

Introduction

General

This program uses DNV-RP-C201, 2010 'Buckling strength of plated structures' to check the design of stiffened deck plate.

DNV-RP-C201 uses the input value of $p.S_d$ to calculate moments, $M1.S_d$ and $M2.S_d$, and shear, $V.S_d$, for verification. This program enables users to define $M1.S_d$, $M2.S_d$ and $V.S_d$ directly using one of the input methods

The user defined loads are calculated separately.

The direction of loading (plate side or stiffener side) is determined by the sign convention used.

Users definition of Se .

This can be used where there are restrictions on plate effective width caused by deck penetrations etc.. Note that this reduced width is used for the entire member length so it might be necessary to perform two analyses, checking locally at the reduced section and then elsewhere using the DNV derived value of Se .

Web loss

An allowance for loss of web depth can be made to allow for loss of web shear area at supports caused by sniping of the stiffener or fabrication cut-outs (rat holes) for ease of welding etc.

Input methods

1 As DNV-RP-C201.

Enter the plate in-plane stresses $\sigma_x.Sd$, $\sigma_{y1}.Sd$, $\sigma_{y2}.Sd$, and the face pressure $p.Sd$.

The program will use the value of $p.Sd$ to determine the moment and shear design loads ($M1.Sd$, $M2.Sd$, $V.Sd$) for verification.

2 User defined design loads

Enter the plate in-plane stresses $\sigma_x.Sd$, $\sigma_{y1}.Sd$ and $\sigma_{y2}.Sd$.

Calculate the design loads ($M1.Sd$, $M2.Sd$, $V.Sd$) and enter them as 'Defined loads'. Note that these should include any p_0 effects, see below.

The program will use the defined values for verification, ignoring any value of $p.Sd$ that may have been entered.

Plate compression p_0

When the plate is in compression from $\sigma_y.S_d$ an equivalent lateral pressure, p_0 , is generated which C201 adds to $p.S_d$ in (7.8).

This pressure produces an additional UDL of $p_0.S$ where S =stiffener centres.

When p_0 is not zero the values of $M_1.S_d$, $M_2.S_d$ and $V.S_d$ should include the loading from $p_0.S$.

Sign Convention

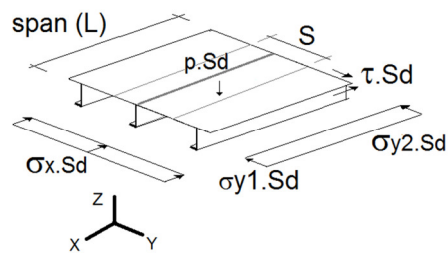
The program's sign convention is;

Plate in-plane principal stresses $\sigma_x.Sd$, $\sigma_y.Sd$; compression is positive

Plate shear stress $\tau.Sd$: The absolute value is used.

Plate normal stress ($p.Sd$); a positive value is in the -Z direction, a 'gravity' loads.

A positive value of $p.Sd$ is a plate side loading.



When defining loads directly the verification is carried out using plate or stiffener side loading according to the following sign convention of $M1.Sd$ and $M2.Sd$. These moments are plotted on the tension side of the stiffener.

Span type	C201	Defined moments	Plate side	Stiffener side
Both	+ve $p.Sd$	0	Y	
Both	-ve $p.Sd$	0		Y
Continuous		-ve $M1.Sd$	Y	
Continuous		+ve $M1.Sd$		Y
Simply supp.		+ve $M2.Sd$	Y	
Simply supp.		-ve $M2.Sd$		Y

This can also be represented by the bending moment diagrams shown below

