GREAT DESIGNS IN STEEL

INSIGHTS FROM MEASURING THE "PRESS TONNAGE" OF 3RD GEN AHSS STAMPINGS (PHASE II)

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Martinrea International
On Behalf of Auto/Steel Partnership

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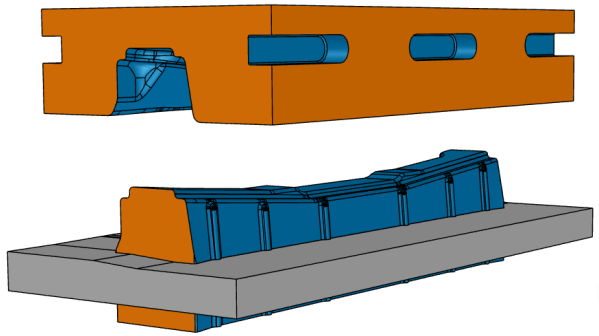
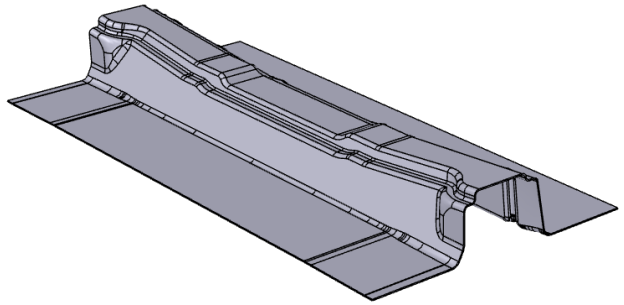
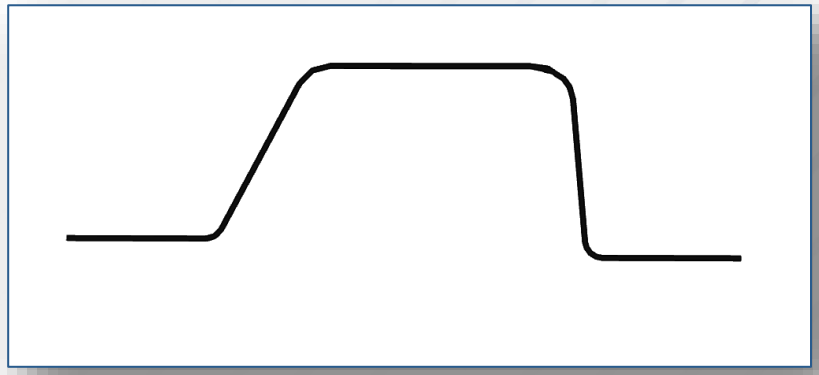
INSIGHTS FROM MEASURING THE "PRESS TONNAGE" OF 3RD GEN AHSS STAMPINGS - PHASE II

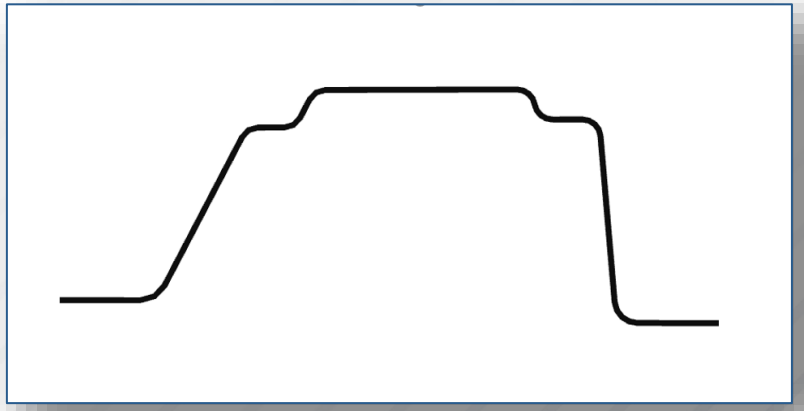
- Brief Review
- Press and Die Set-Up
- Tonnage Results
- Quality Results
- Bonus Tests







Standard Hat Section
Phase I



"S" – Corner
Phase II

INSIGHTS FROM MEASURING THE "PRESS TONNAGE" OF 3RD GEN AHSS STAMPINGS - PHASE II

PROJECT GOAL:

Enable the accurate prediction of the "Press Tonnage" needed to form, trim and perform any secondary forming of 3rd Gen AHSS panels.

"PRE-CLUSIONS":

Press tonnage and forming tonnage are not the same

Forming Tonnage = Press Force – Load Cell Force – Nitro Force

The term "Bottom Dead Center" is not a unique event

The "Press Tonnage Curve" has both predictable and less-predictable segments

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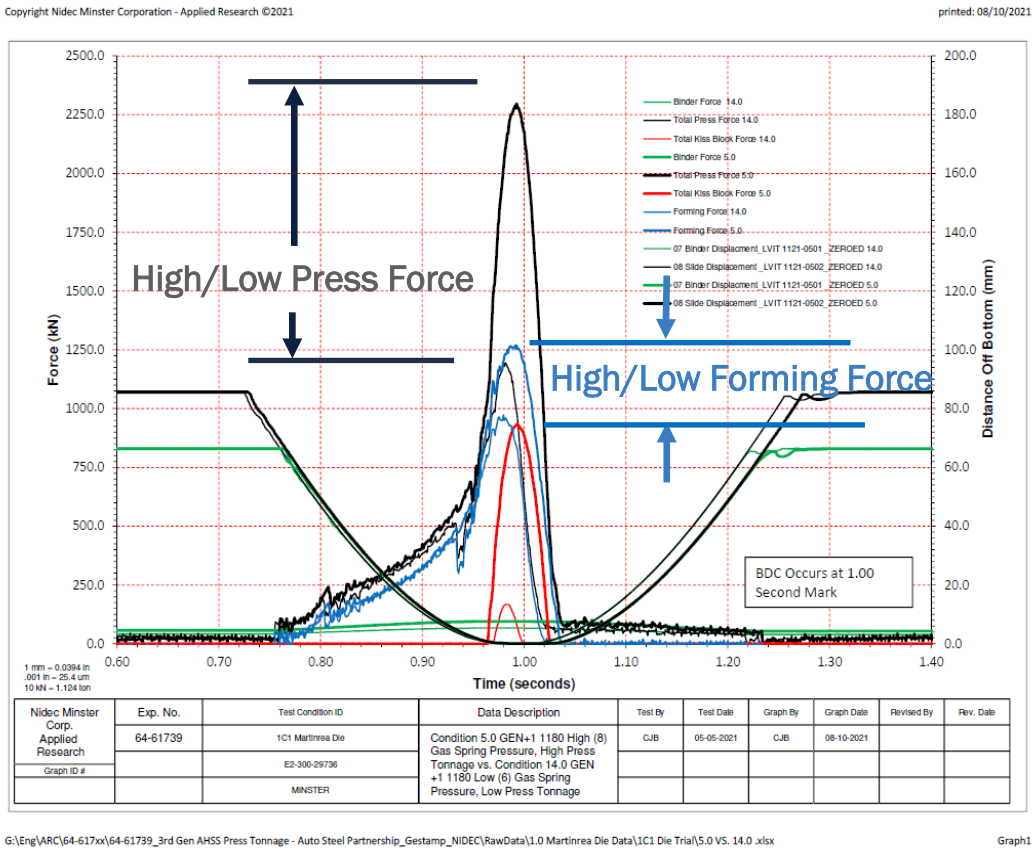

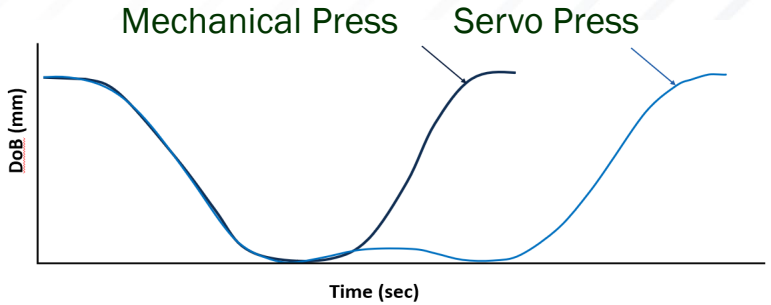

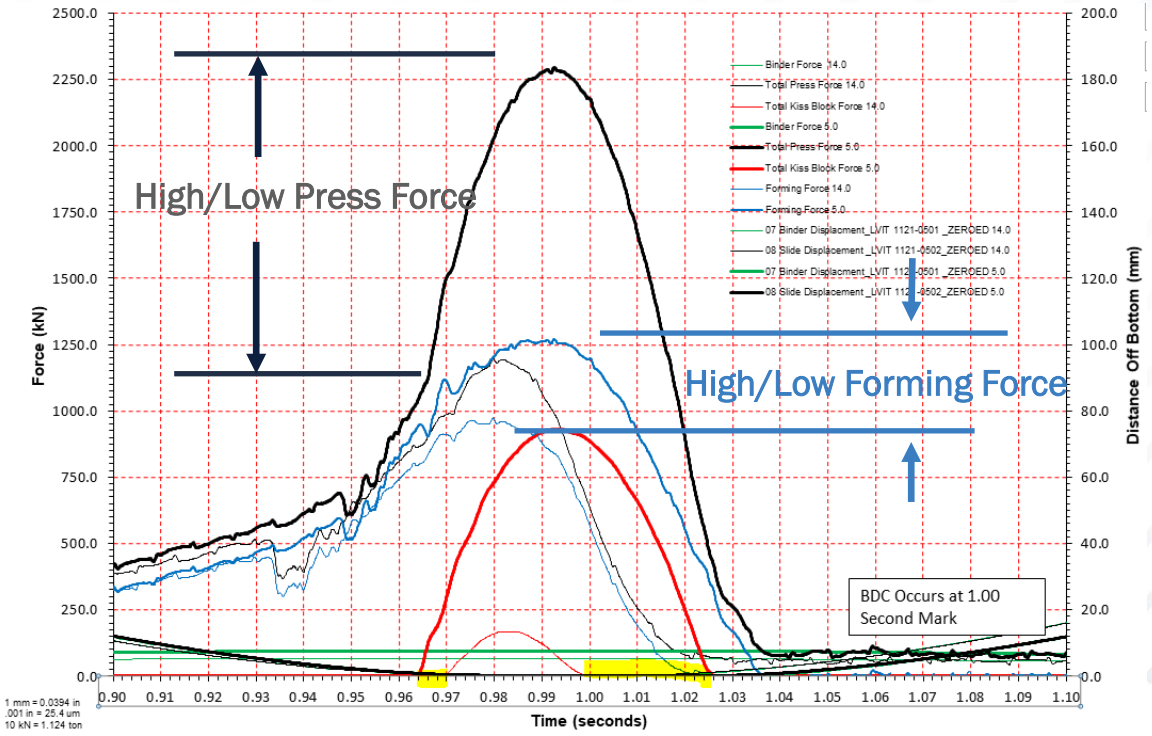

INSIGHTS FROM MEASURING THE "PRESS TONNAGE" OF 3RD GEN AHSS STAMPINGS - PHASE II

INSIGHTS & TOP TAKEAWAYS:

- A longer "Dwell Time" does produce a higher quality stamping
- The upfront "Predictive Tool" needs to account for elastic deformations in the Press and Die System (Even rudimentarily)
- The "Predictable" area of the press tonnage curve will decrease because of this omission.

INSIGHTS FROM MEASURING THE "PRESS TONNAGE" OF 3RD GEN AHSS STAMPINGS - PHASE II

				Test Number
Servo Press "Mechanical Mode"	Press Tonnage (H)	Pad Pressure (H)	Gen3 780	1
			Gen3 980	2
			Gen1+ 1180	3
			Lot #122	4
	Press Tonnage (L)	Pad Pressure (H)	Gen3 780	5
			Gen3 980	6
			Gen1+ 1180	7
			Lot #122	8
	Press Tonnage (H)	Pad Pressure (L)	Gen3 780	9
			Gen3 980	10
			Gen1+ 1180	11
			Lot #122	12
	Press Tonnage (L)	Pad Pressure (L)	Gen3 780	13
			Gen3 980	14
			Gen1+ 1180	
			Lot #122	15
Servo Press Dwell (Long)	Press Tonnage (H)	Pad Pressure (H)	Gen3 780	16
			Gen3 980	17
			Gen1+ 1180	18
			Lot #122	19
	Press Tonnage (L)	Pad Pressure (H)	Gen3 780	20
			Gen3 980	21
			Gen1+ 1180	22
			Lot #122	23
	Press Tonnage (H)	Pad Pressure (L)	Gen3 780	24
			Gen3 980	25
			Gen1+ 1180	26
			Lot #122	27
	Press Tonnage (L)	Pad Pressure (L)	Gen3 780	28
			Gen3 980	29
			Gen1+ 1180	
			Lot #122	30

Load Cells
(1) Shown & (1) Sym Opp

~ 66mm of pad travel

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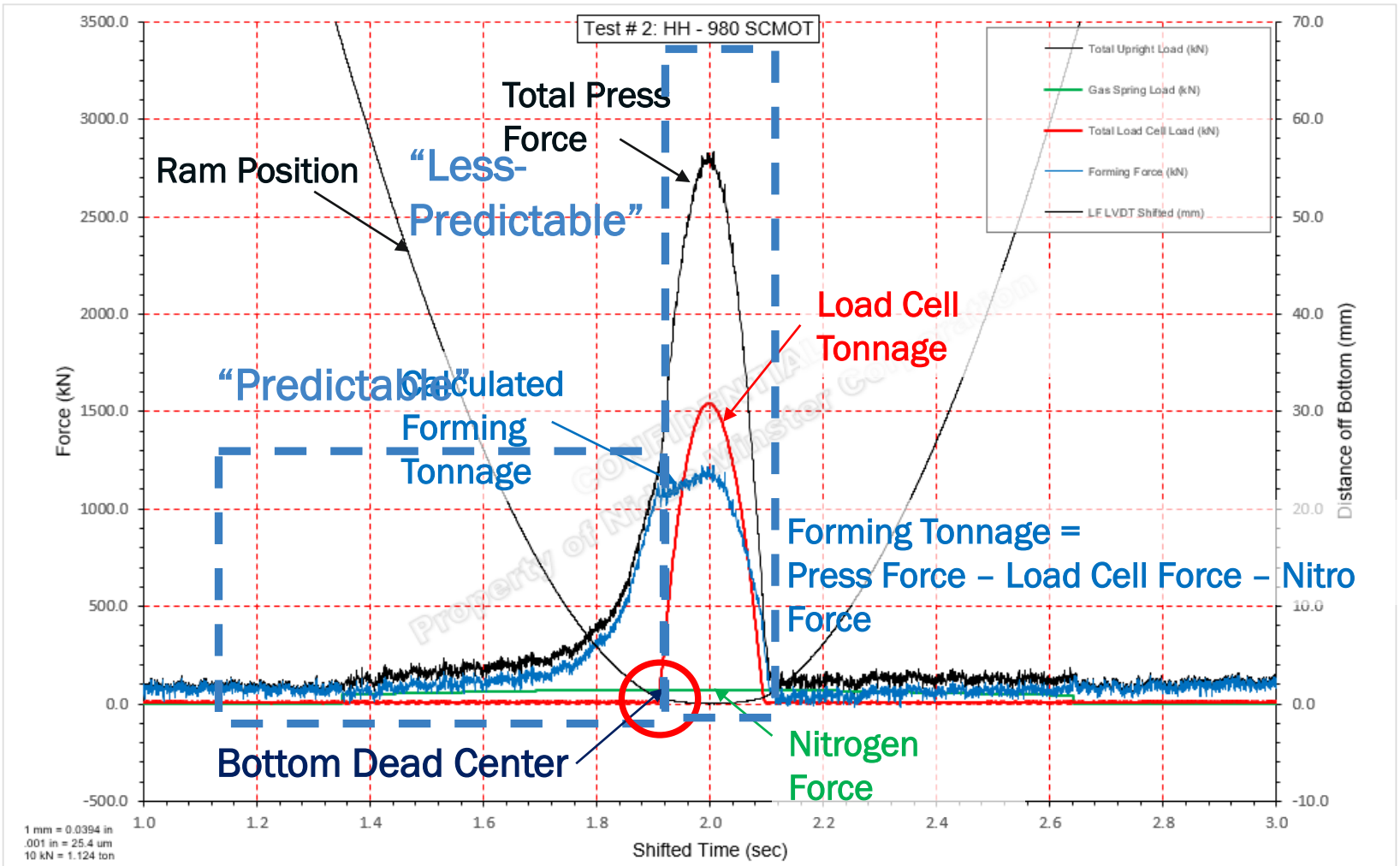

Nidec Minster Corp. Applied Research	Exp. No.	Test Condition ID	Data Description	Test By	Test Date	Graph By	Graph Date	Revised By	Rev. Date
	64-61739	2536-1D-Testing at Arisa	Test # 2: HH - 980 SCMOT	CMD	07/28/2022	CMD	07/29/2022	xxx	MM/dd/yyyy
Graph ID #		GS2-630-7562							
2.0 - HH 980		Nidec Arisa							

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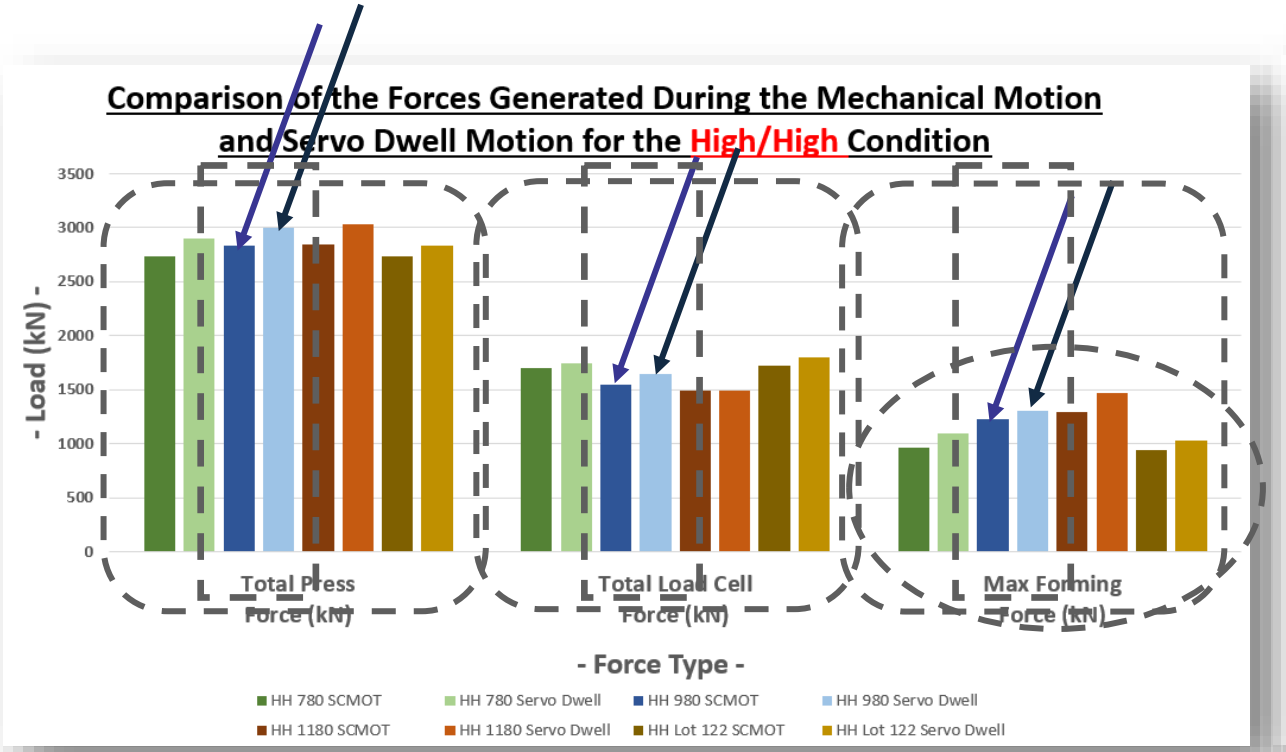

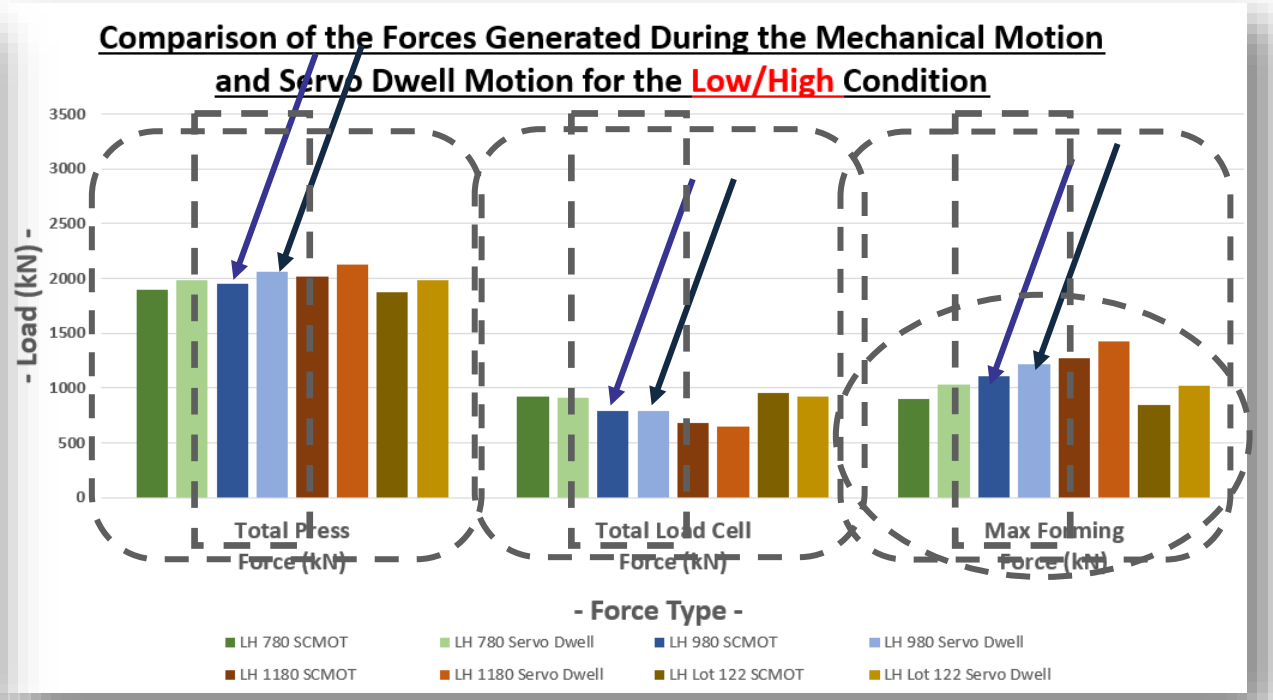

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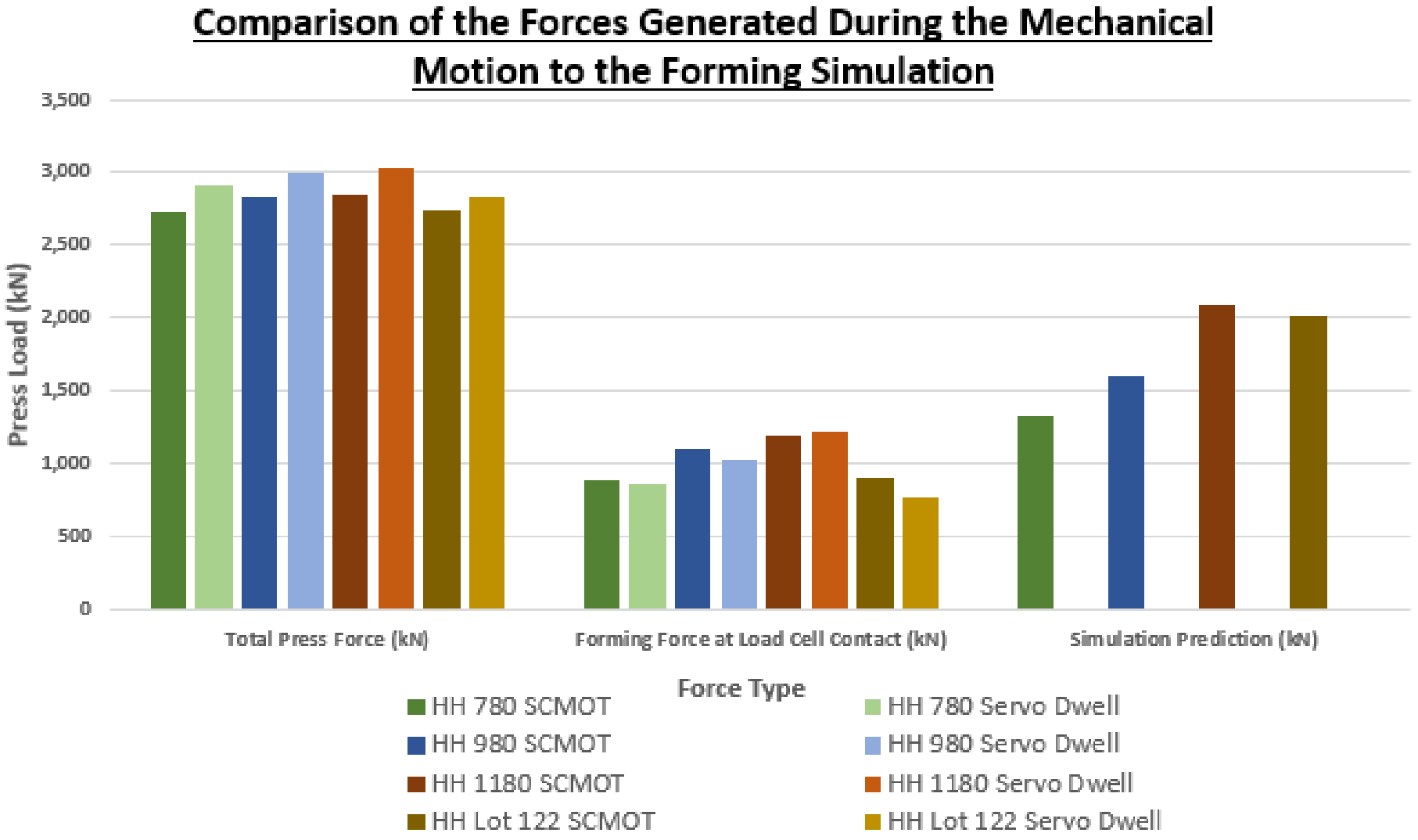

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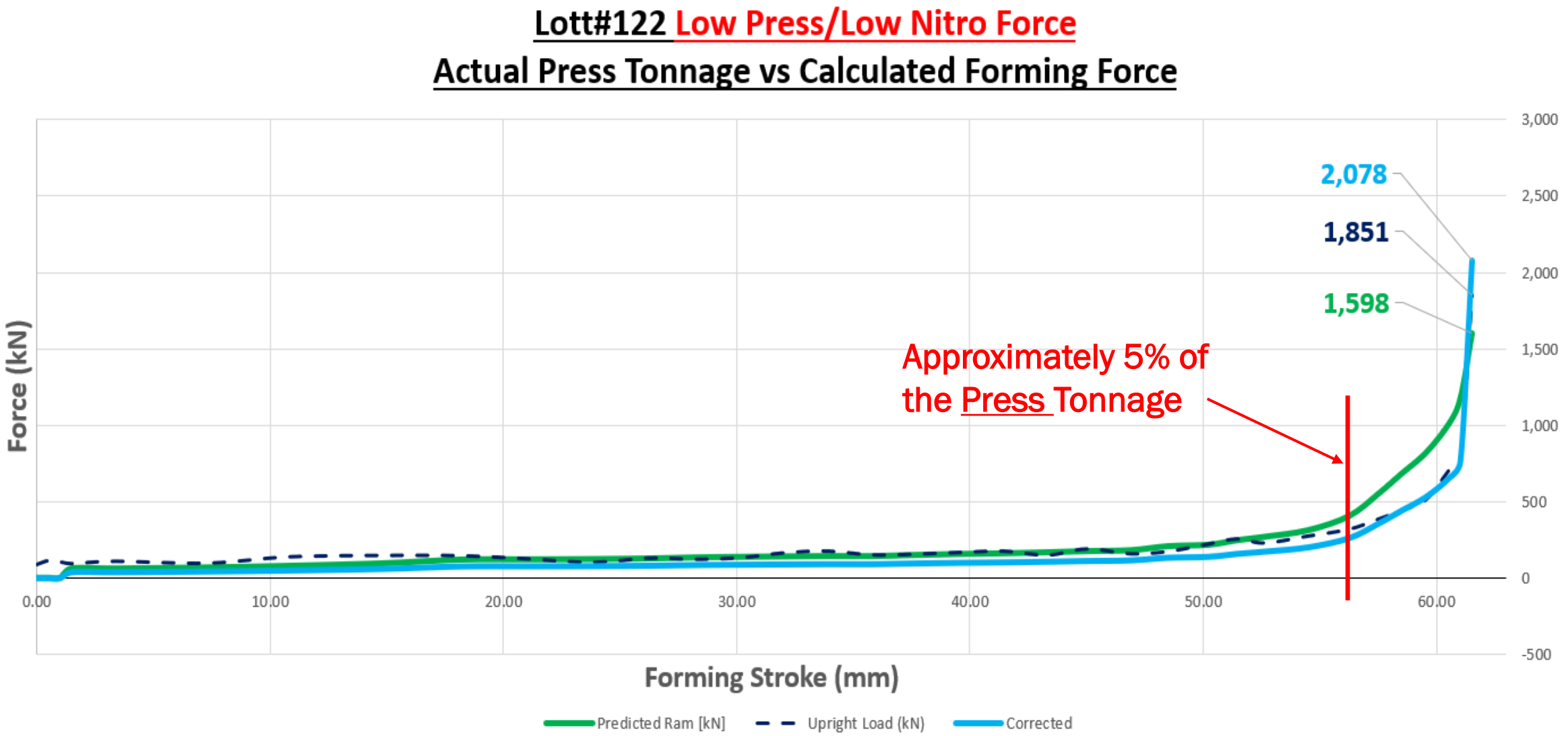

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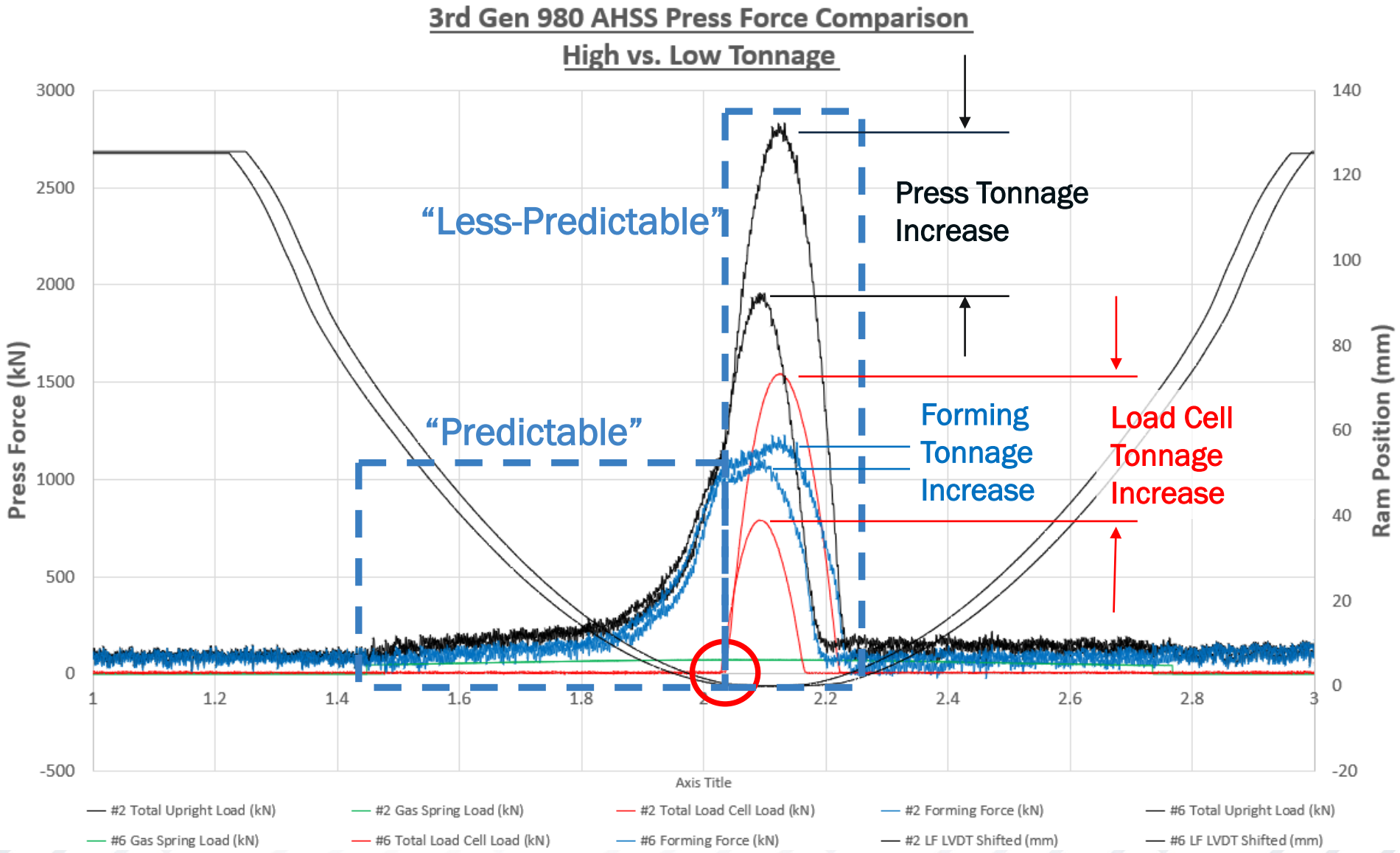

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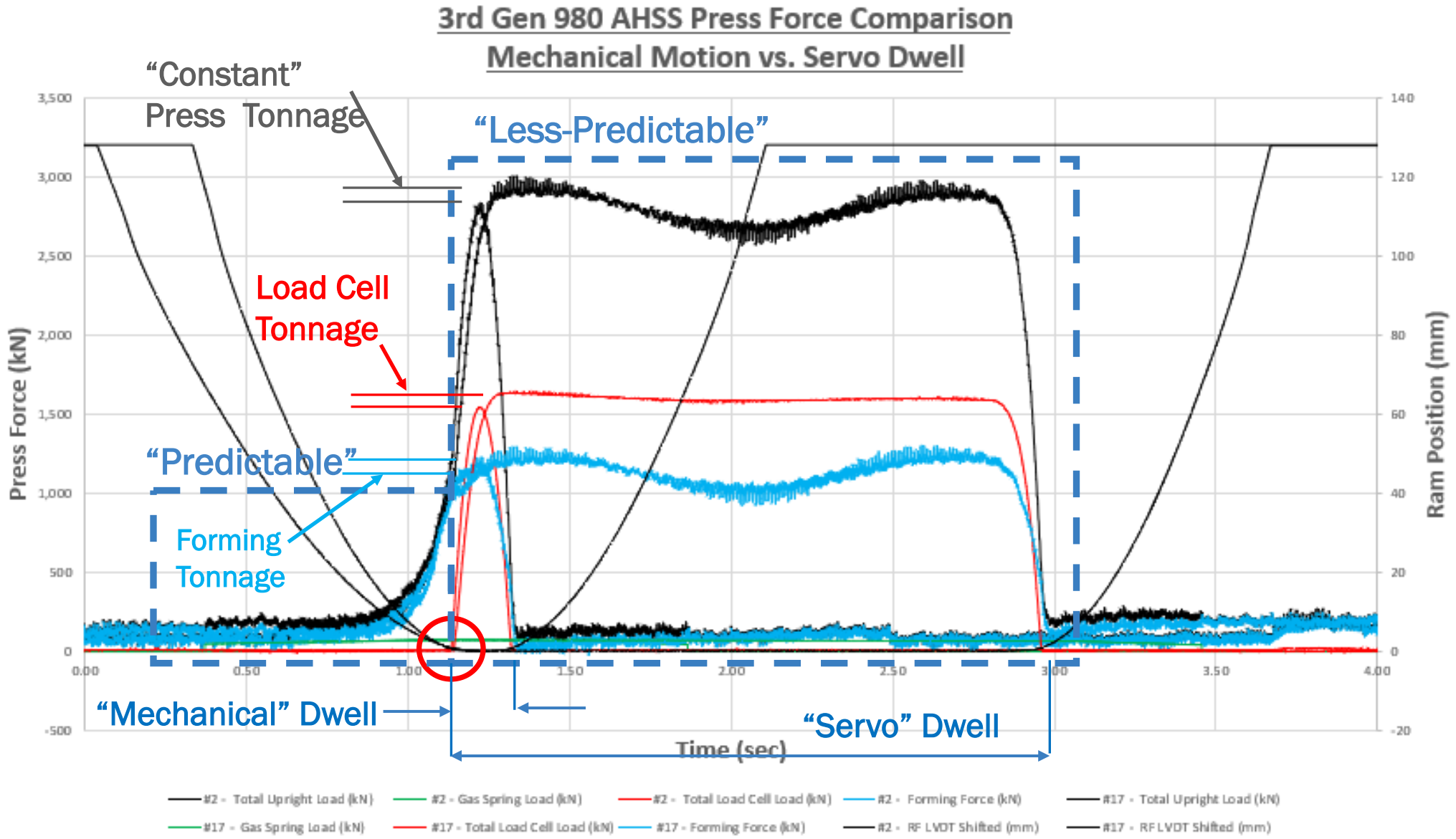
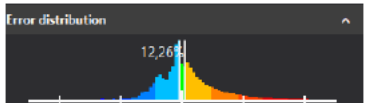


INSIGHTS FROM MEASURING THE "PRESS TONNAGE" OF 3RD GEN AHSS STAMPINGS - PHASE II

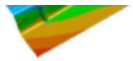
DISTRIBUCIÓN DE LAS DESVIACIONES POR INTERVALO DE TOLERANCIA

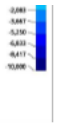
1-TOLERANCIA ±0.25mm



+/- Tol (mm)	"S" 980 HH Mech (%)
0.25	12.26
0.50	27.44
1.00	50.40
2.00	76.88
3.00	89.94
4.00	95.08

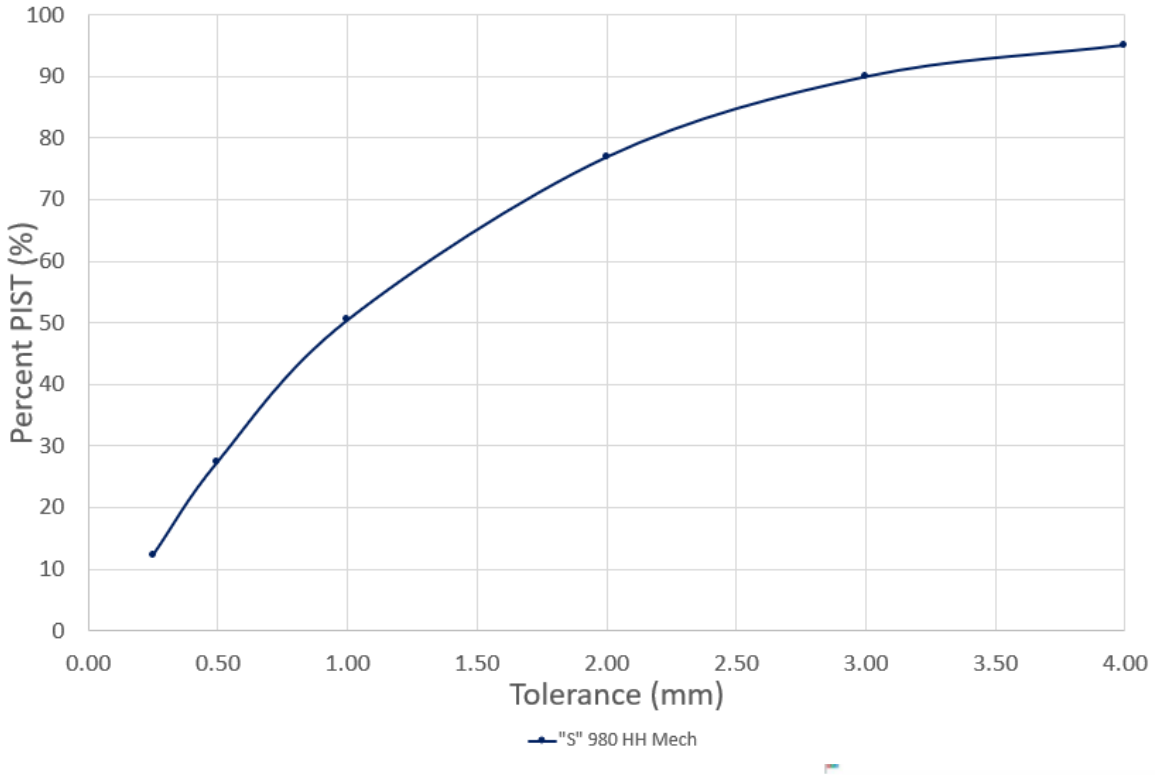
2-TOLERANCI



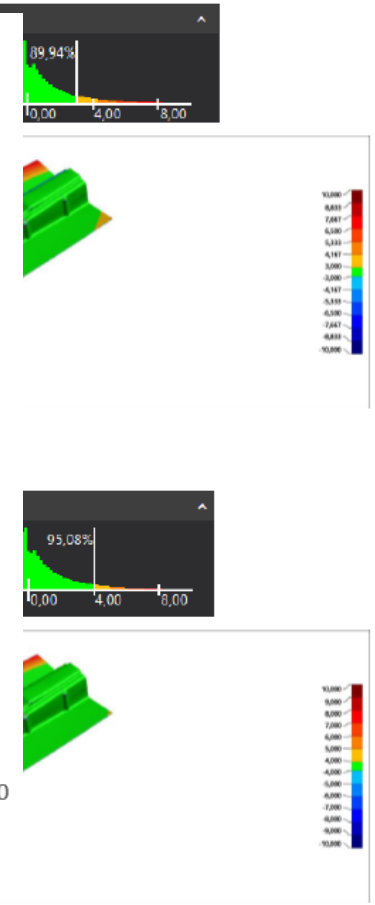


3-TOLERANCIA ±1mm

Gen3 980 "S"-Corner High Press/High Pad in Mechanical Mode



5-TOLERANCIA ±3mm



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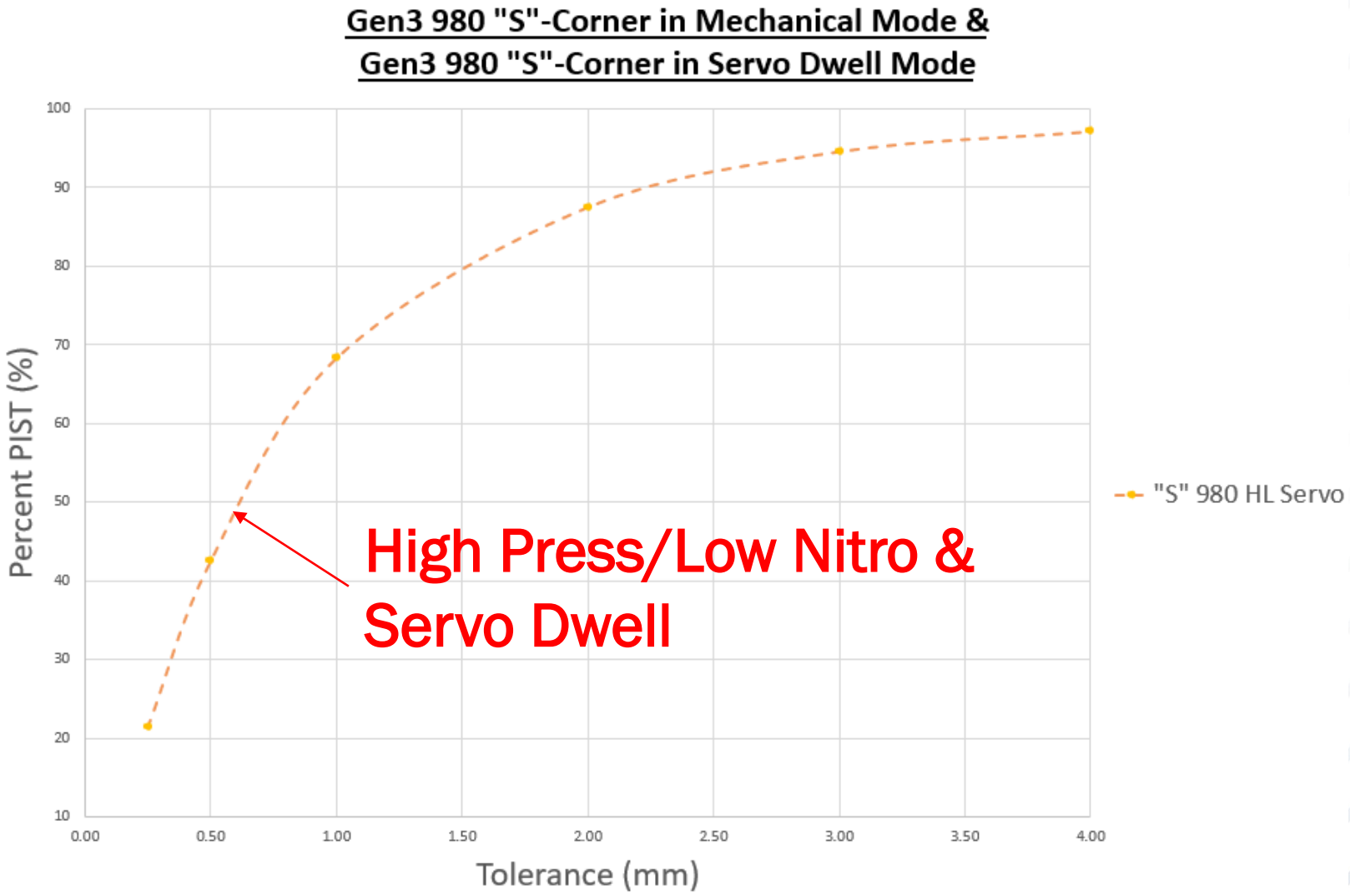

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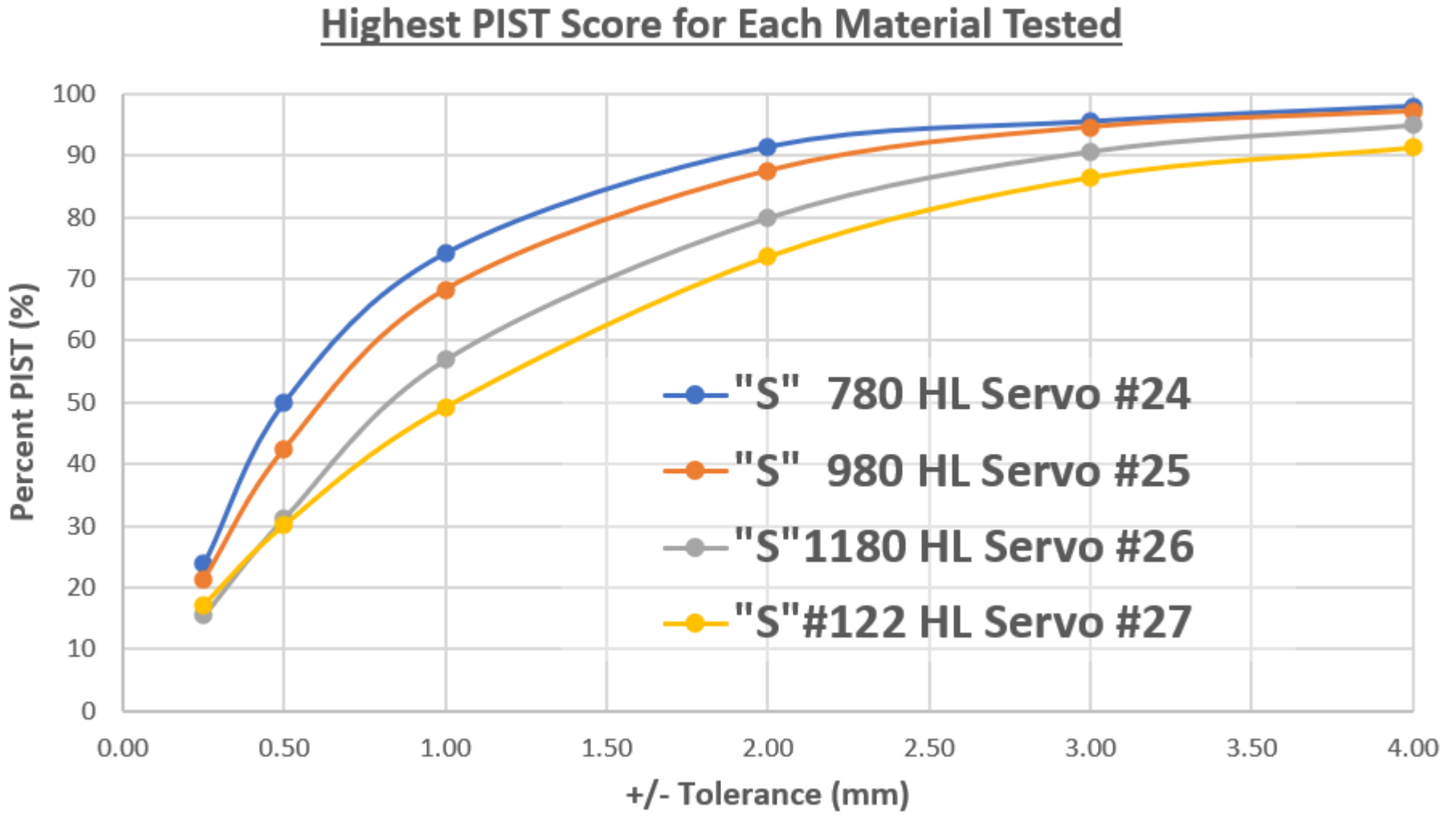
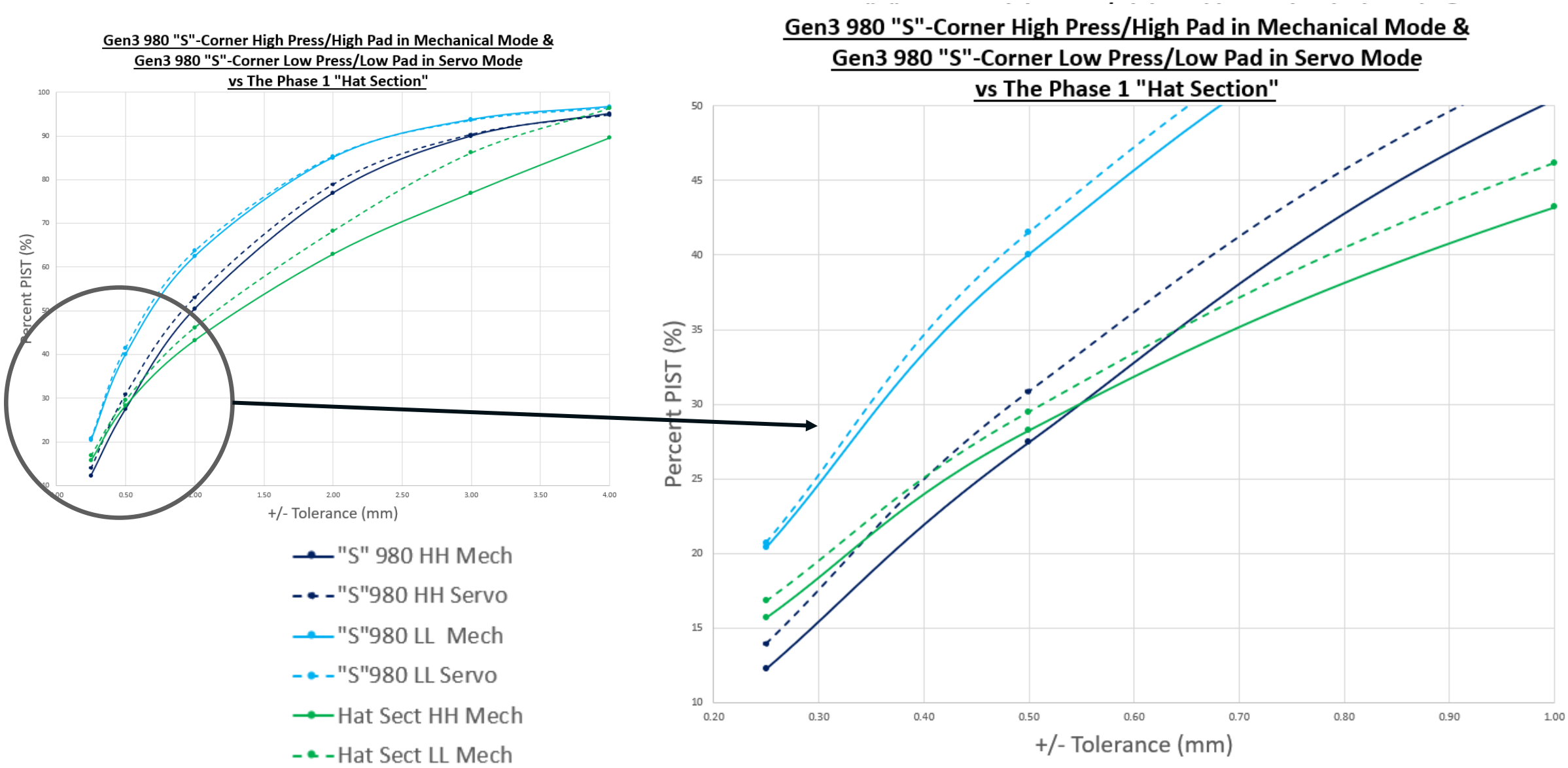


“S”-CORNER TONNAGE & SPRING-BACK STUDY – TONNAGE & QUALITY INVESTIGATION



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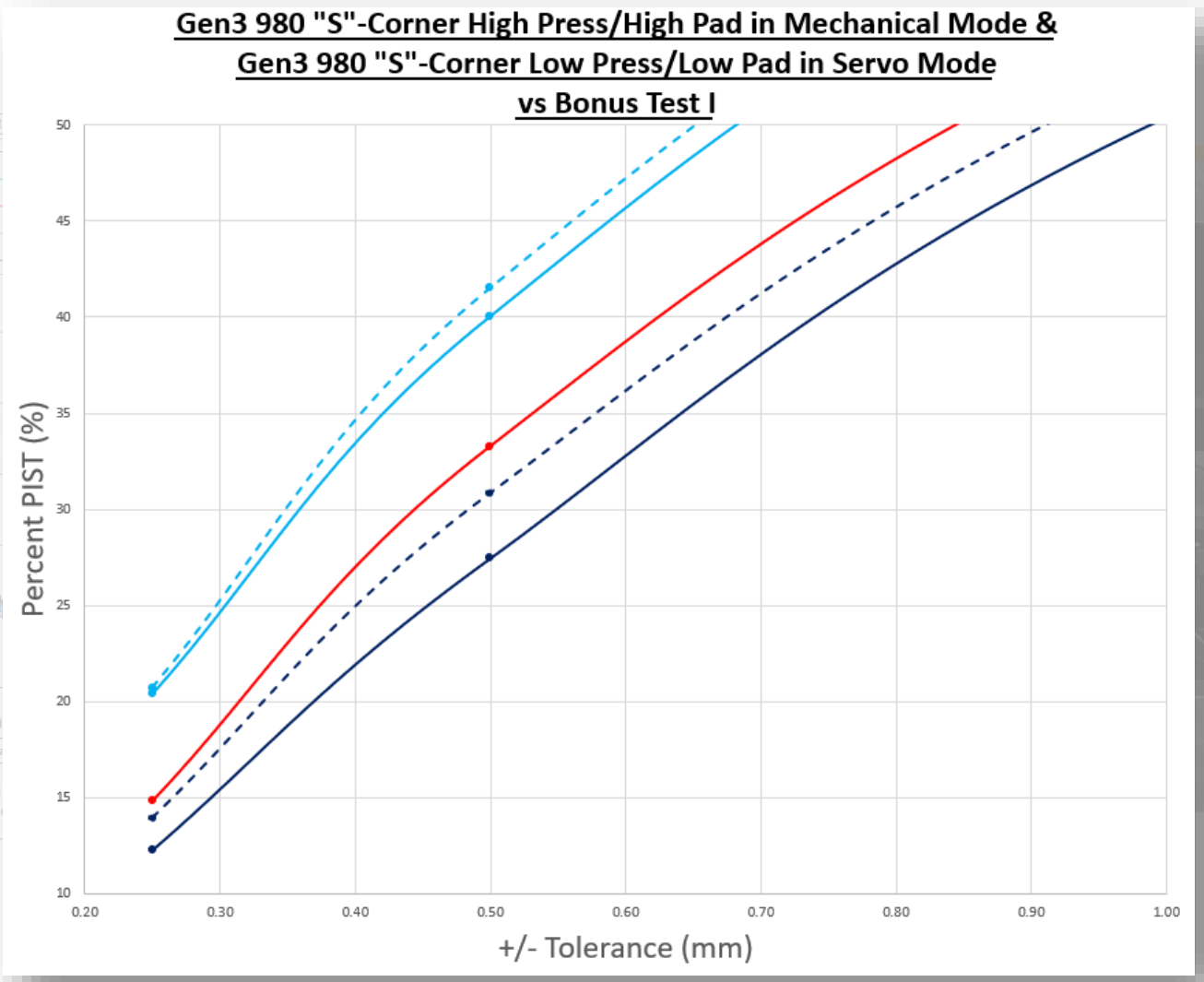

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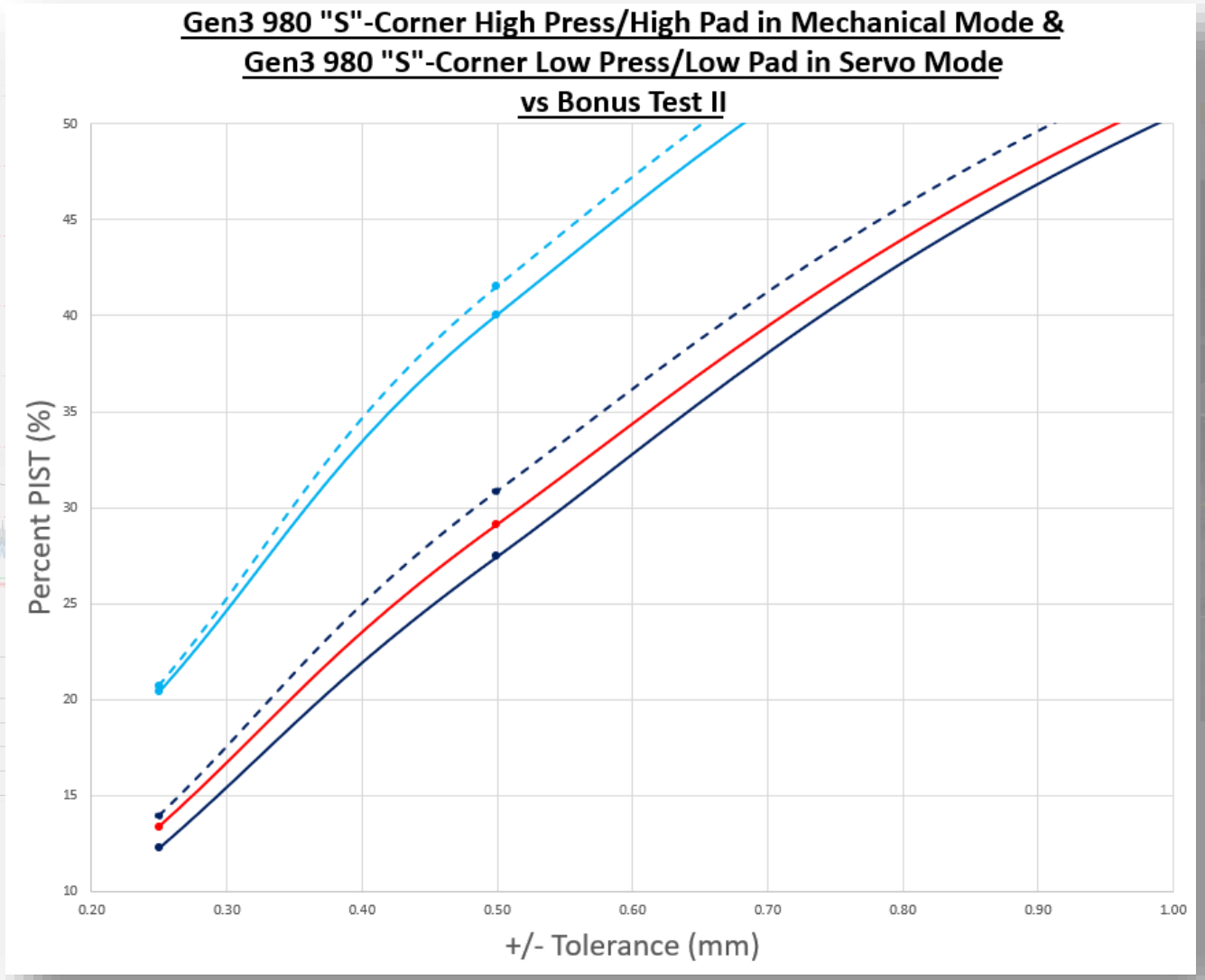

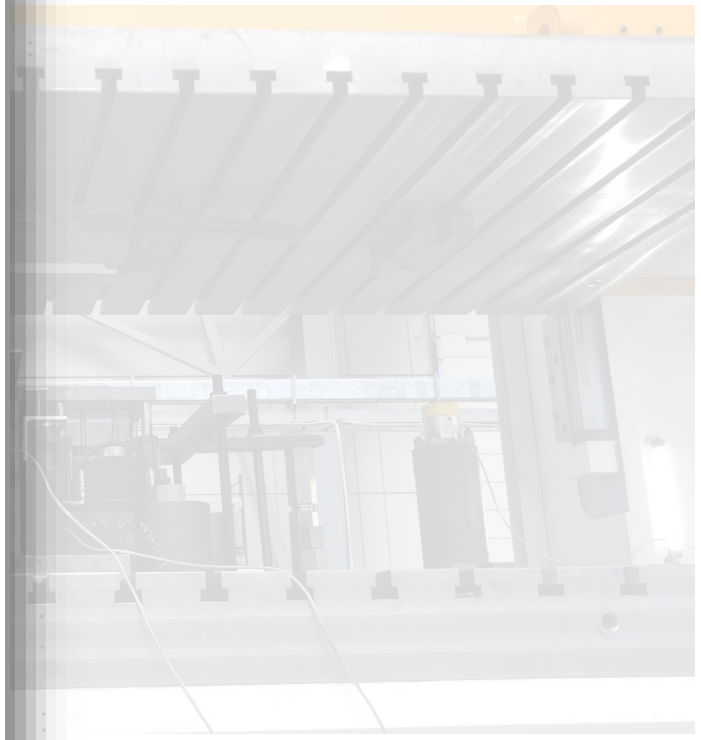

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OTHER CONCLUSIONS

- A longer "Dwell Time" does produce a higher quality stamping
- The upfront "Predictive Tool" needs to account for elastic deformations in the Press and Die System (Even rudimentarily)
- The "Predictable" area of the press tonnage curve will decrease because of this omission.

- Forming Tonnage =

  Press Force – Kiss Block Force – Nitro Force – (Press & Die Stiffness)

- The "Forming Force" does not vary directly with press tonnage
- The "S"-Shape Corner does improve the PIST Score of a stamping in many but not all press set-ups.

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More Questions? Meet the speaker(s) at the Auto/Steel Partnership booth.