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REVIEW OF MEASURES 465

Hot Rolled Structural Sections exported from South Korea
Meeting with Commission post-SEF

WEDNESDAY 22 AUGUST 2018



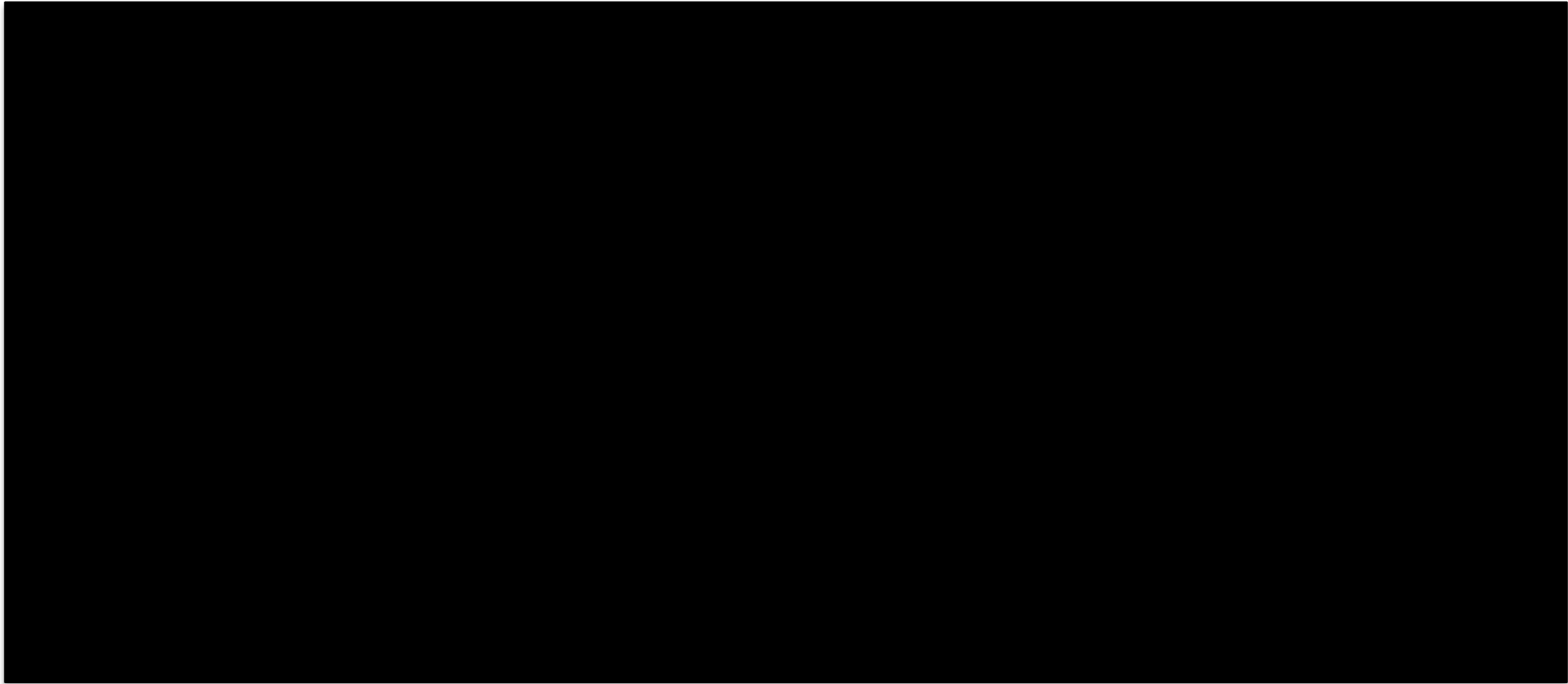
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INTRODUCTION :



AGENDA

- 1 Model Control Codes
- 2 Key structural section properties
- 3 Changes to the Korean Standards
- 4 Establishing the best model match
- 5 Form of measures



MODEL CONTROL CODES

ADN 2018/128 published 9 August 2018

“In cases where different models of the goods exist, it is necessary to select the domestically sold models that are most directly comparable to the particular models exported to Australia”

“The Commission will consider modifications to the MCC structure from the original investigation in subsequent reviews and continuations, where justified.”

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STRUCTURAL DESIGN USING HRS

KEY PROPERTIES IN STRUCTURAL DESIGN SELECTION (MCC)

- ▶ READILY WELDABLE IE. PRE-QUALIFIED (Standard requirements, not test certificate)
- ▶ STRENGTH – DESIGN TO YIELD STRENGTH (Standard requirements, not test certificate)
- ▶ SHAPE
- ▶ SIZE

WHY IS CHEMICAL COMPOSITION IMPORTANT?

- ▶ The weldability of a carbon steel is dependent on its chemical composition specifically its Carbon Equivalent value (CE or CEV)
- ▶ CE required by AS/NZS 3679.1

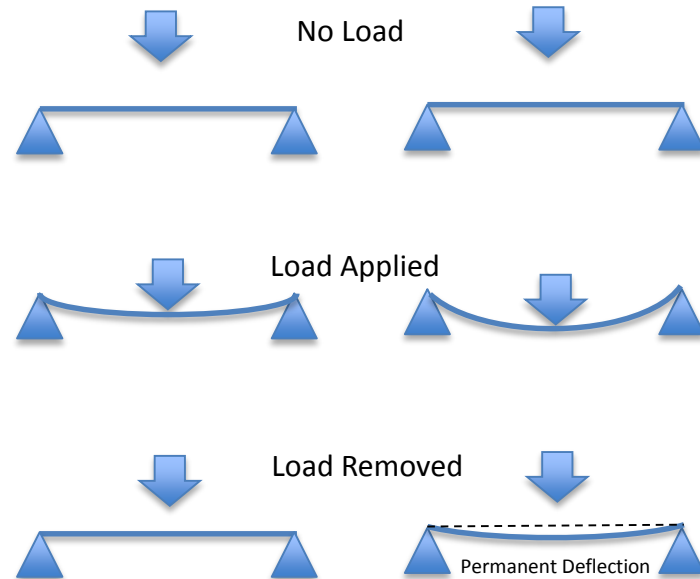
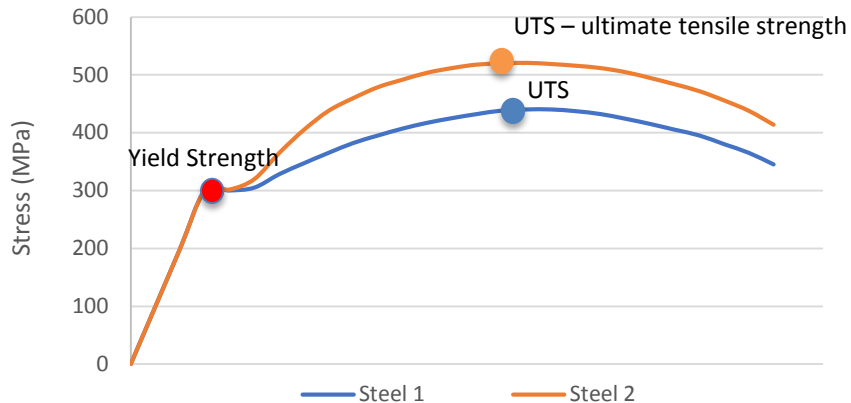
$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

- AS/NZS 1554.1 Welding of Steel Structures requires AS/NZS 3679.1
- ▶ Required by
 - KS D 3515: 2016 (SM Grades – for Welded Structures)
- ▶ Not required by
 - KS D 3503: 2016 (SS Grades – for General Structures)

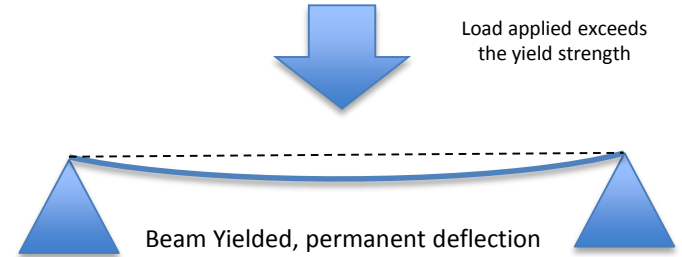
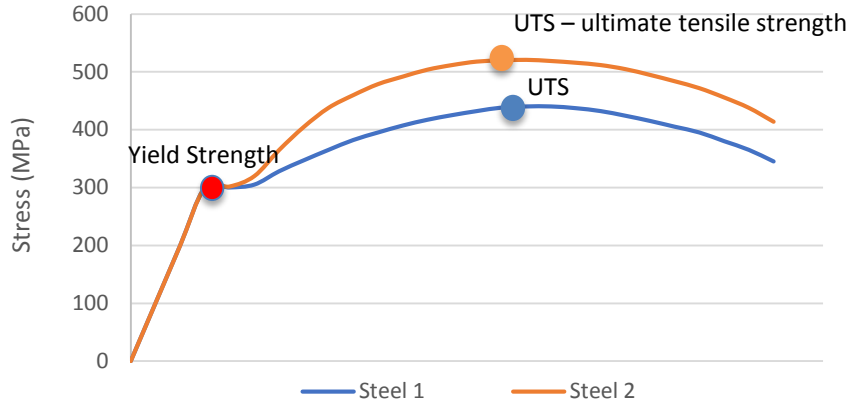
YIELD VS ULTIMATE TENSILE STRENGTH (UTS)

Case 1: Load Below Yield Point

Case 2: Load Past Yield Point



WHY IS YIELD STRENGTH IMPORTANT



- Yielded beam = Failed beam
 - Yield strength is the critical point
- UTS just provides warning
 - Higher UTS no effective design advantage

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CHANGES TO KOREAN CONSTRUCTION STEEL STANDARDS

MAJOR CHANGES DRIVEN BY EXPORT MARKETS

- ▶ Korean Iron and Steel Association advised on 2016.12.29:
 - “In order to **support the strengthening of the export competitiveness of domestic enterprises**, the National Technical Standards Agency (KDNO) issued the Korean Industrial Standards revised notification on Dec. 5, 2016 for 24 kinds of construction steel.”
 - http://kosa.or.kr/statistics/slssue_view_2013.jsp?index=7746
- ▶ Notification No. 2016-602 of the National Institute of Standards and Technology published in the Republic of Korea Official Gazette No. 18918 (Part 2) 2016.12.30
- ▶ 2016 and 2014 version of KS D 3503 and KS D 3515 to be applied concurrently from 1 January to 31 December 2017. From 1 January 2018, 2016 version to apply.

① (시행일) 이 고시는 2017년 1월 1일부터 시행한다.

② KS D 3503:2016(일반 구조용 압연강재)은 KS D 3503:2014(일반 구조용 압연강재)와 2017년 12월 31까지 병행 적용하고 2018년 1월 1일부터는 KS D 3503:2016을 적용한다.

③ KS D 3515:2016(용접 구조용 압연강재)은 KS D 3515:2014(용접 구조용 압연강재)와 2017년 12월 31까지 병행 적용하고 2018년 1월 1일부터는 KS D 3515:2016을 적용한다.

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HYUNDAI PRODUCT GUIDE REFLECTS CHANGES



CHEMICAL COMPOSITION 강재 성분표

HYUNDAI STEEL
PRODUCTS GUIDE



HYUNDAI STEEL

PRODUCTS GUIDE PART 02

Printed 2017. 07.

1) Shapes (형강) KS

규격 Standard	명칭 Designation	종류의 기호 Grade	화합성분 Chemical Composition (%)					CEV. Max	PCM. Max	비고 Remarks	규격 Standard
			C	Si	Mn	P. Max.	S. Max.				
KS D 3503	일반구조용 압연강재 Rolled Steel for General Structure	SS275	0.25 max.	0.45 max.	1.40 max.	0.050	0.050	-	-	Al: 0.300 max. Cu: 0.40 max. Mo: 0.08 max. Cr: 0.30 max. Pb: 4.00 max. B: 0.0008 max.	KS D 3503 JIS G 3101
		SS315	0.28 max.	0.50 max.	1.50 max.	0.050	0.050				
		SS410	0.30 max.	0.55 max.	1.60 max.	0.040	0.040				
		SS450	0.30 max.	0.55 max.	1.60 max.	0.040	0.040				
KS D 3515	용접구조용 압연강재 Rolled Steel for Welded Structure	SM275A	0.23 max.	-	2.5 x C min.	0.035	0.035	0.42	0.26		KS D 3515 JIS G 3106
		SM275B	0.20 max.	0.35 max.	0.05-1.40	0.030	0.030	0.42	0.26		
		SM275C	0.18 max.	0.35 max.	1.40 max.	0.025	0.025	0.42	0.26		
		SM275C	0.18 max.	0.35 max.	1.40 max.	0.020	0.020	0.42	0.26		
		SM355A	0.20 max.	0.55 max.	1.60 max.	0.035	0.035	0.47	0.27		
		SM355B	0.18 max.	0.55 max.	1.60 max.	0.030	0.030	0.47	0.27		
		SM355C	0.18 max.	0.55 max.	1.60 max.	0.025	0.025	0.47	0.27		
		SM355D	0.18 max.	0.55 max.	1.60 max.	0.020	0.020	0.47	0.27		
		SM420A	0.20 max.	0.55 max.	1.60 max.	0.035	0.035	0.48	0.28		
		SM420B	0.20 max.	0.55 max.	1.60 max.	0.030	0.030	0.48	0.28		
		SM420C	0.18 max.	0.55 max.	1.60 max.	0.025	0.025	0.48	0.28		
		SM420D	0.18 max.	0.55 max.	1.60 max.	0.020	0.020	0.48	0.28		
SM460B	0.18 max.	0.55 max.	1.70 max.	0.030	0.030	0.49	0.30				
SM460C	0.18 max.	0.55 max.	1.70 max.	0.025	0.025	0.49	0.30				

$$\text{탄소 당량(CEV)} = C + \frac{Mn}{6} + \frac{[Cr+Mo+V]}{5} + \frac{[Ni+Cu]}{15}$$

CE equation
now matches
AS/NZS 3679

$$\text{용접 균열 감수성(PCI)} = C + \frac{Si}{30} + \frac{Mn}{20} + \frac{Cu}{20} + \frac{Ni}{60} + \frac{Cr}{20} + \frac{Mo}{15} + \frac{V}{10} + 5B$$

- No grade SS400 or SM490A in 2016 versions of Standards
- Grade designation on yield strength not tensile strength

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HYUNDAI PRODUCT GUIDE REFLECTS CHANGES



1) Rolled Steel for General Structure 일반구조용 강재

규격 Standard	종류의 기호 Symbol of Grade	인장시험 Tens			
		항복점 또는 내력 (Min.) Yield Point or Yield Strength (N/mm ²)			인장강도 Tensile Strength (N/mm ²)
		두께 Thickness (mm)			
t ≤ 16	16 < t ≤ 40	40 < t			
	SS275 (구SS400)	275	265	245	410-550
	SS315 (구SS490)	315	305	295	490-630
	KS D 3503				
	SS410 (구SS540)	410	400	-	540 이상

2) Rolled Steel for Welded Structure 용접구조용 강재

규격 Standard	종류의 기호 Symbol of Grade	인장시험 Tensile Test				
		항복점 또는 내력 (Min.) Yield Point or Yield Strength (N/mm ²)				인장강도 Tensile Strength (N/mm ²)
		두께 Thickness (mm)				
t ≤ 16	16 < t ≤ 40	40 < t ≤ 75	75 < t	t ≤ 100		
	SM 275A SM 275B SM 275C SM 275D (구SM 400)	275	265	255	245	400-510
	SM 355A SM 355B SM 355C SM 355D (구SM 490)	355	345	335	325	490-610
	KS D 3515					
	SM 420A SM 420B SM 420C SM 420D (구SM 520)	420	410	400	390	490-610
	SM 460B SM 460C (구SM 570)	460	450	430	420	520-720



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MCC TO REFLECT CURRENT STANDARDS

SEF 465, page 13-14:

“the model matching criteria applied in respect of Hyundai are consistent with the Commission’s overall finding in REP 223 that the SS400 grade was the most comparable grade to the Australian grade and therefore the closest subset of like goods for calculating normal values.”

MCC TO REFLECT CURRENT STANDARDS

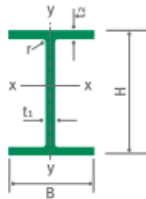
- ▶ Liberty OneSteel’s view based on Standards review:
- ▶ Steels for “General Structure” without CE value specified are NOT a match for G300 (requires CE)
- ▶ Grade SM490/SM355A min yield strength has moved up – now a better match for G350
- ▶ **Closest match for weldability and yield strength now considered to be SM400/SM275(A-D)**

Chemical Composition								Mechanical Properties					
Standard & Grade	%C max	%Si max	%Mn max	%P max	%S max	MA Elements	CE	Minimum Yield Stress (MPa)			Minimum Tensile Strength (MPa)	Minimum Elongation %	
								Thickness, mm					
								<11	≥11 & ≤17	≥17 & <40			
AS/NZS 300	0.25	0.50	1.60	0.040	0.040	0.15	0.44	AS/NZS 300	320	300	280	440	22
KS D SM490 (SM355A)	0.20	0.55	1.60	0.035	0.035	-	0.47	KS D SM490 (SM355A)	355	355	345	490	22
KS D SM400 (SM275A-D)	0.20	0.35	1.40	0.030	0.030	-	0.42	KS D SM400A (SM275A-D)	275	275	255	400	23
KS D SS490 (SS315)	0.28	0.50	1.50	0.050	0.050	-	-	KS D SS490 (SS315)	315	315	305	490	19
KS D SS400 (SS275)	0.25	0.45	1.40	0.050	0.050	-	-	KS D SS400 (SS275)	275	265	245	410	21

- ▶ An additional shape model was added by Hyundai for this review as per Hyundai visit report:
Hyundai Steel advised that it was more accurate to separate I beam from H beam as they are distinct products (H beam is stronger and takes more force than I beam and is typically used in buildings whereas I beam is normally used for mines).
- ▶ Have Universal Beams (I-beams) and Universal Columns (H-beams) been included in model for “H-Beams”?
- ▶ Have only tapered-flange I-beams been classified as the model “I-Beams”?

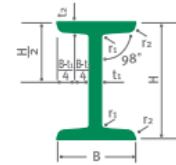
01. H SECTION H형강

Dimensions and Sectional Properties 차수 및 단면성능
(10) Australian/New Zealand Universal Beam & Columns (AS/NZS) - UB



06. I-BEAM I형강

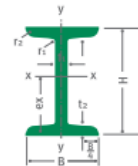
Dimensions and Sectional Properties 차수 및 단면성능



07. I-BEAM FOR MINE SUPPORT

광산지보용 I형강

Dimensions and Sectional Properties 차수 및 단면성능



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FORM OF MEASURES

COMBINATION, NOT AD VALOREM

- ▶ SEF 465 recommends an *ad valorem* form of measures be imposed:

This form of measures was imposed on the basis that an ad valorem rate is more appropriate in view of the cyclical nature of the HRS market observed, which involves price fluctuations.

- ▶ Liberty OneSteel's strongly urges the Commission to consider a combination form of measures be imposed:
 - Dumping margin for Hyundai has increased from 2.52% to 9.9% - *ad valorem* has not been effective in addressing continued dumping
 - The strength of the combination method is the use of the variable duty element which acts as a floor price to capture additional IDD if the exporter further reduces the price. This amount can be refunded via a duty assessment if it is found that the goods sold at the lower price were not dumped.
 - No legislative mechanism exists to collect total final duty liability when the exporter further lowers the export price and effectively absorbs the duties under an *ad valorem* form of measures.

QUESTIONS?

