















### 3. Заключение

В ходе работы были изучены существующие на данный момент методики расчета сварных узлов из труб прямоугольного сечения и выявлены их достоинства и недостатки. На основании проведенного анализа можно сделать следующие выводы:

1. Главный недостаток расчета по методу линий разрушения Йохансена – пренебрежение конечной жесткостью сварных узлов. Нахождение жесткости узлов стало возможным с появлением компонентного метода.
2. Использование метода конечных элементов позволяет снизить трудоемкость и стоимость анализа поведения сварных узлов в зависимости от изменения большого количества параметров.
3. При помощи суррогатного моделирования также сокращается трудоемкость расчетов. В частности, данный метод является перспективным методом оптимизации строительных конструкций.
4. Содержащаяся в СП 294.1325800.2017 методика расчета сварных узлов не учитывает влияние изгибающего момента из плоскости конструкции. Зарубежные нормативные документы содержат четкие методики проектирования сварных узлов, учитывающие совместное действие на элементы продольной силы и изгибающих моментов в плоскости и из плоскости конструкции. Тем не менее, существует большое количество нерешенных проблем.
5. Обзор литературы показал, что на сегодняшний день проведено большое количество лабораторных испытаний сварных узлов из труб прямоугольного сечения, в том числе Т-образных. Большинство работ посвящены изучению поведения узлов, находящихся под действием осевой нагрузки, а также момента в плоскости конструкции, случай приложения изгибающего момента из плоскости узла изучен недостаточно.
6. Кроме того, существующие нормы регламентируют правила расчета лишь для узлов из обычных сталей – с пределом текучести до 355 МПа. На данный момент проведено малое количество исследований поведения сварных узлов из высокопрочных сталей (согласно EN 1993-1-8:2005 к ним относятся стали с пределом текучести от 460 МПа). По этой причине в методиках нормативных документов введены понижающие коэффициенты. Следствием этого является неэффективность использования в качестве материала конструкции высокопрочных сталей. Таким образом, существует необходимость дополнительного изучения сварных узлов из сталей высоких марок.

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## Resistance of welded RHS joints

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### Abstract

*Welded tubular structures are used in a wide range of trusses and frames. In the design of steel structures, Particular attention is paid to the design of joints. The article presents a literature review on the current design methods and rules for welded rectangular hollow section joints. The review discusses the advantages and disadvantages of the presented design methods. Moreover, attention is paid to the reduction coefficients for joints made of high strength steel, which does not allow to obtain all economic benefits from using high strength steels in the construction industry. In addition, there is still a lack of research on tubular joints under out-of-plane bending.*

Keywords:

welded joint, rectangular hollow section, design of joints, design methods, high strength steel

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