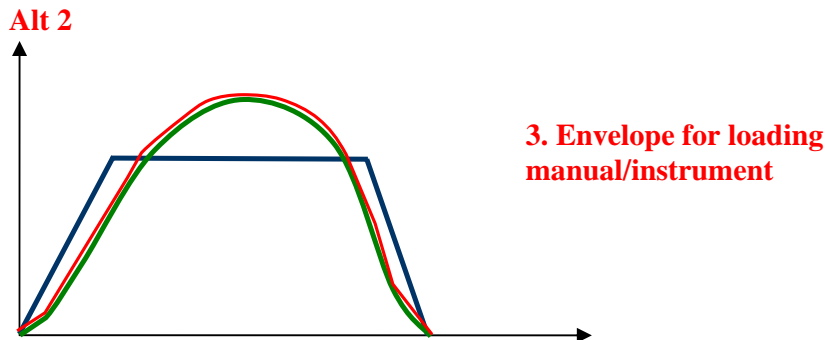
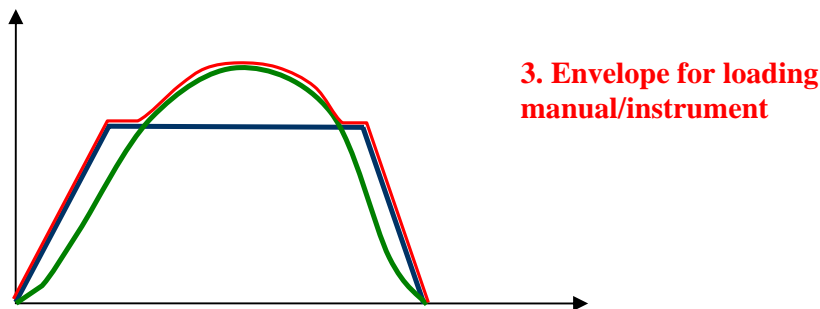
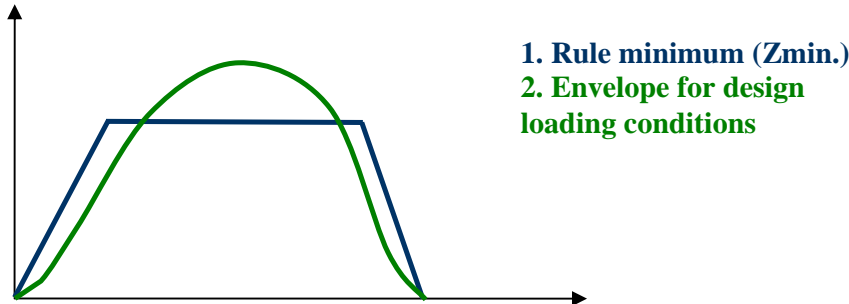


## Design still water bending moments in CSR Bulk rules.

Ch.4 Sec.3 [2.2.1] and [2.2.2] and Ch.5 Sec.1 [4.2.1], [4.2.2], [4.2.4] and [4.3.1]

We assume the following interpretation is valid for design bending moments in **intact** condition:



1(blue). Rule minimum Z (section modulus) is maintained within 0.4 L amidships according to Ch 5 Sec 1 [4.2.1] and [4.2.4]. Corresponding bending moments are given as preliminary design moments in Ch 4 Sec 3 [2.2.2].

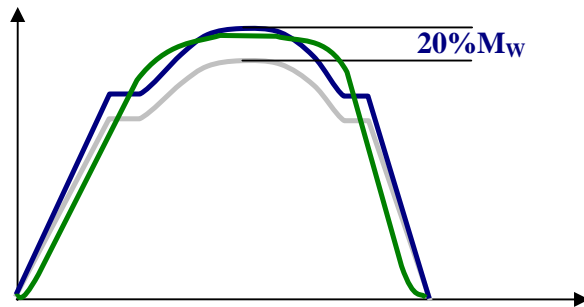
2(green). Envelope curve for all loading conditions in the loading manual. For some points this may exceed the rule minimum requirement (ref. Ch.4 Sec.3 [2.2.1] and Ch.5 Sec.1 [4.2.2] and [4.3.1]).

3(red). Envelope (permissible) curve for loading manual/instrument.

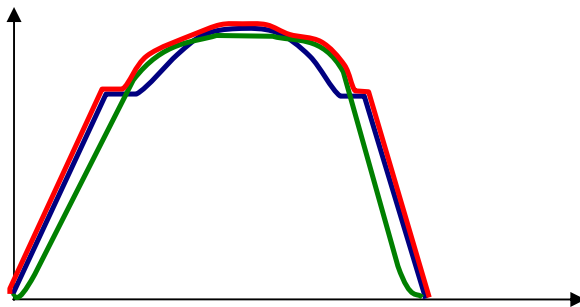
Q1: As long as the item 1 is satisfied, i.e., Rule min. Z is maintained within 0.4L amidships, could “Alt 2” below be used as Envelope for the loading manual/instrument? Could “Alt 2” be used for sig-x for local scantlings and for design bending moment for FEM calculation? Note that the red line may have an uneven distribution within 0.4L amidships and might be below rule minimum (item 1 above).

Q2: In this connection, please clarify if Ch.4 Sec.3 [2.2.2] is a minimum requirement within 0.4L amidships or just a guidance. If it is not a rule minimum, and in case the Envelope (line 2) is below Min. Z (line 1), hull girder capacity of min Z is not fully utilised by the design/permissible still water bending moments of the vessel. As far as we understand, this is given as a minimum requirement for design still water bending moment in the CSR-Tanker rules. Please clarify.

Q3: For the **flooding** condition, we assume the following relationship. We assume that the same principle also applies to harbour condition. Please confirm if our assumptions are correct.



1. Intact envelope
2. Intact envelope + 20% $M_{WV}$
3. Flooding envelope from flooding of design conditions



4. Envelope for loading manual/instrument

1. The intact bending moment based on above assumptions.
2. The Intact envelope + 20% $M_{VW}$
3. The envelope curves from flooding of design loading conditions. This curve exceed curve 2 for certain points.
4. Design limit for the flooding condition and envelope curve for loading manual/instrument.