

# Fire protection hydraulics and water supply

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What factors should be considered when implementing relay operations

Relay operations is a pumping technique used to tackle insufficient fire ground water supply. Factors influencing the implementation of relay operations are grouped in phases like design, setup and shutdown of relay operations.

Relay operations design

Some of the factors influencing relay operations design are

Amount of water to flow and available water at the supply

Availability of number of pumps and their size

Availability of hose at the desired size and height

Evaluate highest operating pressure of the hose for calculating the flow and friction loss.

Distance from the source to the incident as intensity of pumping will depend on the distance,

Relationship between flow and pressure to determine the quantity of water to be pumped..

Maximum rated capacity of the pumps based on numbers and availability.

Setting up relay operations

Source Engine

Position the source engine with a largest pump of water in order to supply water and higher discharge pressure and lay the hose to relay engine.

Relay Engine

Use the dump line to allow water flow from source engine till the discharge of all the air from supply line and engage pump by adjusting throttle.

Continue to dump water through overboard discharge by setting the desired

pressure for the pump and discharge water supply.

#### Attack Engine

The operator opens bleeder valve in order to exhaust air in supply lines and relay water supply is established once the intake valve is opened. Overboard discharge is required to release excess pressure after shut down and pump throttle can be deployed for better supply.

#### Shutting down operations

Throttle pump down and disengage by opening the overboard discharge.

#### Limitations of relay operations

Total flow of water must not exceed the rated flow of the source engine.

Pumped pressure must not exceed the hose test pressure.

#### References

IFSTA, Water Supplies for Fire Protection, 4th Edition, Chapter 6

Fire Fighting Apparatus and Procedures, Glencoe Press, 3rd Edition, pp. 287-315