1 Emergency	00:35:00	00:38:00	1.38	4.00				X
14-0000201	04/06/2014	18:36:00	1 Emergency	00:21:00	00:26:00	1.12	4.00				X
14-0000233	04/15/2014	14:17:00	1 Emergency	00:00:00	00:22:00	1.13	2.00				X
14-0000255	04/21/2014	14:05:00	1 Emergency	00:02:00	00:04:00	0.22	5.00		X		
14-0000373	06/09/2014	17:00:00	1 Emergency	00:00:00	00:06:00	0.15	4.00		X		
14-0000414	06/25/2014	16:07:00	1 Emergency	00:00:00	00:05:00	0.95	4.00			X	

Responses: 183

Reaction Times		Response Times	
Average	00:03:51	Average	00:10:16
Lowest	00:00:00	Lowest	00:00:00
Highest	00:35:00	Highest	00:38:00

Total: 170.89 992.50

Reaction time calculated from time notified to rollout time.
Response time calculated from time notified to arrival time.

Capital Improvement Plan (CIP) for FY2016-2021
Report to Select Board: Fire Department Ladder Truck / Quint

Attachment 2

North Hampton Fire Rescue
Incident Type Report (Summary)

Alarm Date Between {01/01/2009} And {06/01/2014}

Incident Type	Count	Pct of Incidents	Total Est Loss	Pct of Losses
	3	0.06%	$0	0.00%
	3	**0.06%**	**$0**	**0.00%**
1 Fire				
100 Fire, Other	7	0.15%	$0	0.00%
111 Building fire	26	0.56%	$0	0.00%
111L Heating equipment, Dryer or Dishwasher	3	0.06%	$0	0.00%
113 Cooking fire, confined to container	8	0.17%	$0	0.00%
114 Chimney or flue fire, confined to chimney or flue	15	0.32%	$0	0.00%
116 Fuel burner/boiler malfunction, fire confined	1	0.02%	$0	0.00%
123 Fire in portable building, fixed location	1	0.02%	$0	0.00%
130 Mobile property (vehicle) fire, Other	3	0.06%	$0	0.00%
131 Passenger vehicle fire	16	0.35%	$0	0.00%
132 Road freight or transport vehicle fire	2	0.04%	$0	0.00%
135 Aircraft fire	1	0.02%	$0	0.00%
136 Self-propelled motor home or recreational vehicle	1	0.02%	$0	0.00%
137 Camper or recreational vehicle (RV) fire	2	0.04%	$0	0.00%
140 Natural vegetation fire, Other	29	0.63%	$0	0.00%
141 Forest, woods or wildland fire	7	0.15%	$0	0.00%
142 Brush or brush-and-grass mixture fire	24	0.52%	$0	0.00%
143 Grass fire	3	0.06%	$0	0.00%
150 Outside rubbish fire, Other	2	0.04%	$0	0.00%
153 Construction or demolition landfill fire	1	0.02%	$0	0.00%
154 Dumpster or other outside trash receptacle fire	3	0.06%	$0	0.00%
160 Special outside fire, Other	1	0.02%	$0	0.00%
162 Outside equipment fire	2	0.04%	$0	0.00%
173 Cultivated trees or nursery stock fire	2	0.04%	$0	0.00%
	160	**3.46%**	**$0**	**0.00%**
2 Overpressure Rupture, Explosion, Overheat(no fire)				
200 Overpressure rupture, explosion, overheat other	6	0.13%	$0	0.00%
220 Overpressure rupture from air or gas, Other	1	0.02%	$0	0.00%
240 Explosion (no fire), Other	2	0.04%	$0	0.00%
251 Excessive heat, scorch burns with no ignition	1	0.02%	$0	0.00%
	10	**0.22%**	**$0**	**0.00%**
3 Rescue & Emergency Medical Service Incident				
311 Medical assist, assist EMS crew	421	9.10%	$0	0.00%
321 EMS call, excluding vehicle accident with inj	1,922	41.56	$0	0.00

North Hampton Fire Rescue

Incident Type Report (Summary)

Alarm Date Between {01/01/2009} And {06/01/2014}

Incident Type	Count	Pct of Incidents	Total Est Loss	Pct of Losses
3 Rescue & Emergency Medical Service Incident				
322 Motor vehicle accident with injuries	291	6.29%	$0	0.00%
323 Motor vehicle/pedestrian accident (MV Ped)	16	0.35%	$0	0.00%
324 Motor Vehicle Accident with no injuries	283	6.12%	$0	0.00%
340 Search for lost person, other	2	0.04%	$0	0.00%
342 Search for person in water	2	0.04%	$0	0.00%
350 Extrication, rescue, Other	2	0.04%	$0	0.00%
352 Extrication of victim(s) from vehicle	5	0.11%	$0	0.00%
353 Removal of victim(s) from stalled elevator	1	0.02%	$0	0.00%
360 Water & ice-related rescue, other	4	0.09%	$0	0.00%
361 Swimming/recreational water areas rescue	5	0.11%	$0	0.00%
364 Surf rescue	1	0.02%	$0	0.00%
365 Watercraft rescue	4	0.09%	$0	0.00%
381 Rescue or EMS standby	5	0.11%	$0	0.00%
	2,964	**64.09%**	**$0**	**0.00%**
4 Hazardous Condition (No Fire)				
400 Hazardous condition, Other	26	0.56%	$0	0.00%
4000 Hazardous condition, tree down	44	0.95%	$0	0.00%
4001 Hazardous condition, oil burner problem	5	0.11%	$0	0.00%
410 Combustible/flammable gas/liquid condition, other	2	0.04%	$0	0.00%
411 Gasoline or other flammable liquid spill	11	0.24%	$0	0.00%
412 Gas leak (natural gas or LPG)	24	0.52%	$0	0.00%
413 Oil or other combustible liquid spill	11	0.24%	$0	0.00%
420 Toxic condition, Other	1	0.02%	$0	0.00%
422 Chemical spill or leak	1	0.02%	$0	0.00%
424 Carbon monoxide incident	34	0.74%	$0	0.00%
440 Electrical wiring/equipment problem, Other	16	0.35%	$0	0.00%
441 Heat from short circuit (wiring), defective/worn	2	0.04%	$0	0.00%
442 Overheated motor	1	0.02%	$0	0.00%
443 Breakdown of light ballast	3	0.06%	$0	0.00%
444 Power line down	79	1.71%	$0	0.00%
445 Arcing, shorted electrical equipment	12	0.26%	$0	0.00%
460 Accident, potential accident, Other	1	0.02%	$0	0.00%
461 Building or structure weakened or collapsed	2	0.04%	$0	0.00%
462A Aircraft crash	2	0.04%	$0	0.00%
463 Vehicle accident, general cleanup	21	0.45%	$0	0.00%
480 Attempted burning, illegal action, Other	1	0.02%	$0	0.00%
	299	**6.46%**	**$0**	**0.00%**
5 Service Call				

North Hampton Fire Rescue

Incident Type Report (Summary)

Alarm Date Between {01/01/2009} And {06/01/2014}

Incident Type	Count	Pct of Incidents	Total Est Loss	Pct of Losses
5 Service Call				
500 Service Call, other	13	0.28%	$0	0.00%
500H Service Call, Health Inspection	1	0.02%	$0	0.00%
500O Service Call, CO Inspection	2	0.04%	$0	0.00%
510 Person in distress, Other	14	0.30%	$0	0.00%
511 Lock-out	15	0.32%	$0	0.00%
520 Water problem, Other	39	0.84%	$0	0.00%
521 Water evacuation	22	0.48%	$0	0.00%
522 Water or steam leak	1	0.02%	$0	0.00%
531 Smoke or odor removal	5	0.11%	$0	0.00%
5311 Smoke or odor investigation	88	1.90%	$0	0.00%
541 Animal problem	1	0.02%	$0	0.00%
542 Animal rescue	4	0.09%	$0	0.00%
550 Public service assistance, Other	64	1.38%	$0	0.00%
551 Assist police or other governmental agency	40	0.86%	$0	0.00%
552 Police matter	2	0.04%	$0	0.00%
553 Public service	21	0.45%	$0	0.00%
554 Assist invalid	67	1.45%	$0	0.00%
561 Unauthorized burning	45	0.97%	$0	0.00%
571 Cover assignment, standby, moveup	159	3.44%	$0	0.00%
	603	**13.04%**	**$0**	**0.00%**
6 Good Intent Call				
600 Good intent call, Other	79	1.71%	$0	0.00%
611 Dispatched & cancelled en route	50	1.08%	$0	0.00%
621 Wrong location	3	0.06%	$0	0.00%
622 No Incident found on arrival at dispatch address	23	0.50%	$0	0.00%
631 Authorized controlled burning	4	0.09%	$0	0.00%
650 Steam, Other gas mistaken for smoke, Other	2	0.04%	$0	0.00%
651 Smoke scare, odor of smoke	9	0.19%	$0	0.00%
661 EMS call, party transported by non-fire agency	1	0.02%	$0	0.00%
671 HazMat release investigation w/no HazMat	3	0.06%	$0	0.00%
	174	**3.76%**	**$0**	**0.00%**
7 False Alarm & False Call				
700 False alarm or false call, Other	33	0.71%	$0	0.00%
710 Malicious, mischievous false call, Other	2	0.04%	$0	0.00%
711 Municipal alarm system, malicious false alarm	1	0.02%	$0	0.00%
714 Central station, malicious false alarm	3	0.06%	$0	0.00%
721 Bomb scare - no bomb	2	0.04%	$0	0.00%
730 System malfunction, Other	22	0.48	$0	0.00

North Hampton Fire Rescue

Incident Type Report (Summary)

Alarm Date Between {01/01/2009} And {06/01/2014}

Incident Type	Count	Pct of Incidents	Total Est Loss	Pct of Losses
7 False Alarm & False Call				
731 Sprinkler activation due to malfunction	10	0.22%	$0	0.00%
733 Smoke detector activation due to malfunction	31	0.67%	$0	0.00%
734 Heat detector activation due to malfunction	3	0.06%	$0	0.00%
735 Alarm system sounded due to malfunction	27	0.58%	$0	0.00%
736 CO detector activation due to malfunction	9	0.19%	$0	0.00%
740 Unintentional transmission of alarm, Other	74	1.60%	$0	0.00%
741 Sprinkler activation, no fire - unintentional	8	0.17%	$0	0.00%
743 Smoke detector activation, no fire - unintentional	44	0.95%	$0	0.00%
744 Detector activation, no fire - unintentional	36	0.78%	$0	0.00%
745 Alarm system activation, no fire - unintentional	76	1.64%	$0	0.00%
746 Carbon monoxide detector activation, no CO	16	0.35%	$0	0.00%
	397	**8.58%**	**$0**	**0.00%**
8 Severe Weather & Natural Disaster				
800 Severe weather or natural disaster, Other	5	0.11%	$0	0.00%
812 Flood assessment	2	0.04%	$0	0.00%
814 Lightning strike (no fire)	4	0.09%	$0	0.00%
	11	**0.24%**	**$0**	**0.00%**
9 Special Incident Type				
900 Special type of incident, Other	2	0.04%	$0	0.00%
911 Citizen complaint	2	0.04%	$0	0.00%
	4	**0.09%**	**$0**	**0.00%**

Total Incident Count: 4625 **Total Est Loss: $0**

Capital Improvement Plan (CIP) for FY2016-2021
Report to Select Board: Fire Department Ladder Truck / ~~North Hampton Fire T. Rescue~~ Quint

Attachment 3

Aid Responses by Department (Summary)

Alarm Date Between {01/01/2009} And {07/01/2014}

Type of Aid	Count
ALS Exeter ALS	
Mutual aid received	269
Automatic aid received	11
Mutual aid given	6
Automatic aid given	1
	287
AMESBURY Amesbury	
Mutual aid received	1
	1
DURHAM Durham/UNH Fire Department	
Mutual aid given	2
	2
EXETER Exeter	
Mutual aid received	10
Mutual aid given	104
Automatic aid given	1
	115
GREENLAND Greenland	
Mutual aid received	5
Mutual aid given	21
Automatic aid given	2
	28
HAMP Hampton	
Mutual aid received	183
Automatic aid received	6
Mutual aid given	336
	525
HAMP FALLS Hampton Falls	
Mutual aid received	3
Mutual aid given	3
	6
KITTERY Kittery Fire Department	
	1
LEE Lee Fire Department Air Trailer	
Mutual aid received	1
	1
NCAST New Castle	
Mutual aid received	1
Mutual aid given	1
	2
NEWFIELDS Newfields Fire	
Mutual aid received	1
Mutual aid given	1
	2
NEWINGTON Newington	
Mutual aid received	2
Mutual aid given	5
	7
PORTS Portsmouth	
Mutual aid received	22
Mutual aid given	22
	44
RYE Rye Fire Department	
Mutual aid received	70
Automatic aid received	4
Mutual aid given	45
	119
SEABROOK Seabrook	
Mutual aid received	2
	2
SOHAMPTON South Hampton	
Mutual aid given	1
	1

North Hampton Fire & Rescue

Aid Responses by Department (Summary)

Alarm Date Between {01/01/2009} And {07/01/2014}

Type of Aid	Count
STRATHAM Stratham	
Mutual aid received	3
Mutual aid given	63
Automatic aid given	6
	72
YORK York Fire Department/Canteen	
Mutual aid received	1
	1

LOCAL MUNICIPAL INVENTORY OF FIRE EQUIPMENT

Municipality	Ambulances	Engines	Aerial	Forestry	Tankers	Othe r
Portsmouth						
first due	2	3	2	1	0	5
reserve	1	2	0	0	0	
Exeter						
first due	1	2	1	1	0	4
reserve	1	1	0	0	0	
Hampton						
first due	2	2	1	0	0	4
reserve	1	2	0	0	0	
North Hampton						
first due	1	1	1	1	1	2
reserve	0	1	0	0	0	
Greenland						
first due	1	2	0	0	1	1
reserve	0	0	0	0	0	
Newington						
first due	1	1	1	0	1	2
reserve	0	1	0	0	0	
Stratham						
first due	1	1	0	1	1	2
reserve	1	1	0	0	0	

Municipality		Ambulances	Engines	Aerial	Forestry	Tankers	Other
Rye							
	first due	1	1	1	1	1	1
	reserve	0	1	0	0	0	
New Castle							
	first due	0	1	0	1	0	1
	reserve	0	1	0	0	0	
Newfields							
	first due	0	1	0	0	1	2
	reserve	0	1	0	0	0	
Newmarket							
	first due	1	1	1	1	1	2
	reserve	1	1	0	1	0	
Seabrook							
	first due	1	1	1	1	0	3
	reserve	2	1	0	0	0	
East Kingston							
	first due	1	1	0	1	1	1
	reserve	0	1	0	0	0	
Brentwood							
	first due	1	1	0	1	1	
	reserve	1	2	0	0	0	

Capital Improvement Plan (CIP) for FY2016-2021
Report to Select Board: Fire Department Ladder Truck / Quint
Ambulance Data

North Hampton Fire & Rescue

Attachment 5

	2010	2011	2012	2013	2014
Transports	371	398	402	344	248
Runs City					
North Hampton	308	331	324	282	189
Hampton	35	37	35	42	44
Greenland	0	2	0	0	2
Exeter	12	16	16	11	8
Portsmouth	0	1	0	0	3
Stratham	8	3	10	5	1
Rye	5	2	10	3	1
Other	3	6	7	1	0
	371	398	402	344	248
Runs by Location					
Healthcare Facility	3.77%	3.27%	3.23%	2.33%	3.63%
Home/residence	55.53%	60.80%	61.69%	61.34%	58.06%
street/highway	23.18%	19.10%	20.15%	24.42%	22.98%
Business	7.28%	7.54%	7.21%	7.85%	7.26%
Public building	3.50%	4.02%	4.23%	2.03%	5.65%
Median Age	56	60	57	56	59
Gender					
Female	57.95%	55.03%	47.76%	54.07%	46.37%
Male	39.89%	43.97%	51.24%	45.35%	53.23%
unknown	2.16%	1.01%	1%	0.58%	0.40%
Destination					
Exeter	50.40%	42.96%	37.81%	38.66%	37.10%
Portsmouth	26.15%	31.91%	25.62%	40.12%	38.31%
Anna Jaques	0.27%	1.76%	0.25%	1.45%	1.21%
none noted	20.75%	21.86%	25.62%	17.73%	23.38%
other	2.43%	1.00%	10%	2.04%	

Denotes January to June 30, 2014

Capital Improvement Plan (CIP) for FY2016-2021
Report to Select Board: Fire Department Ladder Truck / Quint

Attachment 6

NORTH HAMPTON FIRE & RESCUE
235 ATLANTIC AVENUE
NORTH HAMPTON, N.H. 03862

Dennis P. Cote
CHIEF OF DEPARMENT

TEL: (603) 964-5
FAX: (603) 964-7
EMERGENCY: 1

August 18, 2014

To: **Cynthia Swank**

Ref: **Driveway Issues**

Per the request of the CIP, I have started a list of the driveways that are of concern to the fire department in the event of an emergency. This is just a partial list of addresses on the east side of Lafayette rd. The issues are bridges, tree growth which will lead to snow loads during the winter, narrow passageways, geographical issues such as turning radius etc. These are all issues that will directly hinder our current apparatus from getting to the house let alone a Quint which is taller and in some cases wider than the vehicles that we have now.

96 Atlantic Ave
117 Atlantic
153 Atlantic Ave
19 River rd
21 River rd
71 Mill rd
131 Mill Rd
21 Chapel Rd
10 Chapel Rd

10 Shiprock
12 Shiprock
18 Shiprock
4 Bradley
17 Pond Path
80 Mill Rd
131 Mill Rd
51 Chapel Rd
Dancer's Image

10 & 12a

20.3 MILES

Fire Services Organizational Analysis

North Hampton, NH

February 2008

Prepared by:
Municipal Resources, Inc.
120 Daniel Webster Highway
Meredith, NH 03253
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Municipal Resources

IX. EQUIPMENT/CAPITAL PLANNING

A review of apparatus in terms of age, condition and capabilities finds that North Hampton has adequate apparatus that either meets or exceeds national standards. The Department had a positive vote by taxpayers last year to purchase a new pumper, replacing a 1987 unit that has outlived its usefulness. The warrant article was not approved by the New Hampshire Department of Revenue Administration due to wording. The Board of Selectmen and the Budget Committee voted not to move the request forward in Fiscal 2008. This unit should be moved forward in Fiscal 2009.

Beyond this pumper replacement, we see another ambulance recommended in 2010. Serious consideration should be given to retaining the 2005 unit for simultaneous EMS calls and as a spare when the new unit needs maintenance (or is out of service due to an accident).

The aerial ladder is a 1984 model 100 foot truck that originally was in service in the Boston Fire Department. The truck was refurbished before North Hampton took delivery of it. It is now worn, with the diesel motor especially in need of work (it takes about ½ mile start-up from the station to build up a head of steam). We recommend repairing the motor for now and at the time of the next major purchase for apparatus (2114), acquire a quint apparatus (small aerial and pumper combination) to replace the aerial, at 30 years of service. It may be possible to trade in the 1997 pumper at that time as well, if emergency responses have not substantially increased. Without the 1997 pumper, the Department would have to utilize the Tanker as the second-due pumper if either the proposed 2008 pumper or the new quint were out of service for any reason.

The Department does a fairly good job at maintaining its fleet.

The current apparatus set includes the following:

Rural Water Supply Tanker – Brings water to the scene of a fire in an area where hydrants are not accessible (Tanker 1: 2002 Navistar).

Ladder 1 – Utilized for aerial operations and to provide firefighters a safe working platform that can be quickly utilized without the need to an extensive number of personnel associated with the use of ground ladders (L-1: 1984 Emergency One).

Utility Vehicle – Utilized for fire prevention activities and as an all purpose vehicle that reduces the wear and tear on other more expensive apparatus (Utility 1: 1999 Chevrolet 2500)

IX.1 Recommendation: Utilize the ICMA Guideline for Apparatus/Vehicle replacement for useful life.

IX.2 Recommendation: Replace 1987 Engine 3 with a rescue/pumper in FY09.

IX.3 Recommendation: Replace 2005 ambulance in FY10 and retain the 2005 for simultaneous EMS calls and as a spare for when the 2010 unit is down for maintenance.

IX.4 Recommendation: Replace 1984 aerial ladder in FY14 with a quint (smaller aerial but with a pumper combination)[cost of $700,000].

IX.5 Recommendation: Consider trading in the 1997 Engine 2 with the aerial as well, but that places the 2003 Tanker unit as second-due apparatus if the 2008 pumper or quint is out for repairs.

IX.6 Recommendation: Add more technology in terms of in-station computers. These could be used for training and building pre-plans while crews are on down-time from emergency traffic. Mobile Data Terminals (MDTs) should be used in apparatus and the ambulance, as well for emergency responses and data acquisition (building pre-plans, etc.). An EMS report/billing program on an MDT can be added to the ambulance and should be

Capital Improvement Plan (CIP) for FY2016-FY2021
Report to Select Board: Fire Department Ladder Truck / Quint

Attachment 8

From: Paul Apple <papple@northhampton-nh.gov>

Date: Thu, 7 Aug 2014 07:24:41 -0400
Subject: CIP.DugganMemo07302014

Ladies and Gentlemen:

Please find my memorandum regarding a telephone I had with one of the main authors of the MRI study last week.

Kind regards,

Paul.

Attachment 8

TELEPHONE MEMORANDUM

On July 30, 2014, I spoke with Chief Brian Duggan, one of the principle authors of the 2008 MRI study that recommended the acquisition of a quint. I asked him for some background on how the study team came to recommend the quint and explained to him the context of why this information is important to the CIP Committee and our decisions about a new public safety center.

He first explained that the study itself was a general planning study. A thorough understanding of equipment needs is more properly addressed in a specific study designed to assess optimal apparatus needs now and in the future. With that caveat, he said that the study does not purport to answer the question of whether a community the size of North Hampton needs a vehicle with ladder capability. The assumption is that in any given fire situation, some height will be necessary.

Instead, the question is how a community the size of North Hampton might most efficiently acquire the height capacity it needs. The team interviewed the fire chief and identified some areas of concern (e.g., development sites and residential properties outside the hydrant district with long drive-ways). They then interviewed local area chiefs to assess what equipment was available by mutual aid.

Their conclusion, especially after talking with the Hampton chief, is that there is already significant height capacity in the area. In fact, there are several ladder trucks in the immediately surrounding towns. The recommendation for a quint, therefore, springs from the team's conclusion that we could address immediate height needs with a quint and leverage our mutual aid relationships to acquire additional height capacity more efficiently from surrounding communities. Not every community our size needs a ladder truck, especially communities that border larger towns with ladder trucks. The issues he identified are the stock of emergency equipment in the area, our proximity to that equipment and our mutual aid relationships with the other towns who own that equipment.

We spoke briefly about some of the concerns raised about water-supply. He acknowledged that water supply is an issue in these discussions, but suggested that this was not studied in the 2008

MRI study and should be resolved by reference to local conditions.

Attachment 9

From: Paul Apple <papple@northhampton-nh.gov>
Date: Wed, 9 Jul 2014 10:06:34 -0400
Subject: FW: ISO Ratings

Ladies and Gentlemen:

Please find Bert Garry's response to your enquiry about ISO ratings.

Kind regards,

Paul.

From: Bert J. Garry [mailto:bgarry@dbwarlick.com]
Sent: Wednesday, July 09, 2014 9:47 AM
To: Paul Apple
Subject: RE: ISO Ratings

Good morning Paul.

ISO ratings have minimal impact on policy premium and are much more heavily affected by other protection issues (hydrants, paid vs. volunteer FD, etc). I would be surprised if there is any difference to ISO if the pumper and ladder are combined or separate. The fact that the town has each in some form is what counts (and not for much).

Hope that helps. If not, let me know.

Regards,

Bert J. Garry
Senior Vice President
D.B. Warlick & Co.

(603) 964-6065 X 108
(603) 380-5444 - Cell

Capital Improvement Plan (CIP) for FY2016-FY2021
Report to Select Board: Fire Department Ladder Truck / Quint

Attachment 9

From: Paul Apple [mailto:papple@northhampton-nh.gov]
Sent: Tuesday, July 08, 2014 3:36 PM
To: Bert J. Garry
Subject: ISO Ratings

Bert:

The Capital Improvement Committee asked me to check in with you for an explanation of how the ISO ratings affect homeowners' policies. The concern is that if we move to a quint (a combined ladder and pumper) and give up the individual ladder and pumper, our ISO ratings will go down. The Chief has made this point pretty hard; but, there are some who believe that the ISO ratings don't really affect the policy rates that much.

What do you say?

Kind regards,

Paul.

Research Study

TRADITIONAL AERIAL TRUCK VERSUS A QUINT
WHERE DO WE GO FROM HERE?

FIRE SERVICE FINANCIAL MANAGEMENT

BY: Robert John VanSolkema
Grand Rapids Fire Department
Grand Rapids, Michigan

An applied research project submitted to the National Fire Academy
as part of the Executive Fire Officer Program

August 18, 2000

ABSTRACT

Many fire departments across the country have been fighting scarce local government resources and competition for those resources. Today, every fire chief has the responsibility to take a close look at methods of improving the management of their departmental resources. Fire apparatus is a key area in which improvements can be made. Determining before each apparatus purchase what its objectives are going to be and precisely what outcomes your community requires from it, is a most critical part of managing departmental resources.

The Grand Rapids Fire Department was recently faced with the decision of continuing to replace traditional aerial devices with quints or revert back to the traditional style. The present quints were purchased because of the increasing number of incidents when a ladder truck would arrive on the fire scene without extinguishing capabilities. Department leaders felt a quint provided versatility and options that a traditional aerial device did not.

The purpose of this research paper was to gather available literature and information from the fire service to provide input to assist in the decision.

The study employed action and evaluative research methodology. The following research questions were posed:

1. What is a needs assessment and is it a valuable tool for the purchase process?
2. What are the advantages of quints?
3. What are the disadvantages of quints?
4. Is the current trend for or against the quints?
5. What are important factors when purchasing aerial devices?
6. What is the definition of outcomes and should they be considered for apparatus purchasing?

A review of literature began at the Learning Resource Center at the National Fire Academy in Emmitsburg, Maryland, to gather data for this research project. In addition, a survey instrument was developed and sent to 85 similar fire departments across North America.

The literature review and survey instrument obtained valuable information on the advantages and disadvantages, training, staffing, and standard operating procedures of quints. The literature also produced valuable knowledge on "outcomes" and their importance to the community.

The findings of the research revealed there is not a consensus on the value or use of quints in the fire service today. There was consensus on the advantages and disadvantages of the quints. The research also revealed some inconsistencies on the current trends of purchasing quints.

The recommendations of the applied research project included that a committee be formed and perform a needs assessment for the purchase process. This researcher feels performing a needs assessment and gathering additional information is necessary before the purchase of the two aerial devices.

The goal of the recommendations was to assure a process that would provide "buy in" by the users, fill the needs for the life of the apparatus, and to provide the desired outcomes for the community.

TABLE OF CONTENTS

INTRODUCTION

Many fire departments across the country are fighting scarce local government resources and competition for those resources. Today, every fire chief has the responsibility to take a close look at methods of improving the management of their departmental resources. Fire apparatus is a key area in which improvements can be made.

In February of 1992, two 100-foot aerial ladder platforms with 1,500 gallon per minute pumps were put into service for the Grand Rapids Fire Department. This meant replacing half the ladder truck fleet with quints. Thus began a new era. Purchasing quints, at a cost of over one-half million dollars each, was an attempt to better manage fire department resources.

The main reason for going to the quint concept was versatility. With the increase in the number of emergency medical alarms, the trucks were beginning to arrive first at more and more fire calls.

Since the purchase of the quints in 1992, the on-going discussion of their functionality and usefulness has continued. As with many other departments, we have found out that there are both advantages and disadvantages to this type of apparatus. Some firefighters say quints are too big, too slow, too complicated, or too costly. Others think quints are extremely versatile, and in the right application, one of the most effective firefighting weapons around.

The Grand Rapids Fire Department is now ready to replace the two remaining ladder trucks. The problem we face is to continue the quint concept or to revert back to the traditional type of ladder truck. The number of alarms continues to rise, creating the problem of the ladder trucks arriving first, yet the present quints have created controversy since their arrival.

The purpose of this research paper is to gather the available literature and information from the fire service to provide input to assist in the decision.

The "Transformational Process" open system model will also be used as part of the decision process. This model was presented in the "Financial Management" course at the National Fire Academy (see Figure 1). The model concentrates on "outcomes".

Figure 1.Transformation Process Model (Federal Emergency Management Agency [FEMA] 1996 p. SM 4-14).

Action and evaluative research methodology were used to review the literature and trends of the fire service on ladder trucks to propose recommendations.

The following research questions were posed:

1. What is a needs assessment and is it required for the purchase process?
2. What are the advantages of quints?
3. What are the disadvantages of quints?
4. Is the current trend for or against the quints?

5. What are important factors when purchasing aerial devices?
6. What is the definition of "outcomes" and should they be considered for apparatus purchasing?

BACKGROUND AND SIGNIFICANCE

Grand Rapids Fire Department

The city of Grand Rapids is the second largest city in the State of Michigan. In 1952, the city covered twenty-three square miles and had a resident population of 176,000. In 2000, it has grown to cover forty-eight square miles and the resident population has increased to 194,000.

The Grand Rapids Fire Department operates twelve engines companies, four ladder companies, one rescue squad, one hazardous materials response unit, four pieces of river rescue response equipment, confined space and heavy rescue equipment, and two duty battalion chiefs. The Department has 234 uniformed members.

The apparatus is housed in eleven fire stations. There are six stations that house a single engine, three that house an engine and an aerial ladder, one that houses an engine and a rescue squad, and one that houses two engines and one aerial ladder.

When an alarm is received, if it only requires one piece of apparatus such as a medical, car fire or investigation, then the district engine will respond. If the district engine is not available for response, the ladder truck will respond if it is a medical call, for all other responses, the next closest engine will respond. For a structure fire alarm, the normal response is two engines, one ladder truck, one rescue squad, and a battalion chief.

The Grand Rapids Fire Department currently operates with a minimum daily staffing of 57 firefighters. This allows for three personnel on all engines and four on the ladder trucks. The remaining staffing is five on the rescue squad and two battalion chiefs. On days when the staffing rises above 57, the extra personnel are distributed to engines that will have four personnel for that day.

Starting in 1974, the Grand Rapids Fire Department along with many other departments around the country began diversifying and providing additional services to our community. The reason for making this move was due to the continuing trend of the declining number of fire related incidents. In 1974, the Grand Rapids Fire Department responded to 3,500 fire related incident alarms. In 1999, they responded to 16,567 alarms of which 10,121 where emergency medical responses (Annual report, 1999).

All firefighting personnel are trained to "medical first responder" level response. The engines and ladder trucks are equipped with automatic electronic defibrillators (AEDs) and other equipment necessary for medical alarm response. The district engine is the first assigned to medical emergency alarms. If the district engine is out for reasons such as another alarm or training, then the district truck will respond.

As the number of alarms and training increase for these added services, the result is the engines and trucks spend less time quartered together. The number of fire alarms when the aerial ladder arrives first continues to rise. If the district engine is out and the ladder truck arrives first, there are times when their actions are limited due to no water or hose lines. They would have to wait until an engine arrives with water and hose. While this is only one of the problems created by the increased number of services, it may have serious consequences, especially as the number of alarms continues to rise.

In 1991, fire department leaders decided one way to address the problem was to purchase quint type aerial trucks to replace two traditional aerial trucks This way if the engine was out for various reasons, there was still a piece of apparatus in the station to handle firefighting.

The quints were placed in low volume locations. One is housed with a single engine and the other is housed with two engines.

The quints did not come without the usual concerns such as function, location, training, staffing, and standard operating procedures.

History of Quints

The most popular firefighting piece of apparatus still seems to be the triple-combination pumper and the traditional ladder truck. In the last few decades, we have had the arrival of many specialty type vehicles.

The need for these specialty type vehicles began to rise in the 1980's, when throughout the country the fire service was forced to respond to the public outcry to cut government waste. It forced the fire service to discover new ways of providing new services in a more efficient manner. They wanted the fire service to do the same with less, or to do more with the same.

With these additional services we carry out, the fire service began combining our vehicles as dual or triple-purpose vehicles.

The combining of functions of apparatus is nothing new to the fire service. Back in the days of horse drawn apparatus, apparatus were made up of three separate pieces. With the invention of the combustion engine, soon the triple-combination pumper was born and eventually the quad and quint came along.

Quints have been in the fire service since the early 1930's. The word quint denotes five. A quint is a piece of fire apparatus that combines a fire pump, water tank, hose, ground ladders,

and an aerial ladder. They did not become popular until the 1970's, when the diesel engine made its way into the fire service. The diesel engine supplied the power needed to provide all the quints functions at the same time (Loeb, 1989a).

Modern quints also carry rescue tools, hazardous materials response equipment, EMS kits, technical rescue tools, and a wide variety of other equipment for engine or truck company operations. They allow a fire department to perform five important functions at any working structure fire (Schaper, Gerner, 1996). These are:

1. Establish an adequate water supply.
2. Attack the fire with sufficient hose lines and master stream devices.
3. Ventilate the building quickly and effectively.
4. Perform primary and secondary searches.
5. Conduct salvage and overhaul operations.

The first quints arrived in the Grand Rapids Fire Department in 1992. They replaced two traditional Ladder Tower Incorporated trucks. If the Grand Rapids Fire Department continues with replacing traditional aerial devices with quints or returns to traditional, it is most important the decision be based on desired "outcomes" as taught in Fire Service Financial Management class at the National Fire Academy.

LITERATURE REVIEW

The literature review will concentrate on the apparatus purchasing process, evaluations that cover advantages and disadvantages of quints, and strategies that are important for the quint concept to be effective. It will also cover the importance of considering "outcomes" and not outputs. The review concludes with research on the separation of the engine and trucks.

The Process

Receiving a new piece of apparatus is always looked at with a great deal of anticipation. Unfortunately, that happy anticipation is often tempered with disappointment in the actual design and appearance of the delivered apparatus.

An important, but often forgotten step in purchasing a new piece of apparatus is conducting a needs assessment to identify what type of apparatus the department is interested in purchasing. What does your community need the apparatus for and what "outcomes" do they expect from it? This should be done before talking to salespersons and other manufacturing representatives (Steffens, 1990).

A needs assessment is an analytical and objective identification of required changes in the organization. A needs assessment utilizes objective data and proven analytical techniques to document the existence of an organization's operational or service delivery deficiencies. It identifies "true needs" instead of "wants". This helps members to focus on the needs of the community. It ensures that information necessary is gathered and analyzed in an appropriate manner. In addition, the structured approach results in the accumulation and analysis of data in a manner enabling the department to demonstrate the reasons for its conclusions and to defend its decisions.

The following is a list of steps in conducting a needs assessment.

1. *Define the focus of the assessment*. This sets the parameters of the study.
2. *Collect the data*. Gather all existing data and information on the subject of the study. This includes biased as well as objective data and individual opinion as well as documented fact.
3. *Generate data*. If data or information is not available, it may be necessary to collect primary data through research techniques
4. *Organize the data*. The data must be organized in logical groupings and format so that it can be constructively utilized.
5. *Analyze the information-compare and contrast data*. It is important to analyze the information appropriately.
6. *Interpret data*. Once data has been analyzed, the results must be translated into a form useful to the organization.
7. *Determine needs*. Once the data has been interpreted and the problems identified, it is necessary to plan what needs to be done.
8. *Set priorities*. The final step in the needs assessment is to assign a priority of needs on the basis of which are most critical to the provision of quality service (outcomes) (Grant, Hoover, 1994).

The concept is basically to help design a piece of fire apparatus to perform its assigned duties in a systematic fashion and to acquire a piece of apparatus that will fit the needs of the community you serve. You will be the proud owner of this apparatus for up to twenty years.

When committing to purchasing a new vehicle, the leaders of the department must clarify its functional intent. Basically, determine the types of jobs the vehicle must carry out. Questions

such as how big, type of ladder, how long of a ladder, types of tools, whether to carry out the functions of two vehicles, or one combined unit, need to be answered.

Part of tactical design includes involving during the design phase, the personnel who will use the vehicle. When purchasing a new vehicle, you should spend some time brainstorming with department members who will utilize the vehicle. Some questions to ask should include what they like about existing vehicles, what they don't like about existing vehicles, and what they would like a new vehicle to do differently or additionally.

Getting "buy-in" of the membership early provides several advantages: first, personnel are likely to fully utilize a vehicle they feel they had a part in designing; second, the truck will be more user friendly (Jakubowski, 1993). Keep in mind the members will generally have more focus on how the truck functions for their use, not the outcomes provided to the community.

The Advantages and Disadvantages

One of the first publicized evaluations of quints was back in 1989, when Fire Chief Donald L. Loeb, conducted a national survey on the use of quints. The evaluation consisted of three articles spanning three months in *Fire Chief* magazine.

The survey was sent to over 100 fire departments across the nation operating quints at the time. Of the 100, only about 50% were returned. Some were not filled out but returned. The survey asked some short, but basic questions such as, size of department, description of their quint, and what advantages did the quint give to operations.(Loeb, 1989a).

The survey also asked questions of equipment, hose, ladders, and compartment space. It additionally asked, "What advantage has your quint given your operation?" One answer from Gadsden, Alabama said, "It permits efficient utilization of manpower by combining operations

into one multi-purpose response company." Over and over the term (or its equivalent) was multi-purpose.

When using the quint to get additional credit for its multi-purpose use, do not look for credit for both engine and truck companies. Although components do exist, the unit cannot realistically be in several places at one time. Generally, a quint will not be staffed to meet the demands of both.

The general impression from the survey from the departments using quints was strongly favorable. Although one major West Coast City, which had more than one quint, wrote, "The quints purchased by this department were never really placed in service and have recently been sold. After extensive testing, the quints were found not to be suitable to our type of firefighting." At the time, they fought over 6,000 fires each year. There were other departments that also had negative comments. One department reported the advantages were few and that the quints had caused enough operational problems for them to replace them with traditional aerial ladder trucks.

The operational aspect was also addressed in the survey. It tried to uncover whether or not the quints normally worked at fires using both engine and ladder company modes. Some said yes while others said it was left up to the company officer based on each incident. One department reported the quint was widely used during full-alarm assignments and provided sufficient equipment, enabling companies to work specifically as engine or truck. But the option to convert the quint into dual operation was available, so the equipment can be used to the optimal advantage.

Two favorable quint advantages were seen over and over in the survey returns. First, it is able to pump its own requirement during ladder pipe operations without calling for or relying on another pumper.

The second biggest advantage was the ability of the unit, which is generally regarded as a ladder truck, to convert and replace a pumper. One striking comment was "If we're the first at a fire, we can start applying water. While we're out driving around and come to a car fire, we can put it out." Another similar comment: "If first at a structure fire and the situation lends itself to a quick knock down, the quint affords us that capability (Loeb,1989b)."

The St. Louis Fire Department has illustrated some of these capabilities and more (see Table 1). Since 1987, the St. Louis Fire Department has been successfully using the "total quint concept" to fight fires. They went to the concept due to major budget cuts that made its traditional engine/truck systems incapable of delivering adequate fire and rescue services to their community (Schaper, Gerner, 1996).

Table 1

Traditional System Vs. Total Quint-Concept
A comparison of the capabilities of the engine/ladder system in 1986 and the Total Quint Concept in 1995

	1986	1995	
Pumping capacity	37,500 gpm	65,000 gpm	+ 73%
Number of aerial ladders	10	34	+ 240%
First-alarm staffing	14-17	28	+64%
Aerials on first alarm	1	5	+400%
Companies capable of engine work	30	34	+13%
Companies capable of truck work	12	36	+200%

Companies capable of rescue squad operations	10	36	+260%
Companies capable of EMS operations	0	36	Total
Extrication tools	10	38	+280%
Ventilation fans	14	42	+200%
Rescue saws	12	38	+216%
Firefighters on department	752	631	-16%
Source: St. Louis Quint Concepts, L.L.C.			

The above table shows the benefits of going to a "total quint concept". While not very many departments have gone to this concept, it shows some of the advantages mentioned in the evaluation.

In order to gather some negative or disadvantages of quints the survey asked, "What problems have you entailed"? The majority responded to the question with a simple "none". One chief wrote. "If you have strict SOPs, you should not have any problems".

Another said he had problems arise, "Periodically, keeping the operations of truck company and engine company separate enough to be effective".

One response from the survey said "None that we haven't been able to overcome through training and education." (Loeb, 1989b)

Yet others refer to a quint only as something the chief of the department thought was necessary. A quint is a multi operational company that is most often staffed to perform one operation at a time. A concept that results in an apparatus that is expensive, large, and not easily maneuverable in many areas.

The quint will typically have a 240-inch wheelbase and gross vehicle weight of 48,000 to 66,000 pounds. Although the quint may have more flexibility, if it has a long aerial device, the result is a piece of apparatus that is often "too big, too heavy, and too high" (Loeb, 1992, p.63).

The quint does not offer maneuverability as one of its strong points. (Common turning radius is 44 feet). New standards for cul-de-sacs require them to be 60 feet wide. However, that does not make up for the thousands of cul-de-sacs that already exist that are considerably smaller and won't accept a 44-foot turning radius (Mittendorf, 1996).

Strock (1994) found the following practical considerations from departments that were utilizing quints: water tanks were often too small for required operations; apparatus breakdown created a major fire protection breakdown; vehicles were often too large, too heavy and too high; design deficiencies often made repacking or reloading of attack and supply line difficult; and it was difficult to keep engine and ladder company operations separate by quint crews.

Strategies

Training

The single most important factor for a quint to be effective is training. As the late Vince Lombardi once said, "The will to win is nothing, without the will to prepare". In the fire service, saving lives and property is the same as "winning" (Hatch, 1996).

An improperly trained crew or poor leadership will cripple or limit a quint. In fact, the lack of training of both the officer and crew is the cornerstone of the effectiveness or ineffectiveness of a quint.

Two considerations associated with officer training are experience and specialization.

Officer Experience

The last place to assign a new or inexperienced fireground officer is to a quint. For a quint to be effective, it demands an officer who is able to size up the many and varied needs,

prioritize those needs and then meet them with limited personnel (remember staffing is usually at three or four). This takes fireground experience and both engine and truck company operations experience.

Specialization

The other consideration of training is specialization. It is most important that the officer in charge of a quint equally train the crew in engine and truck company operations. One advantage of separate functional companies such as engine and truck, is that these companies tend to specialize in their responsibility. When responsibilities are combined, being cross-trained is essential for the company to be effective. Cross training also means that later-arriving crews are capable of using the quint for another operation (Mittendorf, 1996).

If members are not cross-trained, it can cause confusion on the fire ground. If engine work is required, than your ladder truck company is lost. If both engine and truck work is preformed, it is not performed effectively. Most of the time, firefighters have either a truck/ladder mindset, or a pumper/engine one. In other words, they are either water or tool oriented. This comes from tradition.

Training is most essential, because both mindsets must act as one in order to operate a quint that has both engine and truck capabilities. Training also teaches when to use the quint as an engine or as a truck should lack of manpower prevent both operations being preformed at once. Training and drilling can also address the tradition issue (Hatch, 1996).

Location

Despite its versatility, if a quint is housed in the wrong location, all of it capabilities and advantages may not be used to the fullest. The best locations for a quint are at stations that make

less than 2,000 runs a year, an outlying station or one serving a large population of apartment complexes or a big industrial area (Hatch, 1996).

With the thought of private dwellings becoming too expensive for most people to obtain, a larger, but not less combustible, multi-dwelling condominium has taken its place. While a pumper or two could handle the one-story detached frame dwelling, the condominium requires a good deal more. The quint then may be a better solution (Loeb, 1989b).

Staffing

The best way to get one piece of apparatus to operate as both an engine and a truck at one time is to staff it with eight well-trained firefighters. Realistically, few departments can or will staff a single piece of apparatus with that many personnel.

Generally, when staffing is at three or four personnel, the quint will either operate as an engine or a truck but not both at once. If the luxury of five or six personnel is available, some simultaneous operations can be performed, but will take careful coordination of personnel (Hatch, 1996).

In a scenario where a quint is staffed with four personnel and is first in to a fire in a single-family dwelling, the officer is occupied with command functions. The equipment operator assists with hose deployment and running the pumps; the two firefighters advance the attack line. Basically, the entire company has been utilized to advance a single attack line. The initial flexibility is lost. Search and rescue, ventilation, utilities, and other operations will have to be handled by later-arriving companies (Mittendorf, 1996).

To attempt to maintain or regain the flexibility, neighboring fire stations may provide a means of personnel for a quint. The personnel need to be properly trained in its use. This concept is useful in industrial areas or apartments where access is limited (Hatch, 1996).

The research process revealed that staffing for departments that use quints varied. Consensus was that as the level of staffing rose, so did the level of efficiency and effectiveness of the quint.

Standard Operating Procedures

Along with training, location, and staffing strategies, standard operating procedures must be developed for quint operations. Depending on its arrival, first, second, or third, on scene, there must be a procedure for designating the quint as a truck or an engine.

If the quint is first due, it may be necessary to send another aerial in its place, as it may operate in an engine capacity attacking the fire. If the quint is second or third due, it most likely will operate as a truck company (Hatch, 1996).

Standard operating procedures for quints and their operations vary among jurisdictions. In some departments, the operation of the quint is left up to the company officer as he or she arrives on the scene. Other departments will use quints as engine companies or truck companies. Some other locations use the quint for a ladder company only, and require that the pump will only be used for tower master stream operations. Generally, most departments dispatched a quint as a truck company, but would assign it engine company duties if a situation required a switch (Loeb, 1989c).

Outcomes

Creating a model of the fire department system helps everyone have a better understanding of the whole and of the component parts (see model page 6). Constructing a model of the fire department begins with defining its boundaries within which the fire department operates. The first component is the political arena and the politics every fire department must balance.

The second component involves identification of the resources the department required to produce its programs and services. These resources are needed to provide resources for programs such as training, inspection, and investigation to name a few.

The third component of the open systems model is identifying what the department processes are. This component answers the question of what the department does with its resources. Every department plans, staffs, trains, develops, and purchases.

The fourth component of the system identifies the departments programs and services. It is an inventory of the programs and services the community is funding.

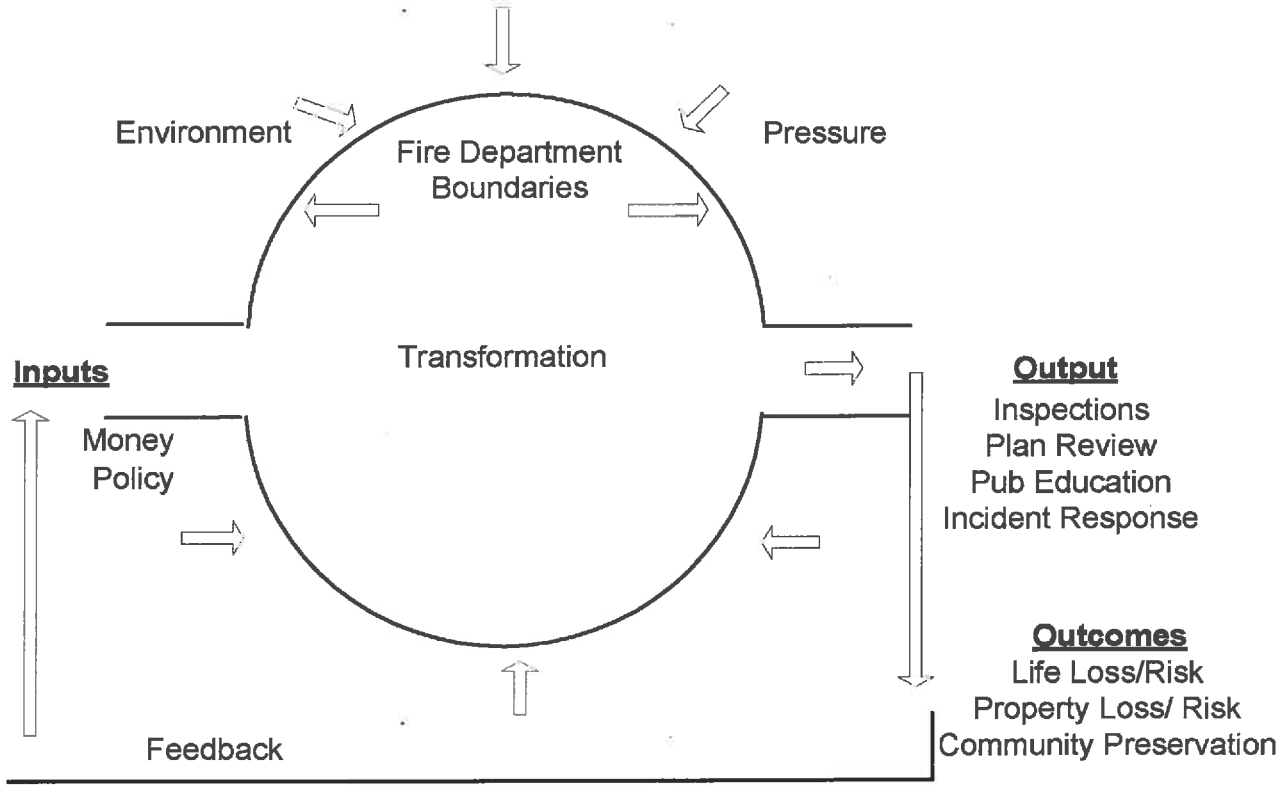
While the model may look complete, an important element is missing. To be successful, the department anticipates making a difference to the community it serves. In order for the model to be complete, the department needs to identify outcomes.

In the book *Urban Outcomes,* the definition of outcomes is defined as "the end of a complicated process". Outcomes are the consequences of the services provided. *Urban Outcomes* notes, that the citizens may have opinions about how resources should be allocated, what apparatus should be bought or its location. However, they do not have the knowledge to make decisions on allocation or apparatus. In the book *The Power of Predictability*, the authors discuss the need to help the organizations predict the outcomes of its actions. We as fire service leaders must make these decisions with the community as the focus. "The leaders of today's organizations must start with a honest assessment of the organization's situation, the possible outcomes of any action the organization may take, and what each outcome will mean" (FEMA, 1996).

The model (Figure 2) demonstrates another system model that helps illustrate the fire department and community. The model is an open system that receives input (money, policy,

processes, and other resources), transforms the raw materials, and outputs to the environment finished products and services. This system also has impact, through its outputs, on the community. These impacts again are called outcomes, the effect of the department's outputs interacting with the community.

Figure 2



Source: (Financial Management, Fire Chief's Handbook, 1995)

Financial management is the art or skill of directing the acquisition and judicious use of money to accomplish an end. The end in question should be outcomes, not the outputs. Resource decisions such as apparatus should be made with the objective of affecting the community life, property, and environmental safety, or other community based outcomes, rather than incident response (Wren, 1995).

The focusing on outcomes and not outputs is most important when purchasing any type of apparatus. We must start with an honest assessment of the situation, the possible outcomes, and what each outcome will mean.

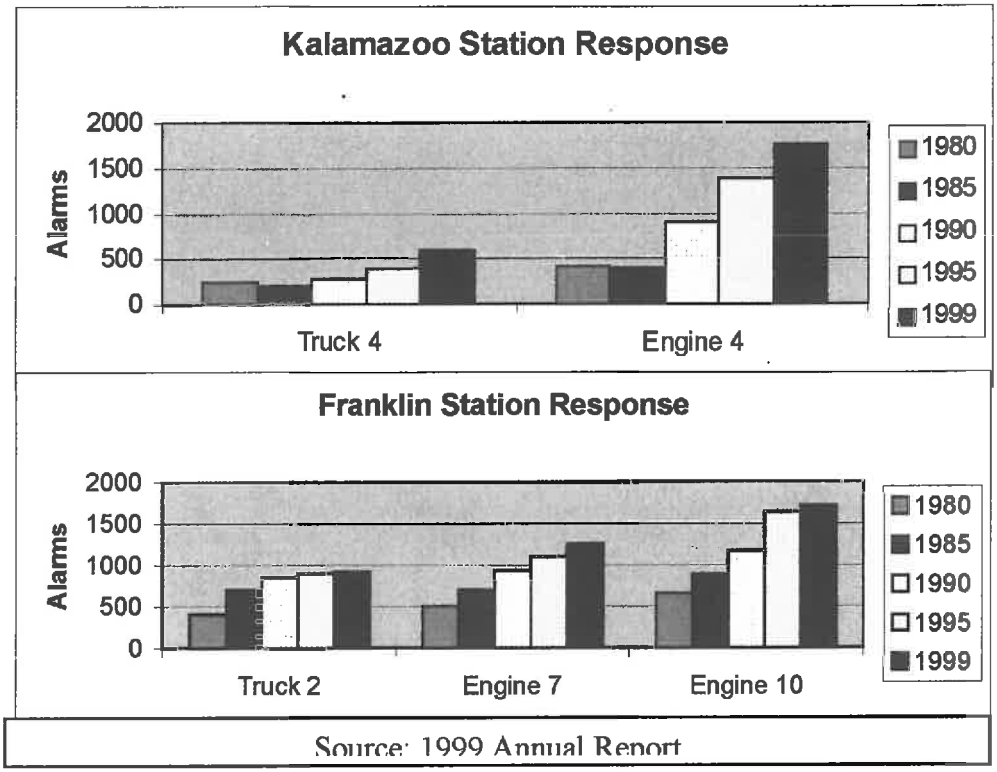
The Separation

All four Grand Rapids Fire Department ladder trucks are housed with at least one engine company. When a truck and an engine are both in quarters, responding in tandem allows them to carry out necessary firefighting activities. If an engine is out, the truck can be the first on the scene.

The number of alarms continues to increase citywide every year. In 1980, the Grand Rapids Fire Department responded to 6,266 calls. In 1999, the number of calls has risen to 16,251. This represents an increase of over 250 % (Annual report, 1999).

The number of incidents when the truck arrives first also continues to rise (see Figure 3). Listed for example are two stations and the number of alarms for both the truck and the engine(s) that it is housed with.

Figure 3



Source: 1999 Annual Report

The separation of the trucks from the engines is not only caused from emergency response incidents. Training is another major cause of separation. Literature was not available to present data on the actual increase of mandated and department required training. However, few departments may dispute the increase.

Other causes of separation of the trucks from the engines such as hydrant maintenance, building inspections, and other daily job requirements are also on the rise. These along with emergency response are and will continue to increase. Fire service managers must make important decisions and predictions based on these trends.

PROCEDURES

The research was conducted following the Fire Service Financial Management course at the National Fire Academy.

The research procedures used in preparing this paper began with a literature review at the Learning Resource Center (LRC) at the National Emergency Training Center (NETC) in March of 2000. Additional reviews were conducted at the Grand Rapids (MI) and Grand Haven (MI) public libraries in Grand Rapids and Grand Haven.

The literature focused in five areas. The first focused on purchasing apparatus, and why a needs assessment is important. The next area was about evaluating the advantages and disadvantages of quints. Another area covered some of the strategies that make quints work. The last area was on the model from the Financial Management course covering "outcomes".

A survey instrument was then developed. The survey instrument called "Applied Research Project Survey" (Appendix A) was sent to 85 fire departments across North America

that were similar in size (200 or more members) and provided similar services to their community. The information was then entered into an Excel spreadsheet. The purpose of the survey was to gather and compile information and data from other departments relating to the purchasing and use of quints.

The survey consisted of 10 questions. The purpose of questions one through three was to gather information about their department to ensure comparison. Questions four through eight gathered information on ladder truck purchasing practices. Questions nine and ten gathered information on important considerations when purchasing ladder trucks. There was also a request for additional research information by providing the survey responders an opportunity to give their comments on quints.

The Transformation Model from the Fire Service Financial Management course covered how resources or inputs such as people, time, and money are invested into the fire service to be transformed into services. The services are then transformed into outputs or "outcomes".

The model was used to maintain focus on the needs or outcomes for the community and not just the functional or operating features of ladder trucks for the fire service.

The literature was obtained from the Grand Rapids Fire Department Dispatch Center as well as from the Learning Resource Center at the National Fire Academy in Emmitsburg, Maryland. Literature on ladder trucks and purchasing was examined from the public libraries in Grand Rapids (MI) and Grand Haven (MI). The books and publications were most helpful, relevant, and much information was gathered.

Assumptions and Limitations

As with all surveys, it was assumed all respondents would answer the survey honestly and were in a position within their organization to have the appropriate knowledge for answering

each question. This assumption appears to have been flawed. Some of the surveys were returned with only the front questions answered. In addition, some surveys were returned with questions left blank. The survey instrument was sent out to 85 departments, and only 68 of 85 (80 %) returned.

The survey was non-random. The population sampled was not representative of the fire service in the United States. It was sent to professional fire departments from metropolitan cities and counties. However, it was important to use departments similar in size and that they performed like services for their community.

RESULTS

The results of the research paper are accumulative in nature and represents a comprehensive study of all the material gathered. The author attempted to answer all six research questions as accurately and thoroughly as possible to accomplish the objective of the paper.

The first research question asked, "What is a needs assessment and is it a valuable tool for the purchase process? This was one important question that was not covered in the survey instrument. However, it should be noted that under the "comments" portion of the survey, 29 (43 %) responders took the time to write how important a needs assessment was to the purchasing process without the question being directly contained in the survey.

The literature and survey supported the importance of a needs assessment or other like tool in assisting fire service leaders in making the best decisions. Needs assessments assist fire department administrators in defining problems more accurately, identify the causes of problems, and examining relative merits of alternative solutions (Grant, Hoover, 1994).

The second research question asked, "What are the advantages of quints"?

The advantages of quints revealed by this research include:

1. Quints functionality:
    - Establish a water supply.
    - Attack the fire with sufficient hose lines and master stream capability.
    - Ability to carry out ventilation procedures.
    - Equipment to perform search and rescue operations.
    - Conduct salvage and overhaul operations.
2. Quints versatility.
    - If arrive first at fire scene, can begin firefighting operations.
    - Carry equipment found on both engine and aerial trucks.
    - Can be used as either engine or truck or both if staffed adequately.
    - Self-supporting. (no need for engine to supply water).
    - Improved aerial coverage (i.e. St Louis).
    - Can handle minor fires without an engine. (car fires, trash fires, etc,).
    - Work well in apartment and condominium environments when access is limited.
    - Require additional training and standard operating procedures.

The third research question asked, "What are the disadvantages of quints"?

The disadvantages of quints revealed by this research include:

1. Quint functionality.
    - Reduces compartment space and ground ladder capabilities.
    - Add additional weight to a piece of apparatus that is already too heavy.
    - Poor maneuverability, require large area to make turns.

- Increased maintenance costs.

2. Quint Versatility.
    - Causes operational confusion on the fireground between engine and truck work.
    - Requires additional training, strategies, and standard operating procedures.
    - Sufficient manpower is required to accomplish its mission.
    - Causes labor unrest (quints are used for staffing reductions).

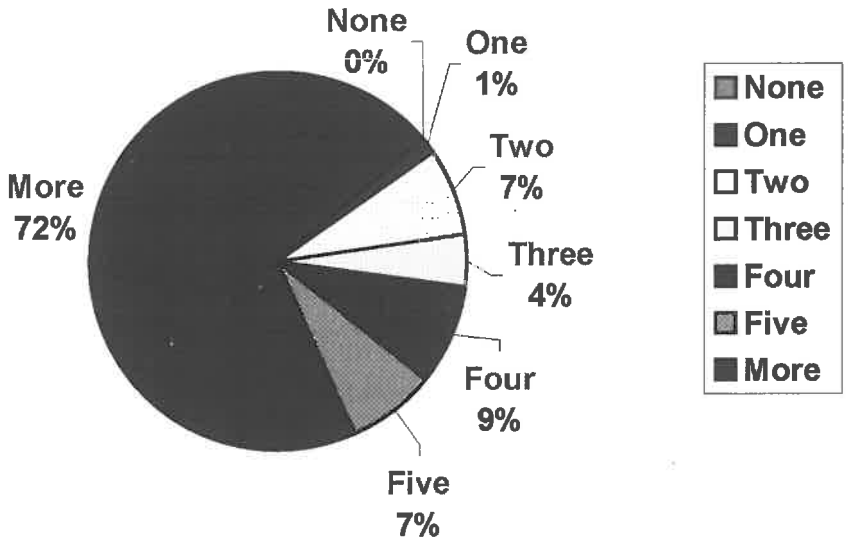
The research did reveal many advantages and disadvantages for quints. In 1989, Loeb revealed that one main advantage of the quint is it's a multi-purpose unit. The quint provides different options depending on the situation. These options don't come without costs. The costs include ensuring crews are properly trained and have solid standard operating procedures.

The fourth research question asked, "Is the current trend for or against the quints"? The survey first attempted to find out how many aerial trucks each department had in service (see Figure 5). The breakdown was that 48 out of 68 (72 %) had six or more, in their fleet. Of those who responded to the survey, the department with the most aerial devices had 27, only three were quints.

When Loeb (1989) conducted his survey, it went out to over 100 fire departments that were using quints at that time. The response for the survey was less than 50 %. This authors survey was sent out to 85 departments with a response of 80 %. The survey was also designed to find out if larger departments are moving toward or away from the quint concept.

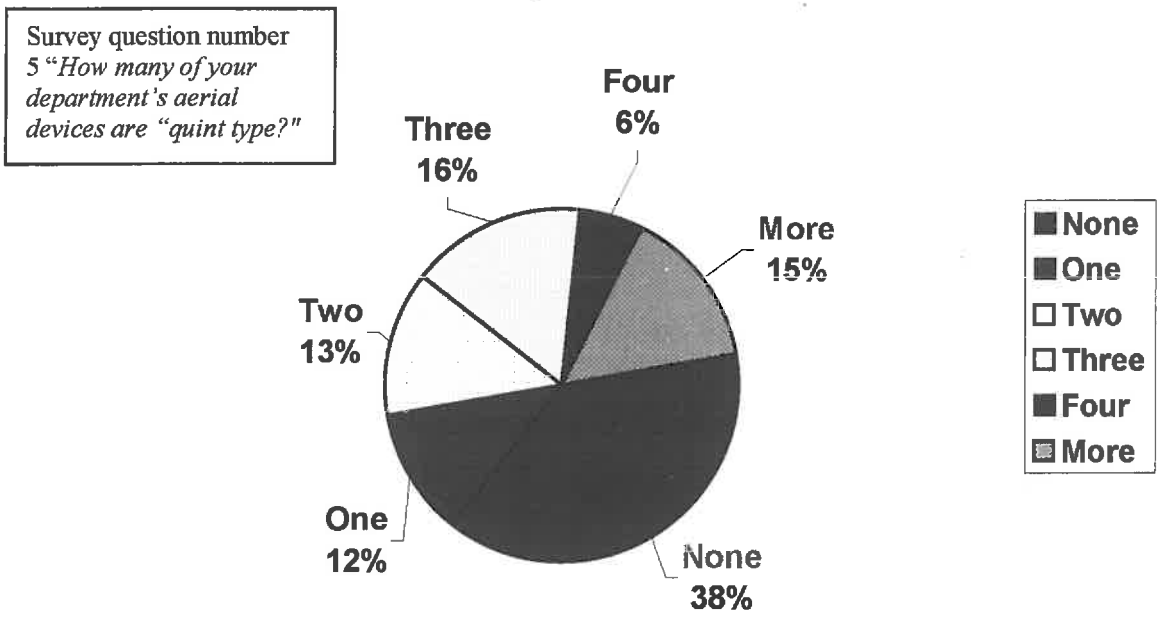
Figure 5

Survey question number 4
"How many aerial devices presently exist in your department?"



With 72 % of larger fire departments having six or more trucks in their fleet, it was necessary to research how many were using quints. Research question number five revealed that 26 of the 68 (38 %) that responded do not have any quints in service (see Figure 6). Of the 10 (15 %) who responded to "more" on the survey, the highest number on quints was 20 and the lowest was six.

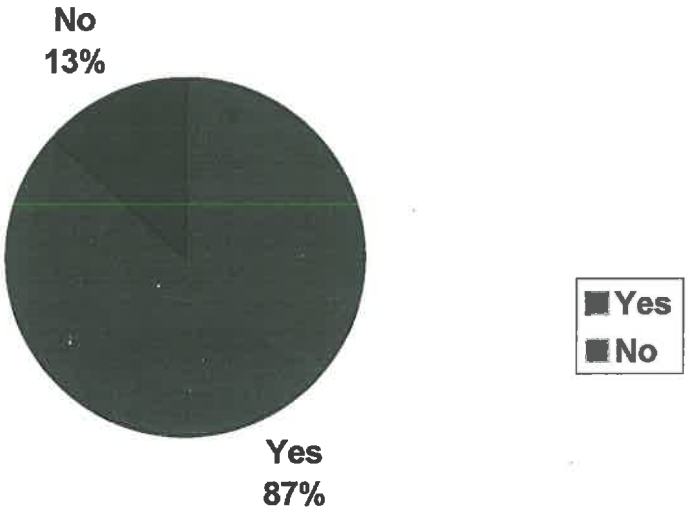
Figure 6



Survey question number six asked, "has your department purchased any new aerial devices in the last five years?" Of the 68 who responded 59 (87 %) departments have added new aerial devices to their fleet (see Figure 7).

Survey question number 6 "*Has your department purchased any new aerial devices in the last 5 years?*"

Figure 7

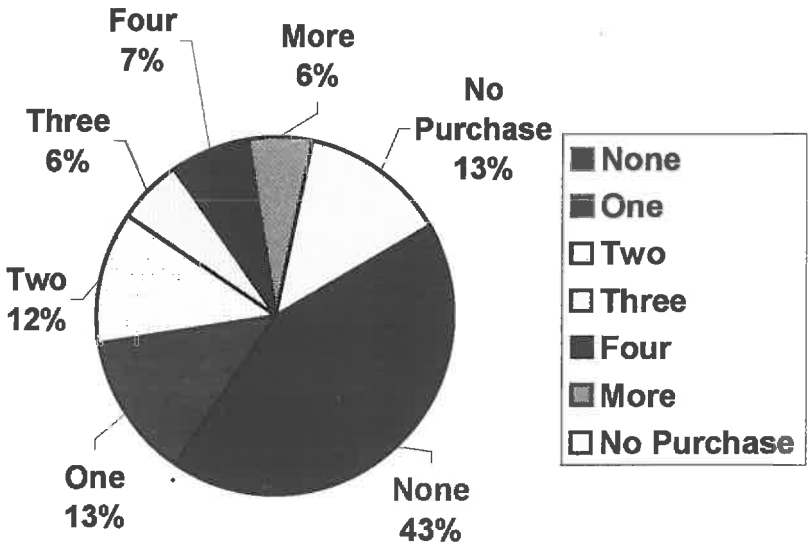


In 1996, Mittendorf wrote that the quint concept has progressed to a point where it is considered popular in the United States. As an example, comparing sales of aerial devices, one leading manufacturer sells 90 percent quints and only 10 percent traditional aerial trucks.

With 87 % of responding departments purchasing new aerial devices in the last five years, what are they buying? Survey question number seven revealed that 29 (43 %) of the departments that purchased aerial devices did not purchase quints while 30 (44%) bought at least one (see Figure 8). The remaining nine department's (13 %) had not purchased any aerial devices in the last five years.

Figure 8

Research question seven *"How many quints has your department purchased in the last five years?"*

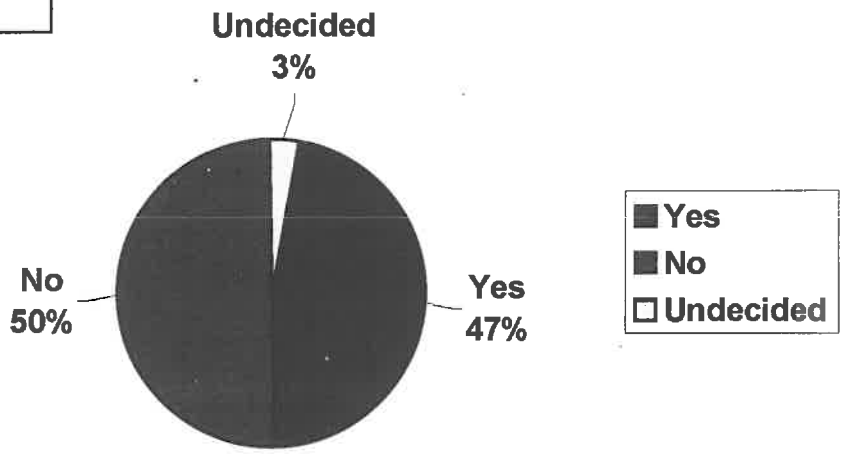


The next survey question obtained information on department's future plans of purchasing quints. Loeb (1989) felt he had sought and won agreement from both producers and consumers that they were in a quint era. He went further to say that if you eyed fire apparatus deliveries or fire department equipment rosters, you would have concluded that back then was a time of "Quint Fever" (Loeb, 1989a).

The survey revealed that 34 (50 %) of the responding departments had no future plans to purchase quints while 32 (47 %) responded yes to purchase quints in the future (see Figure 9).

Figure 9

Research question eight, *"Does your department plan to purchase any quints in* the *future*?"



Research question five asked, "What are important factors when purchasing aerial devices?

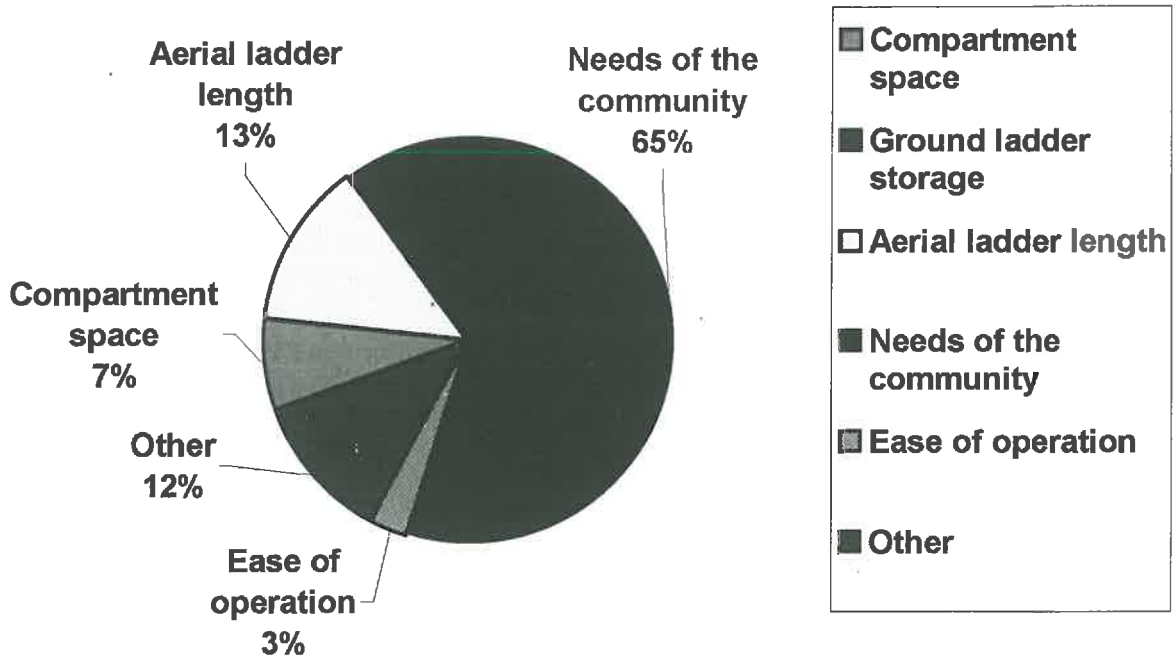
Question nine of the survey researched factors to consider when purchasing an aerial device (see Figure 10). The question covered both operational and functional factors. The operational factors included compartment space, ground ladder storage, and ease of operating the device. The functional factors included aerial ladder length and fire pump. There was also a space provided for the responder to add other considerations they felt strongly about.

Although it was listed as a disadvantage of the quint, ground ladder storage along with fire pump were not chosen by all 68 responders as the most important.

The most important consideration from those responding was needs of the community. It received 44 (65 %) out of the 68. There were other considerations returned that were not on the survey which included reliability, maneuverability, turning radius, costs, and safety.

Research question nine
"*When writing specifications for an aerial device, what is the most important?*"

Figure 10



Research question number 6 asked, "What are "outcomes" and should they be considered"?

In the literature review the definition of outcomes is defined as "the end of a complicated process" in the book *Urban Outcomes*. "Outcomes are the consequences of the services provided" (FEMA, 1996).

The needs of the community was contained in survey question eight. *Urban Outcomes* notes, that the citizens may have opinions about how resources should be allocated, what apparatus should be bought or its location. However, they do not have the knowledge to make decisions on allocation or apparatus. In the book *The Power of Predictability*, the authors discuss the need to help the organizations predict the outcomes of its

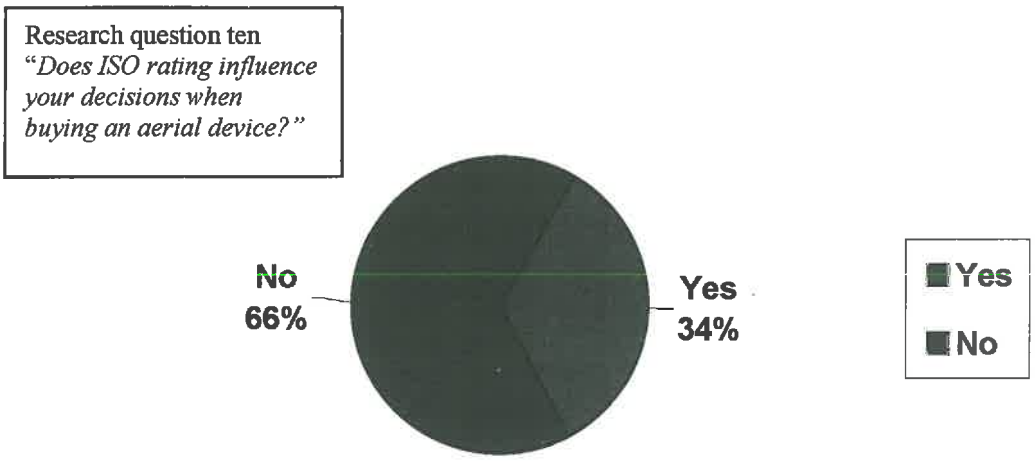
actions. We as fire service leaders must make these decisions with the community as the focus. "The leaders of today's organizations must start with a honest assessment of the organization's situation, the possible outcomes of any action the organization may take, and what each outcome will mean" (FEMA, 1996).

The last survey question asked, "Does ISO (Insurance Services Office) rating influence your decision when buying an aerial device? This question was part of the survey because of its association with "outcomes". The types of apparatus affect the City's rating and insurance costs for the citizens.

The literature review revealed that when quints are looked at for fire insurance ratings, it was hard getting a consistent answer. Departments cannot expect credit for both engine and truck companies. Although components for dual functions exist, the apparatus cannot be in several places at one time. If the quint can fill both responsibilities together where it sits, and is staffed to do so, credit will be given to a complete unit for one function, even though it might constitute a fraction of a unit (Loeb, 1989b).

Only 23 (34 %) of the 68 responders considered ISO rating when purchasing an aerial device and the remaining 45 (66 %) did not consider ISO rating (see Figure 11).

Figure 11



When ISO does an audit on a fire department, they take a look at its apparatus, how it is designed and equipped. An unsuspecting fire chief can look bad for buying apparatus that will negatively affect the community's fire insurance for the next 15 years. How do you explain away a $750,000 aerial device that did not count as one-and-a-half fire truck? Especially, if that is why the piece of apparatus was approved.

It doesn't really matter if the fire service likes ISO. You will be graded against it any way. Ignore the ISO list, and your citizens and businesses will pay the price for your decisions (outcomes) in the form of higher insurance rates (Stevens, 2000).

DISCUSSION

The results of this research compared positively with the findings of the authors reviewed in the literature review process. The study also proved how valuable needs assessments are in the purchasing process. It is very important for a department to know how each piece of apparatus will fit in your community before it arrives. Knowing the expectations of the apparatus before purchasing will assist in knowing the outcomes expected from the apparatus.

The literature and survey instrument did show consensus on the advantages and disadvantages of the quint. The study showed two major advantages. The first was the quint's versatility to be able to pump its own requirements during ladder pipe operations without calling for or relying on another pumper. The second was the ability of the quint, which is first considered a ladder truck, to convert and replace a pumper.

The disadvantages were also clearly outlined by the literature and the survey instrument. They included poor maneuverability, too large, difficult to keep engine and truck company operations separate, limited credit by ISO, and maintenance issues.

Comments from the survey instrument included, "no advantages to a quint without staffing", "When duties are combined, it loses in one way or another", and "Past experience with dual purpose apparatus provided conflicting operation procedures. The benefit of pumps and water do not out weigh lost space for equipment needed for truck work".

The literature covered ways to overcome many of the disadvantages by training, officer experience, location, staffing, and solid standard operating procedures.

The literature also told of *The Power of Predictability*, and how the authors discuss the need to help the organizations predict the outcomes of its actions. We as fire service leaders must make these decisions with the community as the focus. "The leaders of today's organizations

must start with a honest assessment of the organization's situation, the possible outcomes of any action the organization may take, and what each outcome will mean" (FEMA, 1996).

An example of predicting outcomes was demonstrated in this author's most recent class at the National Fire Academy in Emmitsburg, Maryland. During this class the use of quints was a common topic. A large department utilized quints but the pumps were considered a low priority for repairs. In a relatively short period of time, the department experienced several fire deaths. They ranged from an elderly gentleman to two young children. In each incident the ladder truck was the first arriving piece of apparatus. The engines were on other calls, or out of their district. This resulted in lengthy delays and the ladder truck being first on the scene without the use of their pump, water, and hoses due to needed repairs. The outcomes were five fatalities.

The citizens of this community became outraged. The surviving family members began litigation for the apparatus not functioning properly when the department was fully aware of the needed repairs.

In an effort to remedy future problems of this type, the department replaced the quints with new traditional ladder trucks. Recently the same scenario occurred with the new ladder truck arriving first. The department is being sued for damages occurred for not having the pump, water, and hoses needed to attack the fire.

If you apply this example to the Transformation Model (see pg 6), it illustrates that the outcomes (five fatalities) of not having the pumps in working condition would be the same (five fatalities) even with the purchase of new traditional ladder trucks. The only difference is the new trucks shine more.

While the literature and the survey instrument did support one another, there also were some unexpected findings. In 1989, the fire service appeared to have quint fever. The survey

instrument revealed that 87 % of responders had purchased aerial devices within the last five years. It also revealed that 38 % of the departments that responded do not have any quints and that 50 % do not have plans to purchase any. According to the results of the survey, the fire service no longer has quint fever.

There were also inconsistencies in the literature and survey. The literature revealed how a needs assessment was most important. It discussed how a needs assessment will assist organizations in distinguishing the differences between "wants" and "needs" (Jakubowski, 1993). The results of survey question eight revealed 66 % departments that responded felt the needs of the community was the most important consideration when purchasing an aerial device. Yet the advantages and disadvantages revealed in the literature and the survey centered on the operation and function of an aerial device, or "wants" and "needs" of the fire service, not the outcomes to the community. Only one responder commented on how important it was for fire departments to provide its firefighters the capabilities and option to perform the tasks needed to obtain the best outcomes for the community.

The research for this project has clearly demonstrated how controversial the quint concept is. The numbers clearly illustrated how fire departments are divided equally for and against quints.

Loeb (1989c) concluded his "Quint Fever" articles by saying:

> Our facts and figures show that the quints are out there, spread across the land fighting fire and being applied in a variety of different ways with their companion apparatus. While I never had one in my old command, I can see where one would go well as matters stand today.

> How matters stand today and tomorrow is the deciding factor as to whether or not the quint will subside in popularity-it could fall back into the pack to be just another component, or continue its rise in popularity and achieve overall prominence (p.36).

It appears today the quint has fallen back into the pack to be just another component of the fire service. It is this author's hope that the fall back is due to the quint not producing the desired outcomes for the community and not the fire service.

RECOMMENDATIONS

After completion of this applied research project, this researcher feels the literature and the survey instrument provide only information to recommend a process for purchasing two aerial devices for the Grand Rapids Fire Department and not a recommendation on which type. This author recommends:

1. The Grand Rapids Fire Department establish a committee to make recommendations to the fire chief for purchasing two aerial devices.
2. The committee will include a needs assessment for the purchase process. This process should be modeled as described in the literature review. The process should focus on "needs" not "wants". The assessment must include outcomes of the purchase.
3. The committee will set the objectives for the new apparatus as well as evaluate the two current quints. Additional data should include:
    a. Review station locations for present and future aerial devices.
    b. Review current training for present quints –For officers and crews.
    c. Review current standard operating procedures for the quints.

4. Develop tool to retrieve historical data since the purchase of the two quints in 1992. This data should include:
    a. Average time per day the aerial devices are separated from engine (s).
    b. Annual number of alarms the aerial devices arrives first on the fire scene.
    c. Annual number of alarms the quints used pump, hoses, and water.
5. Develop tool to gather present and future trend data to enable the Grand Rapids Fire Department to predict future needs. Apparatus will be in service for 10-15 years. Data is critical for predicting if apparatus will fit those needs. This data should include:
    a. Projected average time per day the aerial devices will be separated from engine (s).
    b. Projected annual number of alarms the aerial devices will arrive first on the fire scene.
    c. Projected annual number of alarms the quints will use pump, hoses, and water.
6. Develop a "users" survey to be distributed to all assigned personnel to gather input. The survey should be "outcomes" based also.
7. Committee will utilize contacts from survey as a "networking" tool to gather additional information concerning the use of quints and traditional aerial ladder devices.

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Applied Research Project Survey
National Fire Academy
Financial Management 2000

1. *Department Size:*

A. 0-100 ☐
B. 100-150 ☐
C. 150-200 ☐
D. Above ☐

2. *What is the population of the community you serve?*

A. 50,000 to 100,000 ☐
B. 100,000 to 150,000 ☐
C. 150,000 to 200,000 ☐
D. 200,000 to 250,000 ☐
E. 250,000 to 300,00 ☐
F. 300,000 and above ☐

3. *Which services below does your department provide to your community?*

A. Fire ☐
B. Hazmat ☐
C. Water rescue ☐
D. EMS ☐
E. Confined space ☐
F. Other _____

4. *How many aerial devices (platform or straight ladder etc.) presently exist in your department?*

A. None ☐
B. One ☐
C. Two ☐
D. Three ☐
E. Four ☐
F. Five ☐
G. More ☐_____

5. *How many of your department's aerial devices are "quint" type?*

A. None ☐
B. One ☐
C. Two ☐
D. Three ☐
E. Four ☐
F. More ☐_____

6. *Has your department purchased any new aerial devices in the last 5 years?*

A. YES ☐
B. NO ☐

7. *If you have purchased an aerial device(s) in the last 5 years, how many have been "quint" type?*

A. None ☐ D. Three ☐
B. One ☐ E. Four ☐
C. Two ☐ F. More ☐____ G. Have not purchased any ☐

8. *Does your department plan to purchase any "quints' in the future?*

A. YES ☐
B. NO ☐

9. *When writing specifications for an aerial device, please list the following in order of importance.*

A. Compartment space ☐ D. Aerial ladder length ☐ Other_____
B. Ground ladder storage ☐ E. Needs of the Community ☐
C. Fire Pump ☐ F. Ease of Operation ☐

10. *Does ISO rating influence your decision when buying an aerial device?*

A. YES ☐
B. NO ☐

If your time permits, I would appreciate any comments that would assist me in my research concerning your thoughts on the advantages and disadvantages of both "traditional" and "quint" aerial devices.

_____

_____

_____

_____

_____

_____

Your department will not be identified by name in the research report. Please provide your department's name and contact person if any follow-up questions are needed.

Department:_____ Contact person:_____
Telephone:_____ E-mail:_____

FireRescue1 News

Article

Product News

with Robert Avsec

05/10/2012

The Quint: a unique and still misunderstood fire truck

Neither a jack of all trades nor a master of none, the quint will fill specific needs

It's probably safe to say that there are many firefighters and officers who consider the quintuple combination pumper, or the quint, to be the "centaur" of fire apparatus: part engine and part truck.

Since the German-based fire and rescue apparatus manufacturer, Metz Aerials, obtained the first patent for a quintuple combination pumper in 1912 — American LaFrance and Seagrave began to produce quints in the 1930s and 40s respectively — the idea of a "five-tool" piece of fire apparatus has been a controversial subject.

Related Article:
Back to the basics

So where does the controversy originate?

Back in 2009, Robert Rielage, Chief of the Wyoming (Ohio) Fire-EMS department, a 78-member combination fire department bordering Cincinnati, wrote, "The modern quint ... has been described by some as a fire truck designed by a city manager who thought four firefighters could do all the work of both an engine and ladder crew from a single apparatus."

Fire chiefs who share Chief Rielage's sentiments point out that if you have only three or four people on the quint that you have the function of either a truck crew or an engine crew at a fire, but not both.

A leading proponent for the use of the quint is Neil Svetanics, the former chief of the St. Louis Fire Department. In 1987, Svetanics standardized all the apparatus in the city as quints and in 1999 ordered 34 new quints, replacing the city's fleet.

Svetanics' rationale for his unconventional thinking was really pretty simple: he needed a vehicle that would provide the most services at a time of reduced budgets.

Quint by definition

Before this discussion goes any further, let's make sure that we're talking about the same animal. Today's quint is designed to provide five tools for firefighters to carry out these tactical firefighting functions:

- Supply fires streams (pump and hoses);
- Provide initial and continuing water supply (pump, water tank, and hoses)
- Provide personnel with access to elevated areas (ground ladder complement and aerial device)

- Provide elevated master fire stream (pump, hose, and aerial device)

The National Fire Protection Association outlines the requirements for a piece of apparatus necessary to function as a quint in NPFA Standard 1901, The Standard for Automotive Fire Apparatus. Here is a summary of the quint requirements as detailed in Chapter 9 of the standard:

- Fire pump with a minimum capacity of 1,000 gallons per minute
- Water tank with a minimum capacity of 300 gallons
- Aerial ladder or elevating platform with a permanently installed waterway
- Hose storage area with a minimum of 30 cubic feet of storage area capable of accommodating 2.5 inch or larger fire hose; two hose storage areas, each with a minimum of 3.5 cubic feet or 1.5 inch or pre-connected hose lines.
- Enclosed compartments with a minimum of 40 cubic feet for equipment storage
- Complement of ground ladders containing a minimum of 85 feet of ground ladders, including at least: two extension ladders, one roof ladder and one attic ladder
- Suction hose of a minimum of 15 feet of soft suction hose or 20 feet of hard suction hose for drafting water.

Though the quint has now been around for 100 years, like all types of fire apparatus it has evolved along with new technologies. Today's quints are in many ways smaller, lighter and more agile than their predecessors. This is due to many influences, such as diesel engines, single-stage pumps, all-wheel steering, improved hydraulic systems (aerial device) and improved braking systems.

Yesterday's large, tandem-axle quints, are now more maneuverable on the road and fireground because of shorter wheelbases made possible by eliminating the second axle.

What it can do

So why would a department's leadership consider adding a quint to their department's capabilities? There are many needs that a quint can address.

Staff shortages. Rather than under-staffing both a truck and an engine with a crew of less than four personnel — the optimal number for safe, efficient and effective firefighting operations — staff a quint with a four-person crew.

- Funding cuts. The cost of a quint is less than the combined cost of an engine and truck. A quint has the tactical capabilities of both apparatus available, but through the purchase of one vehicle. (Point of emphasis: The tactical capabilities are available, but even with a four-person complement of staffing, the quint and its crew can perform either engine company or truck company functions, but not simultaneously).
- Need for some aerial capablities. The quint with a 75-foot elevating device is the most popular model in the United States today because its reach can meet the operational needs for a wide variety of departments.
- Need for a smaller vehicle with an elevated master streams. Older cities and towns have narrow streets with tight turning radiuses; newer cities and suburban areas are experiencing growth of the neo-classic community, that is, new construction that seeks to emulate the most positive features of older cities and towns. Quints come in a variety of sizes and configurations; all-wheel steering and other mechanical innovations provide more maneuverability for today's quints as well. For example, by positioning a quint on Side C of a structure with a narrow alley, the incident commander would have both engine and truck tactical capabilities available in that area.
- The need for lighter vehicles. Once again, the variety of sizes and configurations and weight can provide fire service leaders with an apparatus option for areas with infrastructural constraints, such as old bridges. Quints can also reduce the overall number of apparatus necessary to cross residential bridges or traverse long access roads to reach more remote homes and property.

About the author

Battalion Chief Robert Avsec (Ret.) served with the Chesterfield (Va.) Fire & EMS Department for 26 years. He was an active instructor for fire, EMS, and hazardous materials courses at the local, state, and federal levels, which included more than 10 years with the National Fire Academy. Chief Avsec earned his bachelor of science degree from the University of Cincinnati and his master of science degree in executive fire service leadership from Grand Canyon University. He is a 2001 graduate of the National Fire Academy's Executive Fire Officer Program. Since his retirement in 2007, he has continued to be a life-long learner working in both the private and public sectors to further develop his "management sciences mechanic" credentials. He makes his home near Charleston, W.Va. Contact Robert at Robert.Avsec@FireRescue1.com

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The 75-Foot Quint: Know What It Can Do

Article

02/01/2009

BY BILL ADAMS

Quint debates can be partial, biased, and downright emotional. Traditionalists cannot accept the idea that the traditional *pumpless* ladder truck, equipped with large amounts of ancillary equipment, an aerial device, and numerous ground ladders, may be a thing of the past. They cannot understand why today's firefighters and administrators believe that multitasking apparatus with fewer personnel is the cure-all on the fireground. This article does not discredit the quint or pit the old against the new. Instead, it objectively illustrates the diminishing capabilities of the traditional ladder company and limitations that purchasing a quint—and, in particular, a small one—imposes on fireground operations. The quintuple apparatus may not be the cure-all for budget cuts, consolidation, downsizing, and inadequate staffing.

The basic quint concept has remained the same over the years. The Miami-Dade (FL) Fire Department purchased this 2007 quint (and 14 others) as "pumpers equipped with master streams."
(Photo by Bob Milnes.)

Click here to enlarge image

A *big* quint has an aerial device, fire pump, booster tank, hose, and ground ladders mounted on a tandem rear axle. A *small* quint has similar features mounted on a single rear axle. Big quints carry large amounts of equipment and are usually Insurance Services Office (ISO)-rated ladder trucks. Quints may have rear-mounted or mid-mounted aerial devices. Although each has similar limitations, this discussion concerns only the rear-mount quint with a single rear axle.

Many departments use this small quint with a 75-foot ladder as a first-out engine with ladder truck capabilities. But it may unintentionally reduce fireground efficiency, jeopardize firefighters assigned to it, and convey a false sense of security. Although it carries and does a little of everything, can it carry enough of any one thing to safely and proficiently accomplish the tasks assigned to it? The discussion below considers a typical Smalltown USA fire department, *without* an ISO-rated ladder truck, opting to run a small quint *first due* from a single company station with a couple of engines responding from different locations. It also reflects one that may combine engine and ladder company capabilities into a *small* quint.

POPULARITY

In a questionnaire, *all* the aerial manufacturers responding were favorable to the small quint, noting widespread acceptance and increasing sales. One commented that the small quint was its most popular aerial (Ferrara Fire); another noted that, in some cases, the 75-foot quint was actually replacing pumpers (Rosenbauer America); yet another said that sales of the small quint increased dramatically with the availability of an aluminum ladder (Pierce/Oshkosh Truck). Manufacturers opined that the small quint is popular because of its compact design and short wheelbase (KME); one cited increased maneuverability and versatility among the reasons for the steady increase in its 75-foot quint sales (Smeal). Crimson observed that although the 75-foot, single-axle quint was still popular, there was a trend toward tandem-axle versions.

SIZE AND WEIGHT LIMITATIONS

Small quints may not have the room or axle ratings to carry all ISO-required ground ladders *and* ladder company equipment, in addition to a full complement of engine company equipment. The manufacturers reported the overall length of the 75-foot quint ranges from 34 to 38 feet with wheelbases between 200 and 230 inches. Rear-mount apparatus travel heights are usually higher than mid-mounts because the aerial device nests above the cab.

Small quints are usually limited to 31,000-pound rear axle and 21,000- to 23,000-pound front axle ratings. Weight distribution is crucial to ensure axles are not overloaded. *In-service* weights may be very close to the quint's maximum gross vehicle weight rating (GVWR). Limited space and axle ratings usually determine what options are available and the amount of equipment carried. Departments should be objective with equipment wish lists. The question no longer is "What else can we put on our new truck?" but rather "What else do we have to leave off?" Less equipment means fewer tools with which to work.

TANK SIZE

Pumper booster tank capacities average between 750 and 1,000 gallons. The smallest size that the ISO and the National Fire Protection Association (NFPA) acknowledge is 300 gallons, which is common on big quints. The manufacturers stated small quints feature tanks in the 400- to 500-gallon range. If you have a 750-gallon tank on your first-due engine and reduce this to a 500-gallon tank on a quint, you are responding with *one-third less* water. If you use a 400-gallon tank to make room for additional hose capacity, ground ladders, or compartmentation, you respond with *46 percent less* water. Less water means less extinguishing capability, a consideration when the first-due apparatus arrives with fire showing and must decide to establish a water supply. Rosenbauer America said half its quint purchasers specify Class A or compressed air foam systems, noting that a larger tank is not a necessity, and they are "using the quint for typical *pumper type* attack vehicles." Jim Salmi, chief operating officer of Crimson Fire, says, "Since these trucks are often operating as pumpers, the increased use of foam follows the industry trend."

CUSTOMIZATION

Everything is relevant in size and space but not in weight or priority of use. A three-section, 35-foot aluminum ladder weighs 129 pounds and occupies approximately 28 cubic feet. Where do you store it on the quint—in the area available for compartmentation or that of the hosebed or of the water tank? That 28 cubic feet can also accommodate 550 feet of five-inch hose weighing about 600 pounds or 200 gallons of water weighing 1,668 pounds. The same *space* can be filled with 129,600 or 1,668 pounds of equipment. Exercise caution in what you carry and where it is carried.

According to KME Aerial Product Manager Pete Hoherchak, "When designing 75-foot quints, everything we do is based on proper weight distribution and axle loads"; he adds that the tank size can be restricted depending on the options chosen. Salmi from Crimson elaborates, "Customization is common, but axle weight limits

reduce the number of options, especially with the 500-gallon tank. Careful weight analysis of the truck is essential to stay within axle ratings and weight distribution." He also notes that customization can increase when tank size is reduced. Salmi continues, "This particular truck configuration (from all manufacturers) is prone to problems with brake wear and life. Stopping distances increase as weight increases, so understanding this characteristic is important for drivers."

The various materials used in apparatus construction (e.g., steel or aluminum for the aerial; aluminum, steel, polymer, or composite materials for the body and the cab) present inherent weight differences and advantages/disadvantages. The pros, cons, and selling features of each are not addressed here and are left to the salespeople. However, regardless of the materials used, exercise caution and do not overload the unit.

GROUND LADDERS

For a fire department to receive full credit for possessing a ladder truck, the ISO requires that the apparatus include 16- and 20-foot roof ladders; 14-, 28-, 35-, and 40-foot extension ladders; and a 10-foot collapsible ladder. The ISO does allow the following alternatives: a second 35-foot extension ladder instead of the 40 foot; a 24-foot extension ladder instead of the 28 foot; another 16-foot roof ladder instead of the 20 foot; and a *folding* or *attic* ladder instead of the *collapsible* ladder. According to NFPA 1901, *Standard for Automotive Fire Apparatus*, the ground ladder requirement for a ladder truck is two roof ladders of any size, two extension ladders of any size, and a single attic ladder; the combined length of these ladders should total at least 115 feet. The NFPA 1901 requirement is less than and does not meet the ISO's requirement. As strange as it is, you *should* comply with the NFPA to be *compliant*, but you *must* comply with the ISO to get a *rating*.

Although the ISO has no standard for quints, the NFPA does, requiring quints to carry a minimum of 85 feet of ground ladders. Any combination, size, or quantity will suffice as long as it includes at least one roof, one extension, and one attic ladder, the combined lengths of which must total at least 85 feet.

Several manufacturers state that their 75-foot quints provide a 115-foot ground ladder complement, including a 35-foot, three-section extension; a 24-foot, two-section extension; two 16-foot roof ladders; a 14-foot combination ladder; and a 10-foot attic ladder. (A two-section, 35-foot ladder is seldom carried, since it is five feet longer than the three-section when stowed). That 115-foot ground ladder complement meets the NFPA's ground ladder requirement for a ladder company!

But lettering your quint as a "Ladder Company" or "Truck Company" does not necessarily mean it really is one. An NFPA-compliant quint with a minimum NFPA-compliant ground ladder complement may give a false sense of security. Besides not meeting ISO requirements, a 75-foot quint that has fewer and shorter ground ladders cannot physically accomplish the same tasks as an ISO-rated ladder company. Paul Stephenson, director of aerial sales for Ferrara Fire Apparatus, notes, "The ISO is looking for a ladder to the roof of the tallest building or a 100-foot aerial—whichever is less. 75s by design may get less points."

When writing apparatus specifications, some purchasing committees and occasionally apparatus salespeople consider only *minimum* NFPA requirements; ISO ratings are not always mentioned. Purchasers "very rarely" require small quints to meet the ISO's ladder truck requirements, responds Chuck Glagola, aerial products specialist for Smeal. In taking delivery of what could be a half-million-dollar piece of equipment, you would likely feel uncomfortable explaining to City Hall about the ISO's not giving you 100-percent credit for it.

It is even less comfortable to respond to a working fire in an occupied 2½- or three-story structure and be unable to use your new quint because of overhead obstructions or a long setback. It would be embarrassing to have only one or two small to midsized extension ladders available to accomplish roof ventilation and simultaneously attempt rescues from the top floor. Fireground operations and safety may be compromised when

fire departments are forced to purchase equipment to fit an undersized rig rather than purchase the proper equipment to efficiently accomplish a mission.

SUPPLY HOSE

The NFPA requires engines to carry a minimum of 800 feet of 2½-inch or larger hose with a minimum cubic footage of space required. The ISO requires 1,200 feet of hose, at least 800 feet of which must be 2½-inch or larger. Most engines are delivered with main hosebed capacities ranging from 1,200 to 1,500 feet; larger capacities are common in suburban and rural areas. The manufacturers state that, on the 75-foot quints, a 1,000-foot main hosebed capacity is the average requested (and probably all that is offered or will fit). *Caution:* When replacing an engine with 1,500 feet of supply hose with a quint carrying 1,000 feet, you lose *one-third* of your supply hose *before* you leave the station. The officer should consider this when arriving first due in areas with extended hydrant spacing.

In single-engine and ladder operations, usually the engine arrives first, doing size-up and (hopefully) leaving room for the ladder company. When a quint responds first due, however, it does not have that first-arriving engine doing size-up. It must accomplish size-up, aerial placement, and initial attack in addition to possibly establishing a water supply, which may necessitate forward laying a supply line. It is not safe or practical to jockey the quint around to position the aerial device with a supply line hanging off the back. Purchasing committees should be aware of operational differences when running a small quint first due in place of an engine.

ATTACK HOSE (1½-, 1¾-, or 2-inch)

NFPA 1901 requires two storage areas of 3½ cubic feet each for preconnected attack hose and a minimum of 400 feet of hose carried. The ISO requires 400 feet of attack hose, plus 200 feet of booster hose; however, 200 feet of preconnected attack hose can be substituted for the booster. Multiple preconnects are commonplace; many suburban companies carry more than a half dozen, including multiple attack and backup lines, blitz lines with portable monitors, short supply lines for standpipes or with leader line wyes, and even *long* lines.

The flexibility in choosing multiple sizes, lengths, and task-oriented preconnects is *not* an option with the 75-foot quints—there isn't enough room. Discounting the safety aspect of having hoselines pulled off and hanging over the pump operator's head, there are only so many crosslays that can physically fit over a midship pump house. Electric cord reels, generators, long-handled tool storage, the hydraulic oil tank for the aerial device, and a myriad of other stuff may also be in the way. Front bumpers can handle a couple of preconnects, provided the angle of approach and wall-to-wall turning radius are not compromised. Urban and metropolitan companies carry large amounts of nonpreconnected hose; consequently, storage for extra hose is another concern. The 75-foot quint with limited preconnects and only 1,000 feet of supply hose may not have the room. How do you extend lines or stretch two 200-foot lines of 2½-inch—one around each side of a building? Do you wait for the next-due company?

Again, lettering your quint "Engine Company" does not guarantee the *same level of performance* traditional engines provide. As an engine company, it might be ISO and NFPA compliant, but will it really work well? The 75-foot quint, carrying less hose, offers fewer options—fireground flexibility is lost.

COMPARTMENTATION

Small quints have large pumper bodies into which manufacturers, at the request of customers, cram in as much as possible without overloading axles. Most have 140 to 160 cubic feet of enclosed equipment compartments, far exceeding the NFPA requirement of 40 cubic feet (which also applies to engines and ladder trucks).

If planning to carry all the equipment normally carried on an engine and a ladder truck, plan well. Everything may not fit in one oversized pumper body. Granted, some equipment is duplicated and may not be required. To determine compartment acceptability, have a manufacturer back a demonstrator quint into your quarters between the pumper and ladder truck you want to replace or combine. Load the 75-foot quint with the equipment you *must* carry; then attempt to load what you *want* to carry. Then decide what equipment you may have to *leave behind*.

Pierce and Ferrara state 90 percent of their quints have generators; KME confirms their popularity. Crimson, Smeal, and Rosenbauer note that PTO/hydraulic onboard generators are popular, since they are compact, lightweight, and sensible for quint applications. Some 75-foot quints are equipped with hydraulic auto extrication equipment. What necessary ladder or engine company equipment was omitted to accommodate the auto extrication equipment? How much does the equipment weigh? Does it impact axle weights? Responding with a limited amount of ancillary equipment can be equally as dangerous as running with inadequate staffing.

STAFFING

Mixing topics of staffing and quints incites biased and emotional opinions from career and volunteer personnel. Regardless of whether deployed in a career, volunteer, or combination department, quints do not extinguish fires. Nor do engines, ladders, or squads. *Firefighters* put out fires. If there are not enough of them responding on or with the apparatus, jobs will not get done efficiently—if at all. For simplicity, only the firefighters riding on the rigs are addressed—regardless of their vocation.

With four people per apparatus, a response from a station housing an engine and a ladder company provide eight firefighters on location ready to work with all the equipment normally carried on each piece. Responding a little quint with only six seating positions, you arrive with 25 percent fewer firefighters—even when running *fully staffed*. Respond with five, and you have 38 percent less. Respond with just four people, and you have 50 percent less personnel. This all occurs before the alarm rings and the doors open.

Regardless of the financial benefits of combining companies, running with fewer people is inefficient and means less work can get done. The quint's crew, responding first due, will have its hands full until help arrives. Do we ventilate? Do we limit search and rescue? Can we effectively advance the first line? Can we afford to lose someone at the hydrant—even temporarily when laying in? Can we afford an aerial operator and pump operator at the same time? Running shorthanded and trying to accomplish multiple tasks can be an invitation to disaster and injury.

AWARENESS

Declining numbers of volunteers and shrinking budgets in career sectors are forcing companies to consolidate or close and fire departments to merge. Multifunction apparatus are the standard today. Automatic mutual aid is commonplace for specific apparatus and personnel as departments struggle to accomplish more with less.

Small quints will never accomplish what fully equipped ISO-rated ladder trucks accomplish with 100-percent efficiency; nor can they achieve the same results as fully equipped engines. It is not physically possible to carry enough equipment and people. Bill Peters, a known industry expert and author in fire apparatus specifications and purchasing, refers to the small quint as a good Swiss Army knife. "It does a lot of things, but none of them really well. Sometimes a 75-foot quint is perfect for an outlying area where the arrival of an [ISO-rated] aerial might be delayed."

The small quint's merits cannot be ignored. Shorter and, in most cases, more maneuverable than full-sized ladder trucks, it may fit into places where its larger counterparts cannot. Prior to a designated ladder company's arrival, a first-arriving quint could make rescues from upper floors. It has an elevated waterway, and, according

to Ann Stawski, Oshkosh's vice-president of marketing communications, "[Pierce] has found departments are looking for apparatus that have front-line capabilities with the ability to have an elevated master stream with some ladder rescue capabilities."

The 75-foot quint has those attributes. Being acceptable to many, it has rightfully earned a place in the front row. Someday, the quint may evolve into a two-piece company similar to the ladder/tender concept in the Southwest United States. A tender carrying all the *stuff* that can't fit on the quint could possibly handle EMS and service calls while keeping the primary rig in service, albeit with a limited crew.

As long as the authority having jurisdiction, department officers, and the firefighters riding the load are aware of its limitations as well as its merits, the quint can be, as it has been in the past and will continue to be in the future, a good resource tool. It is no different than an ax, a nozzle, or an SCBA. If used properly within its operating parameters, the quint will continue to do good service. The solution is awareness of those parameters.

BILL ADAMS, a 40-year veteran of the fire service, is a former fire apparatus salesman. He is a past chief of the East Rochester (NY) Fire Department.