COMPARATIVE STUDY ON BEHAVIOUR OF COLD-FORMED PURLIN SECTION-REVIEW PAPER

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Abstract - *An analytical study was conducted on cold and hot formed steel section of different forms under the elastic parameters such as load carrying capacity and deflection for various section. The results are used to compare the effectiveness and feasibility of various cold and hot formed steel section.*

Key Words: Cold-formed steel section, Hot-formed steel section, Load carrying capacity and Deflection

1.INTRODUCTION

Steel structures has two primary member types they are hot rolled steel members and cold formed steel members. The hot rolled steel members are formed at elevated temperatures whereas the cold formed steel members are formed at room temperatures. Till today, the role of hot rolled steel members have been recognized as the most popular and used widely , but in the modern days the use of cold formed high strength steel members has been rapidly increased. When a steel section cold- formed members from the flat sheet or strip found to have more yield strength, and a lesser extent increase in the ultimate strength, particularly in the bends of the section.Cold formed steel members are widely used in bridges, buildings, storage racks, car bodies, railway coaches and agricultural equipment. Cold formed steel is thinner than hot rolled steel.

2.LITERATURE REVIEW

Chong Ren a, Long-yuan Li b, Jian Yang

In this paper they have studied about the analytical model to describe the bending and twisting behavior of the channel-section purlins when subjected to an external loading Cold-formed steel section beams are widely used as the secondary structural members in buildings to support roof and side cladding or sheeting. These members are thus commonly treated as the restrained beams either fully or partially in its lateral and rotational directions. Formulae used to calculate the bending stresses of the roof purlins are derived by using the classical bending theory of thin-walled beams. Detailed comparisons are made between the present model and the simplified model proposed in Eurocodes (EN1993-1-3). To validate the accuracy of the present model, both available experimental data and finite element analysis results are used.

Mohammad Reza Haidarali, David A.Nethercot

In this paper bending tests carried out by previous researchers have been used two series of finite element models for buckling behavior of laterally-restrained cold-formed steel Z section beams have been developed with special reference to material and geometrical non linearities The finite element(FE)method is capable of solving the complex interactive buckling of cold-formed steel beams allowing for all important governing features such as geometrical imperfections, material nonlinearity, post buckling, etc. this is unlikely to be achieved by analytical methods. Predictions of load carrying capacity and deformed shapes exhibit excellent agreement with both the results from the more extensive models and laboratory tests.

M. Anbarasu

In this paper they have dealt with the ultimate strength, post-buckling behavior and design of cold-formed steel lipped channel beams affected by local-distortional buckling mode interaction, subjected to uniform bending of the major axis.. The beams are analysed underpinned with warping free end conditions. 12 sections were selected for this analysis.. The selected sections satisfy the geometric limitations for pre-qualified sections in AISI- S100:2007. The results were compared with corresponding results from the experiments available in the literature. Based on the comparison of ultimate strengths obtained from the finite element analysis and Direct Strength Method(DSM), an equation is proposed for lipped channel sections which have their elastic local and distortional buckling moments nearly equal.

Pratibha Surendra Dhole, Prof. Vijaykumar Bhusare

In this paper torsional behaviour of the cold form steel is studied. The use of the cold form steel section in the building sectors is growing in day to day life. As they can be used as the individual members and are applicable in any size and shape. These shapes are open in nature they are designed with the consideration of the beam loading but at times it undergoes the torque as the shear centre and the centroid do not intersect.. The effect of the eccentric loading is studied on the beam designed as the flexural member.

Sudhir Sastry Y B

In this paper the flexure behaviour of the cold form steel is studied. The use of the cold form steel section in the building sectors is growing in day to day life. As they can be used as the individual members and are applicable in any size and shape. These shapes are open in nature they are designed with the consideration of the beam loading but at times it undergoes the torque as the shear centre and the centroid do not intersect.. The effect of the eccentric loading is studied on the beam designed as the flexural member. For the study the channel section is considered with the different stiffener.

Gotluru et al

In this paper they have studied the behavior of cold formed steel beams having open sections, which were subjected to torsion. They focused only on beams subjected to bending and torsion. They conducted a series of experimental study on C-sections and compared the results with simple geometric analysis, finite element analysis and finite strip analysis results. They observed that when the unbraced thin walled beams were subjected to transverse loads applied away from the shear centre, lateral buckling of beams did not occur suddenly but took place by displacing horizontally and by 12 rotating gradually. They also reported that the serviceability limit state might be more critical than the strength limit state and that warping restraint at the ends depends on type of supports. They presented an expression to find partial restraint based on support condition in terms of warping spring stiffness. They also found that local buckling load decreased with the rotation of the beam and the lateral torsional buckling load increased.

Schifferaw & Schafer

In this paper they have studied the inelastic bending capacity in cold formed steel members. Generally, the inelastic bending Capacity is dealt mainly on Hot Rolled Steel Sections, whereas the authors made the first attempt to study the inelastic bending capacity of Cold Formed Steel sections and demonstrated that the inelastic reserve strength exists in common CFS beams from the experimental observations made over 500 specimens in flexure. They concluded that the demand for average strain in inelastic distortional buckling was much higher than in inelastic local buckling at an equivalent slenderness.

Yu & Schafer

In this paper they have analyzed the effect of longitudinal stress gradients on the elastic buckling of thin isotropic plates. They presented the influence of longitudinal stress gradient on stiffened and unstiffened elements under two different boundary conditions. They also presented a empirical formulas to calculate the buckling coefficient of plates with fixed and /or simple supports.

3. CONCLUSIONS

From the literature studied, Steel structures has two primary member types they are hot rolled steel members and cold formed steel members. The hot rolled steel members are formed at elevated temperatures whereas the cold formed steel members are formed at room temperatures it is inferred that study on Cold Formed Steel members is emerging today because of its inherent properties. The studies on closed and open section beam are still going on by adopting different forms of cross section. Very little literature is available on built up open cross section beams. Hence here an attempt is made to study the behaviour of latticed beam using Cold Formed Steel sections similar to hot rolled steel latticed beam. Cold formed steel members are widely used in bridges, buildings, storage racks, car bodies, railway coaches and agricultural equipment. Cold formed steel is thinner than hot rolled steel.

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