CHAPTER 1

INTRODUCTION

1.1 Introduction

In new era technology, cold-formed steel is widely used in various fields. The use of cold-formed steel not only focuses on building construction, its use was expanded to other areas. Cold-formed steel is commonly used in automobiles, furniture, equipment, storage rack, utility poles, drainage facilities, highway product and bridges. It popularity can be accredit to lightness in weight, uniformly quality, economy in transportation and handling, high strength and stiffness, and non-shrinking and non-creeping at ambient temperatures.

Cold-formed steel is made from steel plate, sheet or strip materials. These plates are fed through press-braking or cold-roll forming, where the shaped based on the requirements of specification. The cold-formed steel is formed in variety shape such as C-section, U-section, Z-section and even hat-shaped sections. Furthermore, press-braking is used to design simple shape in small quantities. Steel and metal building is made using cold-roll forming. C, Z and hat section also made by cold roll forming as shown in Figure 1.1.

Cold-formed steel can be divided into two major categories type:

i. Individual structural framing members
ii. Panels and decks

C-section, Z-section, I-section, T-section, hat-section and tubular section is classified as individual structural framing members. The main function of this type is to carry structural strength, load and stiffness in the design. Generally, individual structural framing members are used in building construction, transmission pole, steel plate structure and highway sign support structure as show in Figure 1.2.

Panels and deck are generally used for floor deck, wall panel, roof decks and others. The design on this cold formed not only to carry loads, the electrical conduits space also provided.

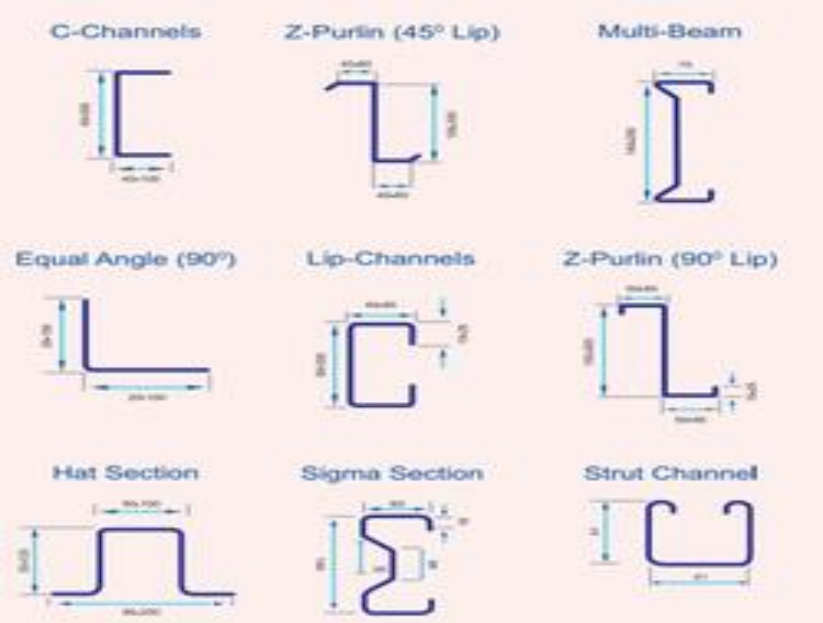

Figure 1.1 Type of cold-formed section

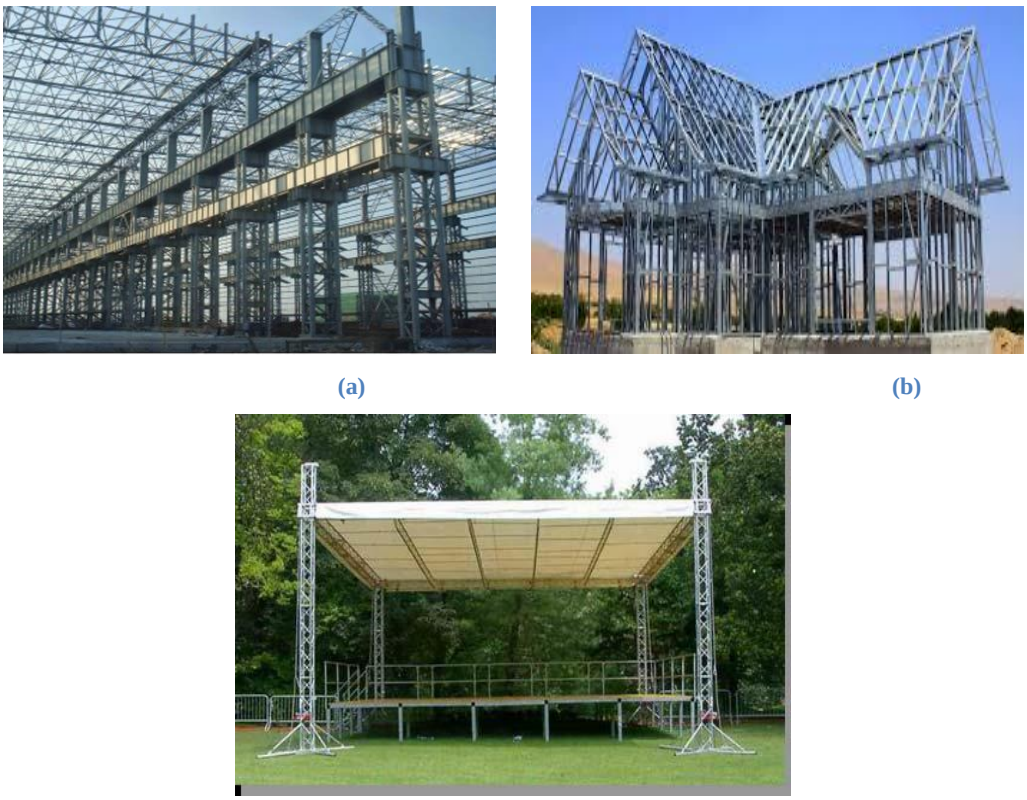

Figure 1.2 Type of light weight structure. a) industry building b) housing c) temporary structure

Source: Landolfo (2008)

Stiffened is a members which is supported by webs along both its longitudinal edge. Almost all main bridge beam have stiffeners. The function of stiffeners is to controlling local buckling and connecting bracing. Stiffeners can divided in two type of principles:

i. Longitudinal web stiffeners
ii. Transverse stiffeners.

In the past, research on web-stiffened channels mainly focused on those with simple edge stiffeners (Yap et. al., 2011). Complex edge stiffeners which consist of multiple fold sat the free edge can improve the stability and enhance the strength of these members (Scahfer et. al., 2006). Buckling stress of the elements can be remarkably increased by intermediated stiffeners, because the element width-to-thickness ration was reduced effectively (Wang et. al., 2015)