CHAPTER ONE

INTRODUCTION

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1.1. Preface

Unfortunately, tragic lessons were learnt from recent building and structural fires. The aftermath was devastating, resulting in the damage to assets and loss of lives. Fires in a building with inadequate fire protection features can present severe problems and create complexity in a fire fighting operation. This inevitably causes deficiency in the protection of occupants and contains from fire and smoke during the egress or evacuation.

The fire professionals, consultants and contractors have been adopting mostly on standards from the NFPA (National Fire Protection Association) with regards to the life safety design, building construction, fire protection, firefighting, fire alarm and smoke ventilation systems. This thesis will analyze different three firefighting systems depend on the agent that use to fight the fire, these systems are; wet sprinkler system, FM-200 agent system and CO2 agent system.

1.2. Problem Definition

Through firefighting system design, companies are differ on applying, the following parameters:

. Fluid sciences

. Pipes diameter, length and material.

. Cost saving.

This thesis will describe the appropriate implementation of the parameters above.

1.2. Purpose of the Thesis

Fire is the main hazard that is enough to cause a huge damage, so fire safety is a system attends wide scope in engineering field. Fire safety could be implemented by

• PREVENTION: Make sure fires don't start

• PRECAUTIONS: Minimize the damage from fire

• PROCEDURES: Action to take in the event of fire

So a fire fighting system is to consider the mentioned aims very effectively. For these considerations study of fighting system is very important. The main objectives of this research are:

• Study firefighting system design principles.
• Firefighting network classification.
• Designing firefighting system of deferent cases.

1.3. Scope

Design of firefighting systems using wet sprinkler, FM-200 agent and CO2 agent and analyze the results.

1.4. Methodology

Using NFPA, the thesis will focus on designing three types of firefighting according to fluid used such as: sprinkler systems, CO2 and FM-200.

1.5. Literature Review

There are so many studies in firefighting, some engineers designed samples of firefighting systems.

In 2006 model of sprinkler system was designed by engineer Tamer A. Ghbai, a wet riser sprinkler selected using tree network to complete design including the hydraulic calculation that required to the sprinkler network [1]

In March 2010 Ahmed M.Sami represent a project of sprinkler system using NFPA13, the calculation of the system expressed using the Elite for Firefighting Calculation program, the system was designed by Gulf Consulting Group in Doha [2]

1.6. Outline of the Thesis

Chapter 1 provides introduction and aims of the thesis. Chapter2 provides background about fire safety, main principles of firefighting systems,

Chapter 3 provides sprinkler systems, and Fm-200 agent system. Complete design of different three systems is described in chapter 4, using manual and software calculation and simulation for the design, this chapter also shows the results and analysis of the systems. Chapter 5 contains the most important conclusions gleaned from the project and recommendation.