EXTERNAL FIRE-FIGHTING SYSTEMS

Condrate MESESAN 1
Rares-Dan MESESAN 2
Alecu TOMA 3

1 Invited Lecturer, Master Mariner, Naval Academy, Constanta
2 Chief Officer on Offshore Vessels, PhD student in Maritime Law
3 Lecturer, Naval Academy, Constanta

Abstract: The offshore industry is considered a field “on steroids” for its fast expansion, largely owed to the ever increasing mankind need of oil and gas. This commercial pressure experience by naval sector has led to shortcuts in the safety of the operations undertaken, thus the recent accidents encountered (i.e. BP Platform in Gulf of Mexico). One major component is the human capital invested and retained within the maritime industry. Present paper – project’s aim is to refresh professionals about a crucial system found on board offshore vessels: the external fire fighting systems (Fi-Fi System). Many operators are still in doubt about the correct usage, start-up procedure and monitoring its efficiency. An emergency is not the time for uncertainty, as the situation can escalate from delicate to critical in a short period of time and everyone must be crystal clear on how machinery and equipment works.

Keywords: External Fire-Fighting (Fi-Fi) Systems, Fi-Fi Class Notations, Start-Up Procedure, General Procedure under Operation.

INTRODUCTION

Fire is a phenomenon with which everyone is familiar. We use it daily to heat our homes and cook our meals. When harnessed, the power and energy from fire serves us well; however, when it is uncontrolled, a fire can quickly consume and destroy whatever lies in its path.

While we are all familiar with fire, few of us are aware of its nature and complex processes.1 On the high seas there is a paradox: even if a vessel is surrounded by a large amount of water, if the fire-fighting operations are inefficient (i.e. too slow reaction time, ineffective communication, poor crew performance, wrong extinguishing agent etc.) the fire can spread rapidly and become uncontrollable, thus leading to fatalities, injuries, property damage and environmental pollution.

THE EXTERNAL FIREFIGHTING SYSTEM (FI-FI SYSTEM)

The external firefighting system (Fi-Fi system), is a system that is fully integrated with the vessel. The power source is very often the main engine which utilizes the vacant power through a power-take-off (PTO) during station keeping and maneuvering during firefighting operations. The power is transferred to the pumps via remote operated clutch and necessary transmission.

On ships with no vacant power available, a dedicated diesel driver or electrical or hydraulic driver may be used to avoid impact from ships operation to the Fi-Fi system. The pumps are normally located in the engine room below water line for best possible performance via suction line design. They deliver water to the discharge pipe which supplies the monitor on top of the bridge or similar position. The water jet is created in the monitor outlet by pressing water at optimum speed through the special designed monitor nozzle. A foam mixture can be pressed out through the monitor to extinguish chemical and or high hazardous fires.2

The reaction force must be compensated by the vessel propulsion and maneuvering system for station keeping. The system may also include self-protection deluge system (Water Spray) with water taken from the Fi-Fi pumps and / or various types of foam systems / additional pumps onboard.3

It is important to have the complete system operation in mind during design process for optimum performance at minimum power consumption and equipment cost.

1 See: ABS GUIDANCE NOTES ON FIRE-FIGHTING SYSTEMS, MAY 2005 (Updated February 2014)
2 See: www.novenco-ff.com/Files/Billeder/PDF/Brochures/FiFi_spread.pdf
3 See: www.academia.edu/506443/Marine_info_19_THE_EXTERNAL_FIRE_FIGHTING_SYSTEM_FI-FI.SYSTEM_

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Non-classed Fi-Fi vessels (Fi-Fi 0)

Any type of vessel with an external Fi-Fi system but without any formal classification will be covered under this heading. Normally capacities between 300m3/h and up to Fi-Fi I (2400m3/h) are used. Fire water for the monitors may be supplied by one ore more fire pumps, driven by dedicated diesel engines, PTO gearboxes or electrically driven pumps. The monitors can be either remote controlled (recommended) or manual.

Fi-Fi I

Figure 1: Basic layout of Fi-Fi System

1See: ABS GUIDANCE NOTES ON FIRE-FIGHTING SYSTEMS, MAY 2005 (Updated February 2014)
2 See: www.novenco-ff.com/Files/Billeder/PDF/Brochures/FiFi_spread.pdf
3 See: www.academia.edu/506443/Marine_info_19_THE_EXTERNAL_FIRE_FIGHTING_SYSTEM_FI-FI_SYSTEM_

4 See: www.aksismak.com.tr/fifisystems.htm
The class notation Fi-Fi I means that the vessel is to be equipped with minimum 2 fire monitors, able to throw water to a minimum distance of 120 meters from the vessel and to a height of minimum 45 meters. The monitors are to be remote controlled from the wheelhouse. Since the fire pumps and related equipment are located in the engine room these are also normally remote controlled. Fi-Fi I Systems are normally installed on Escort tugs, Fire fighting vessels etc.

Fi-Fi II

The class notation Fi-Fi II means that the vessel is to be equipped with minimum 2 fire monitors, (DNV rules) able to throw water to a minimum distance of 180 meters from the vessel and to a height of minimum 110 meters, or if other classification for the vessel (i.e. LRS, ABS, R.I.N.A, BV, GL etc), the vessel is to be equipped with 3 or 4 fire monitors, able to throw water to a minimum distance of 150 meters from the vessel and to a height of minimum 70 meters.

Whatever configuration is chosen for the Fi-Fi II vessel the total water capacity shall be not less than 7200 m3/h. The monitors are to be remote controlled from the wheelhouse. Since the fire pumps and related equipment are located in the engine room these are also normally remote controlled. Fi-Fi II Systems are normally installed on offshore vessels like Anchor-handling tug/supply vessels, or other specialized vessels.

Fi-Fi III

The class notation Fi-Fi III means that the vessel is to be equipped with minimum 3 fire monitors, (DNV rules) able to throw water to a minimum distance of 180 meters from the vessel and to a height of minimum 110 meters, or if other classification for the vessel (i.e. LRS, ABS, R.I.N.A, BV, GL etc), the vessel is to be equipped with 4 fire monitors, able to throw water to a minimum distance of 150 meters from the vessel and to a height of minimum 70 meters.

Whatever configuration is chosen for the Fi-Fi II vessel the total water capacity shall be not less than 9600 m3/h. The monitors are to be remote controlled from the wheelhouse. Since the fire pumps and related equipment are located in the engine room these are also normally remote controlled. Fi-Fi III Systems are not so common, but are normally installed on larger offshore vessels, or other specialized vessels.

Table 1: Fi-Fi Classification

<table>
<thead>
<tr>
<th>Class Notation</th>
<th>Fi-Fi I</th>
<th>Fi-Fi II</th>
<th>Fi-Fi III</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Monitors</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Monitor capacity (m3/h)</td>
<td>1200</td>
<td>3600</td>
<td>2400</td>
</tr>
<tr>
<td>No. of Pumps</td>
<td>1-2</td>
<td>2-4</td>
<td>2-4</td>
</tr>
<tr>
<td>Total pump capacity (m3/h)</td>
<td>2400</td>
<td>7200</td>
<td>9600</td>
</tr>
<tr>
<td>Throw length (m)</td>
<td>120</td>
<td>180 (from bow)</td>
<td>150</td>
</tr>
<tr>
<td>Throw height (m)</td>
<td>45</td>
<td>110 at 70m</td>
<td>70</td>
</tr>
</tbody>
</table>

START-UP PROCEDURE

Operations necessary to protect the monitors and to operate them in a safe manner contained in this start-up procedure:
1. Remove monitor-parking supports.
2. Switch on the main control panel.
3. Test the monitors for correct movement in all directions together with the correct operation of any remote deflectors and valves.
4. If the system and ALL monitors are operation correctly, point each of the monitors’ nozzles towards a safe area.

NOTE! Personal injury or damage to the vessel can result if a valve is opened incorrectly or by accident.

5. Open the pump suction (sea chest) valve together with valves in the by-pass line around the pump discharge valve.
6. Check that the pump discharge valve is closed.
7. Open the monitor stop valves.
8. Start the pump against a closed discharge valve.

Water will now flow through the by-pass line and fill up the main pipeline to the monitor

GENERAL PROCEDURE UNDER OPERATION

SAFETY: Due to the possibility of personal injury or damage to property, the monitors and the area on which they are trained must be held under constant supervision.

The following procedure should be regarded as the minimum requirements for continuous operation:
1. Continuously observe the water jet target area and adjust the monitor as necessary.
4. Check the water pipe system for leakage in the Engine-Room or Pump-Room. These compartments have been flooded due to leakage in the pipe system!

5. If no problems are encountered with the system in the first 24 hours the observation intervals can be extended. During operation never direct the water jet directly to other vessels, structures or personnel escape ways without first making sure that all personnel have been evacuated. The jet should never be directed towards live electrical installations. Note: The impact force of the jet can reach 1 ton.

REFERENCES
1. ABS GUIDANCE NOTES ON FIRE-FIGHTING SYSTEMS, MAY 2005 (Updated February 2014)
2. www.novenco-ff.com/Files/Bilderen/PDF/Brochures/FiFi_spread.pdf
3. www.academia.edu/506443/Marine_info_19_THE_EXTERNAL_FIRE_FIGHTING_SYSTEM_FI-FI_SYSTEM