InDetail:

InDetail highlights relevant technical information on topics of interest to the fire service.

The objectives of **InDetail** are to

- enhance the understanding of fire protection, fire prevention, and life safety principles;
- promote the use of established and state-of-the-art technology to enhance public fire safety;
- raise awareness with respect to ongoing fire research and code development.

Topics will be selected based on various factors, including, requests for information/ clarification from the fire service, OFM staff perception of fire service needs, new developments in the fire safety and fire protection fields, new OFC and OBC requirements, current OFM research, and OFM evaluation of products.

We hope to take what are sometimes fairly complex technical issues and present them in an easy to read and interesting format that will benefit the fire service. Your input is welcomed, and encouraged. Please direct your comments to the Editor. They will be passed on to the Applied Research section for appropriate action.

Dry fire hydrants for suburban and rural firefighting

By Bob Miner

A dry fire hydrant is simply a standpipe arrangement of steel or plastic tubing piping, with fire hose fittings. The pipe connects to a static source of water. There is no water pressure within the 'dry' pipe.

A fire pumper truck must connect to the standpipe to prime the dry hydrant. It then pumps water through the piping arrangement into fire hoses under pressure.

Insurers' Advisory Organization/Fire Underwriters Survey (IAO/FUS) recognize the dry hydrant as a creditable source of water for fire fighting purposes. They must be municipally installed and maintained as provided in NFPA 1142 'Water Supplies for Suburban and Rural Fire Fighting'.

Arranged properly and strategically, the dry fire hydrant can be a time efficient, cost effective and beneficial firefighting tool available all year round. It requires less effort and time to safely position and connect a pumper fire truck to a dry hydrant than connecting several large hoses into a source of water that may be covered with ice.

This has a positive impact on Municipal Fire Insurance Classifications. Homes within 1,000 feet of any IAO/FUS recognized hydrant of 200 IGPM, whether pressured or a dry hydrant, can result in insurance rate reductions.

If used in conjunction with IAO/FUS recognized water tanker shuttle, many insurance companies allow discounts to homes which are over the 300 metres (1,000 feet) but within eight kilometres (five miles) *[NOTE – most insurance companies allow up to 14 kilometres or eight miles]* of the first responding fire hall.

The infrastructures of most communities suffer some deficiencies. With respect to water delivery, they range from: lines too small, incrustation restricted lines, more users than originally intended, to greater water consumption per household than originally planned.

Firefighters can utilize dry hydrants in conjunction with a multitude of other static water sources throughout a fire area, in addition to pressurized hydrants.

Other sources of static (not pressurized) water fall into two categories:

- Natural: rivers, lakes, ponds, ditches and creeks.
- Man made: dug ponds, wells, swimming pools, cisterns and special fire water reservoir.

There are many areas in Canada where dry hydrants could be extremely useful in providing fire protection. Considerations include:

- Special fire reservoirs – water levels could be automatically maintained from municipal water supply systems. Although they cannot produce sufficient volume to fight a fire, over time they can fill, supply and maintain a reservoir with lesser volumes, through 'one way' valves to prevent stored water from returning to the public water system.
- All must be equipped with dry hydrants and quick connections, with year round accessibility at the side of the road.
- Different types of risks and exposures require different 'fire flow' rates of water for fire suppression

as per IAO/FUS criteria to obtain the lowest fire insurance rating:

- Single-family dwellings require a minimum accessible total volume of water must be 114,400 litres (25,000 IPG) or 900 litres (200 IPG) per minute for at least a two-hour period.
- Commercial risks and structures may require double or triple that volume per minute for at least a two-hour period.
- Industrial risks and structures could require 13,500 litres (3,000 IPG) per minute (again, more may be required), which results in 1,620,000 litres (360,000 IPG) being needed over two hours.

The vehicle fog pile up and fire disaster on the 401 highway in 2000 illustrated another possible use for dry hydrants. For almost every overpass a large man made water pond is produced from the excavation. Expenditure of $600 to $2,000 for materials for a dry hydrant at these ponds could mean that water could be readily available for fire suppression or control for the 401 and/or the local area.

Dry hydrants are not exclusively useful to rural areas. One of the best utilization of dry hydrants in an urban area is in the Town of LaSalle, with a fire department under the direction of Fire Chief Pat Kelly – telephone 519-966-0744.

LaSalle is one of seven municipalities comprising Essex County. The town is situated directly abutting the southern border of Windsor, with the Detroit River on it west side. Several creeks flow through the Town into the Detroit River.

Under Chief Kelly's direction, Lasalle had 14 dry hydrants (with more to come) installed. All are IAO/FUS tested to supply 4,500 litres (1,000 IPG) per minute at the hydrant and at any point along their 3,000 feet of four inch high-volume hose.

Each dry hydrant is strategically positioned:

- At bridges directly accessible from the road
- Along the Detroit River at large condominium complexes
- Several marinas have installed dry hydrants
- Three dry hydrants within a large ship construction and repair yard can supply 13,500 litres (3,000 IPG) per minute until the Detroit River runs dry.

LaSalle's dry hydrants consist of:

- A six inch #40 plastic ordinary underground PVC plastic piping (heavier thickness is optional) is used for the riser and horizontal lines.
- A standpipe riser is right angle connected 24 inches below the frost line, to a horizontal pipe extending between 3 and 150 feet into the water. This ensures the desired volume of water is available at the intake, with the pumper truck always on stable ground.
- The right angle and horizontal pipe are 24 inches under the frost line and below the ice.
- The end of the pipe with its strainer etc. is permanently fixed to remain 24 inches off the bottom of the creek or river.
- Costs ranged between $600 and $1,000 for materials for each dry hydrant.

WATER PRESSURE: A Dry Fire Hydrant*

LaSalle uses a unique system to prevent water from freezing in the vertical standpipes while not in use.

The dry hydrants have a cap that pressure seals the hydrant – the cap is equipped with an ordinary car tire/tube air valve through which air is injected under pressure. Since the bottom of the vertical pipe is 24 inches under frost line, the water retains a constantly trapped air chamber within the vertical riser, well below the frost line.

The first group of dry hydrants have been in use since 1997 and were IAO/FUS checked and certified in 1998. Each dry hydrant is draft pumped and volume flow metre checked twice a year. There has been no volume reduction or failure since they were installed.

The trapped air pressure is checked regularly by injecting air into the riser until air bubbles up from the intake end.

IAO/FUS recognition of a dry hydrant as a 'complete recognized source of water' requires a 'designated IAO/FUS recognized pumper' to pump from the dry hydrant.

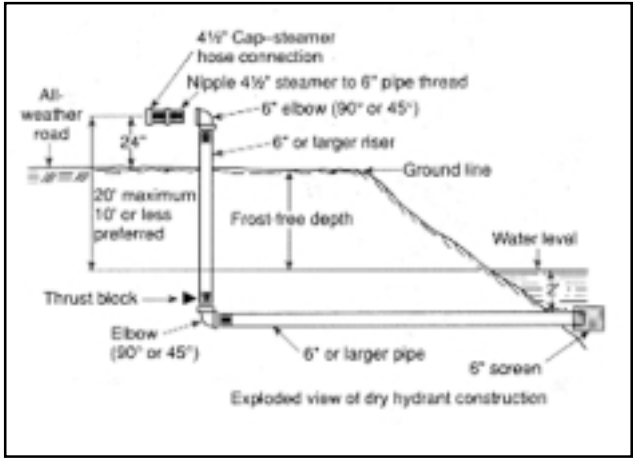
To get dry hydrant recognition over 1,000 feet requires

a ‘designated IAO/FUS recognized pumper’ at the dry hydrant as well as the pumper at the fire, utilizing an IAO/FUS recognized water tanker shuttle service program.

Dry fire hydrants have the potential of being one of the most effective suppression tools a firefighter can use. They utilize one of Canada’s most abundant natural resources - lakes and rivers - for firefighters to use at a moment’s notice. Not only does it bring high volumes of fire suppression water much closer to citizens and firefighters in rural areas but it can be done for a minimal cost.

Bring your fires closer to the water – install dry fire hydrants.

Bob Miner is a retired Deputy Fire Chief, Comber and District Fire Department. Mr. Miner has 42 years as a volunteer fire fighter, 25 years as Deputy Fire Chief and 30 years as an Independent Insurance Broker. He is a strong proponent for increased use of dry hydrants and has been closely involved in several Water Shuttle Programs.



CROSS-SECTION: Dry fire hydrant construction using iron, steel or PVC pipe.*

*Illustrations used with permission from the NFPA. NFPA 1231 1993 Edition Standard on Water Supplies for Suburban and Rural Fire Fighting Copyright © 1993 NFPA, All Rights Reserved.