

# **FlexPLI Inverse Certification Corridors - Further Test Results -**

**2<sup>nd</sup> Meeting of  
Task Force Review and Update Certification Corridors (TF-RUCC)  
of the  
Informal Group GTR9 Phase 2  
March 23<sup>rd</sup>, 2012**

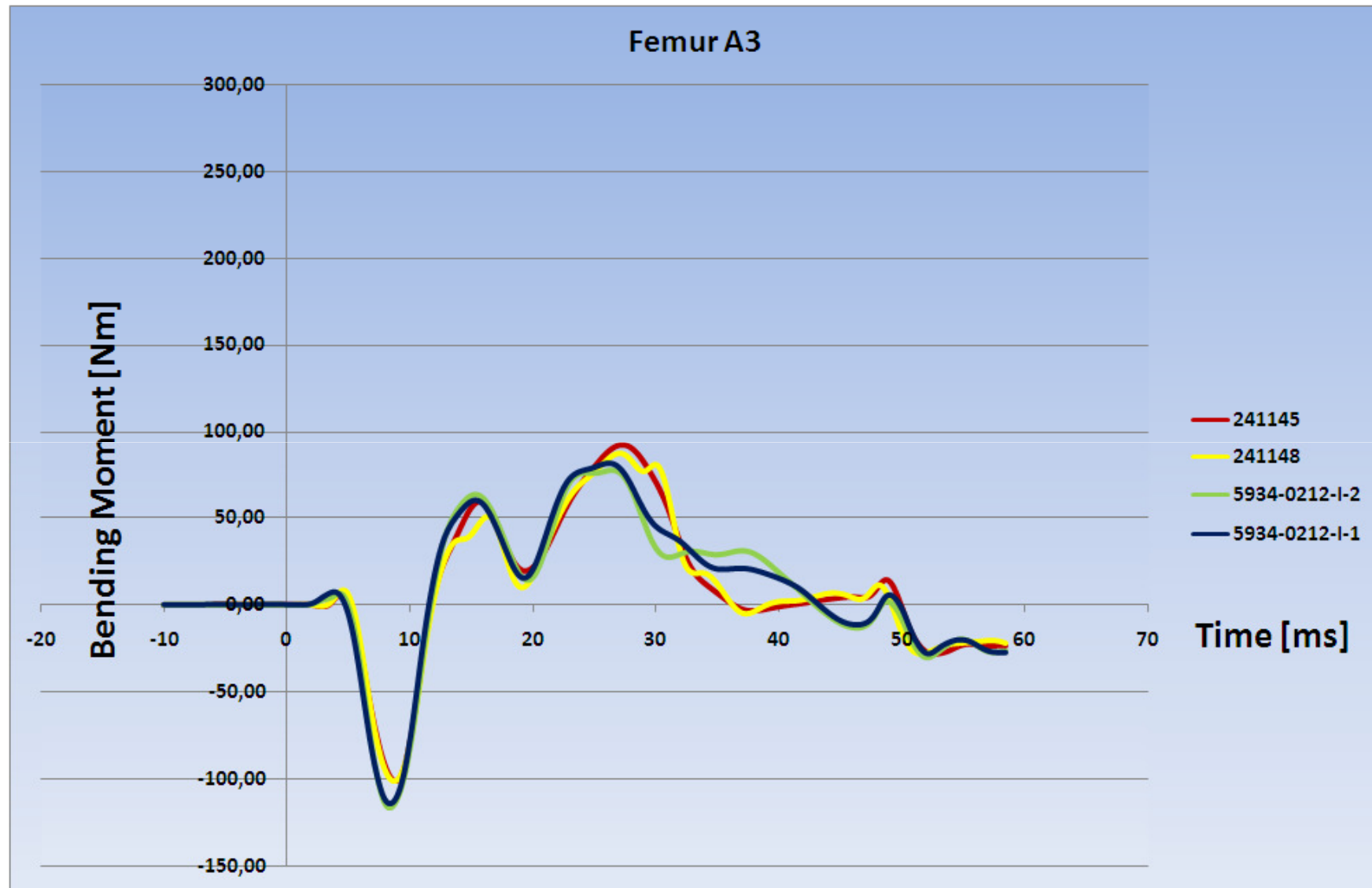
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(Federal Highway Research Institute)

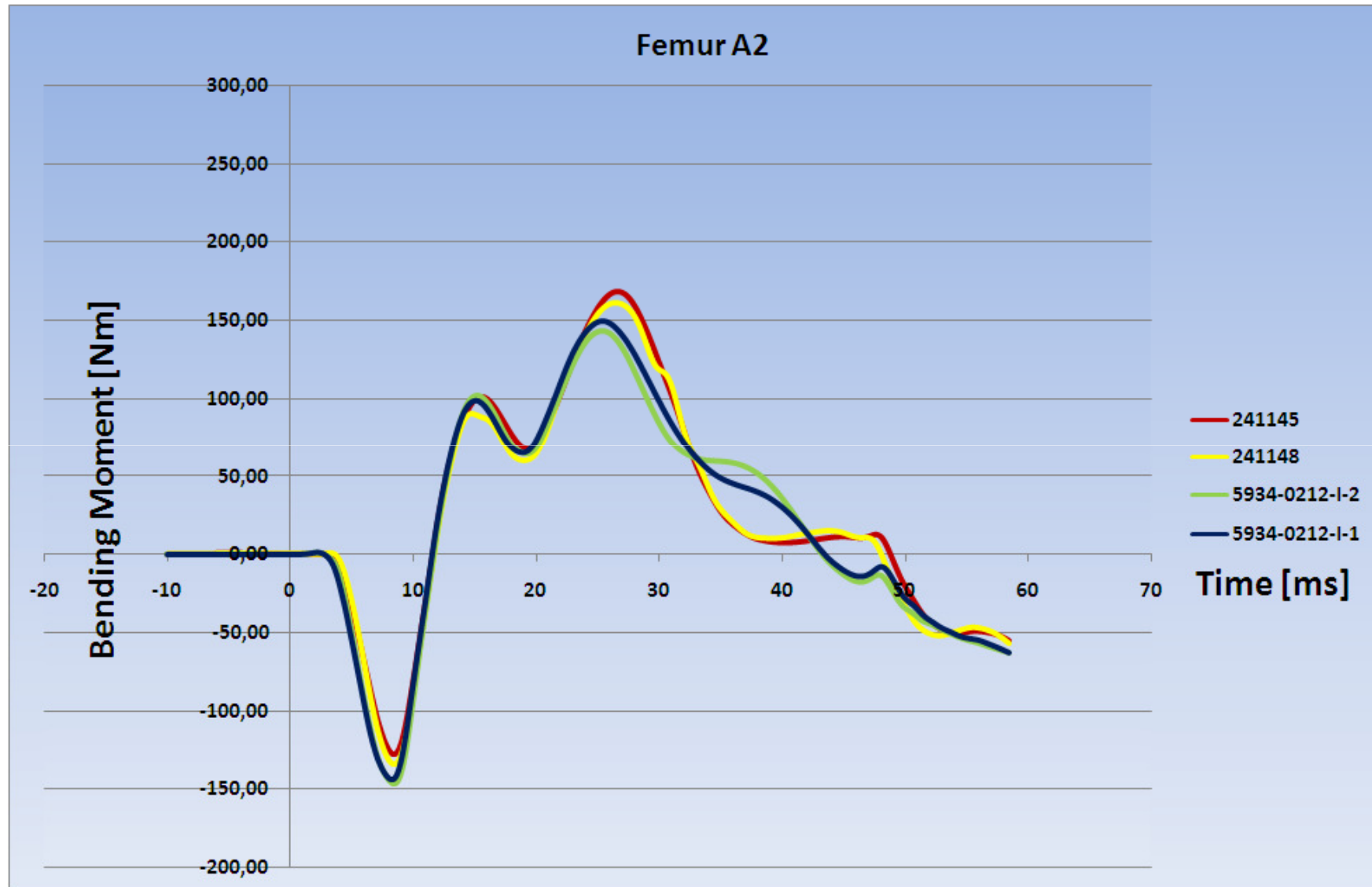
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- **The recently established Task Force of the Informal Group on GTR9-PH2 (TF-RUCC) is currently reviewing and evaluating all draft certification corridors for the FlexPLI (i.e. on component as well as assembly level).**
- **In the meanwhile, a completely renewed serious production leg (latest built level) has been pendulum and inverse certified twice at Humanetics and inverse certified twice at BAST directly afterwards.**
- **The legform has met the pendulum but twice failed the inverse certification test at Humanetics.**
- **The legform has twice met the inverse certification test at BAST.**
- **A comparison of inverse test results is given on the following slides.**

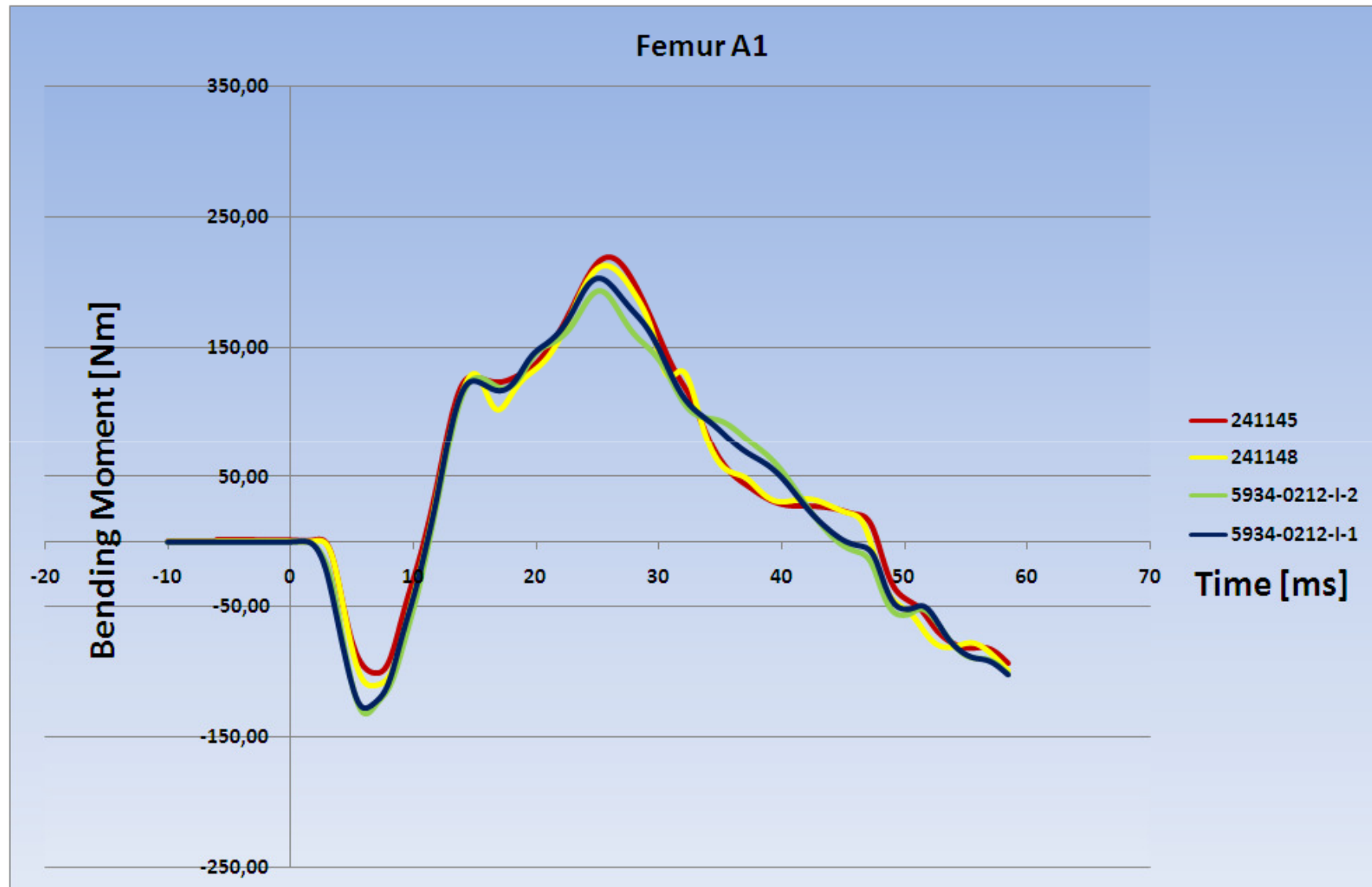
# Test results with production leg



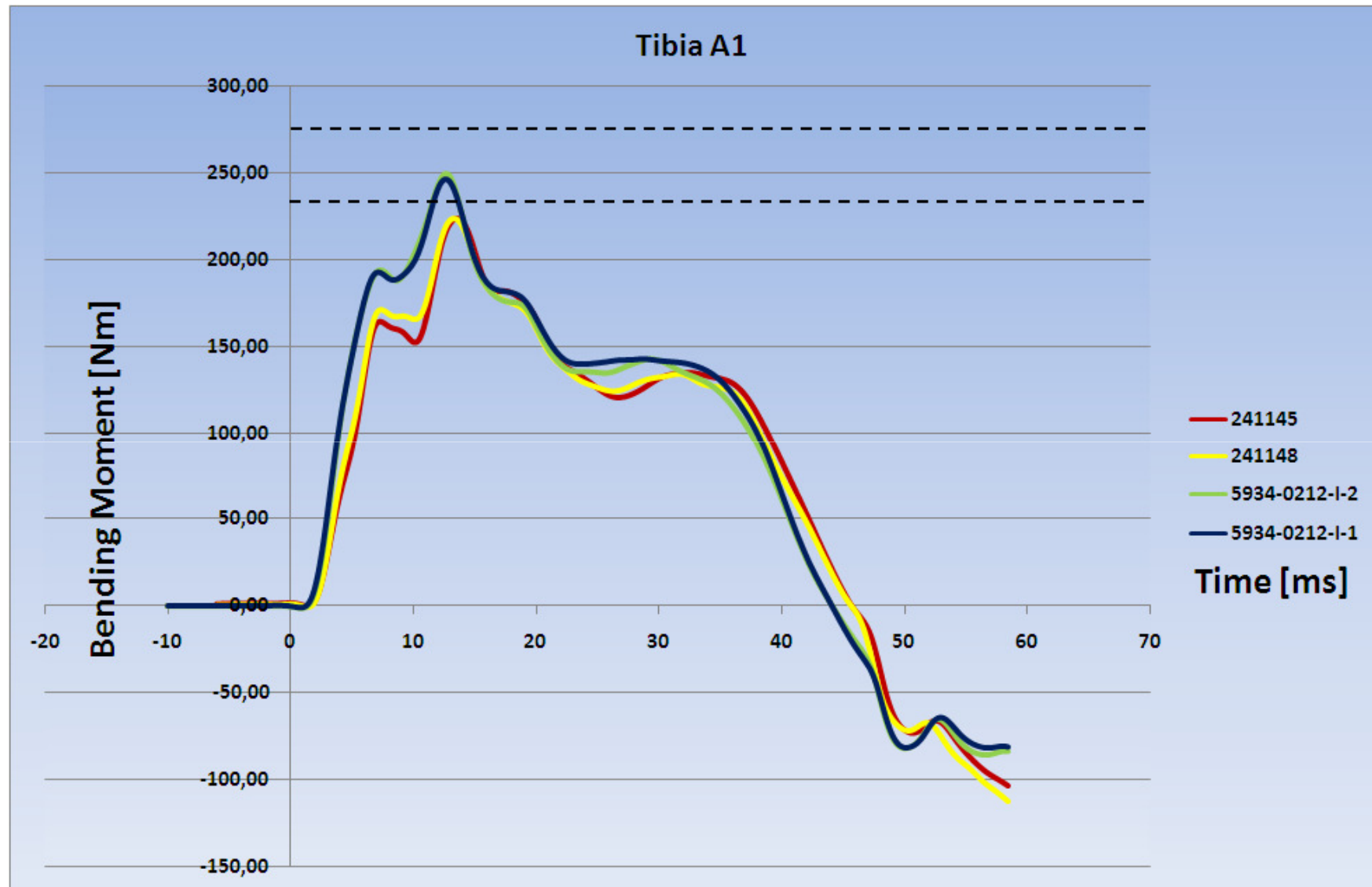
# Test results with production leg



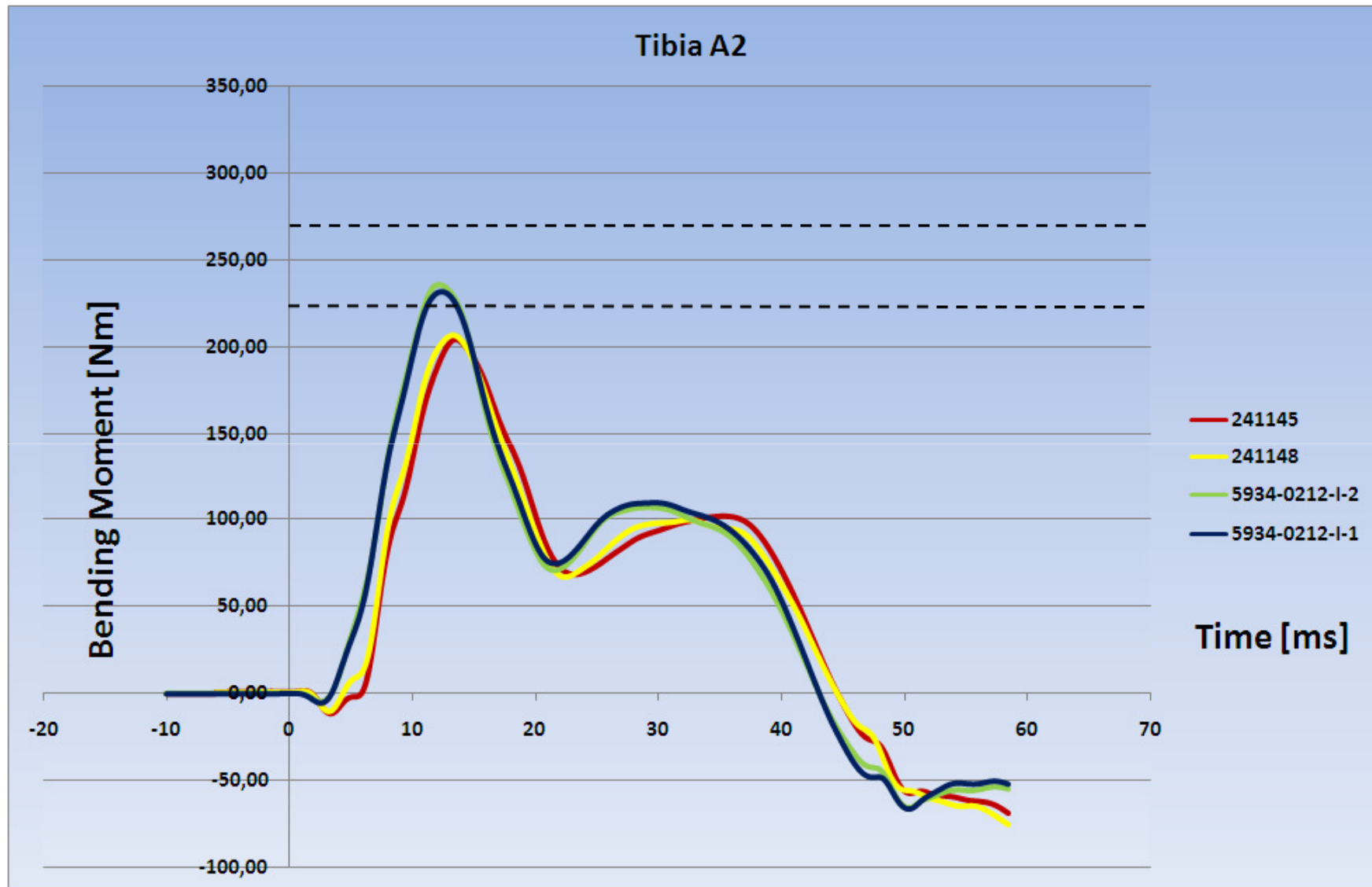
# Test results with production leg



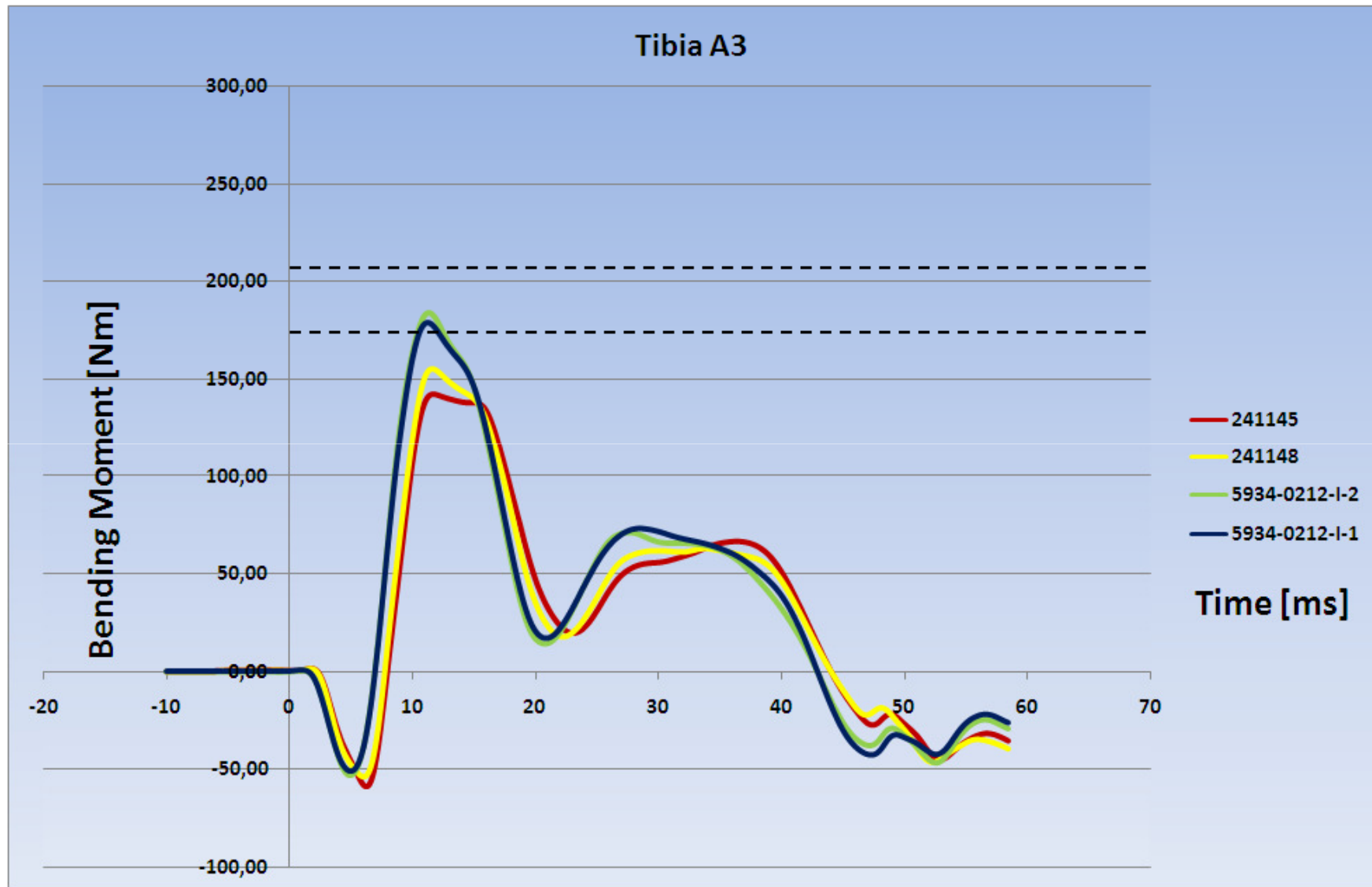
# Test results with production leg



# Test results with production leg

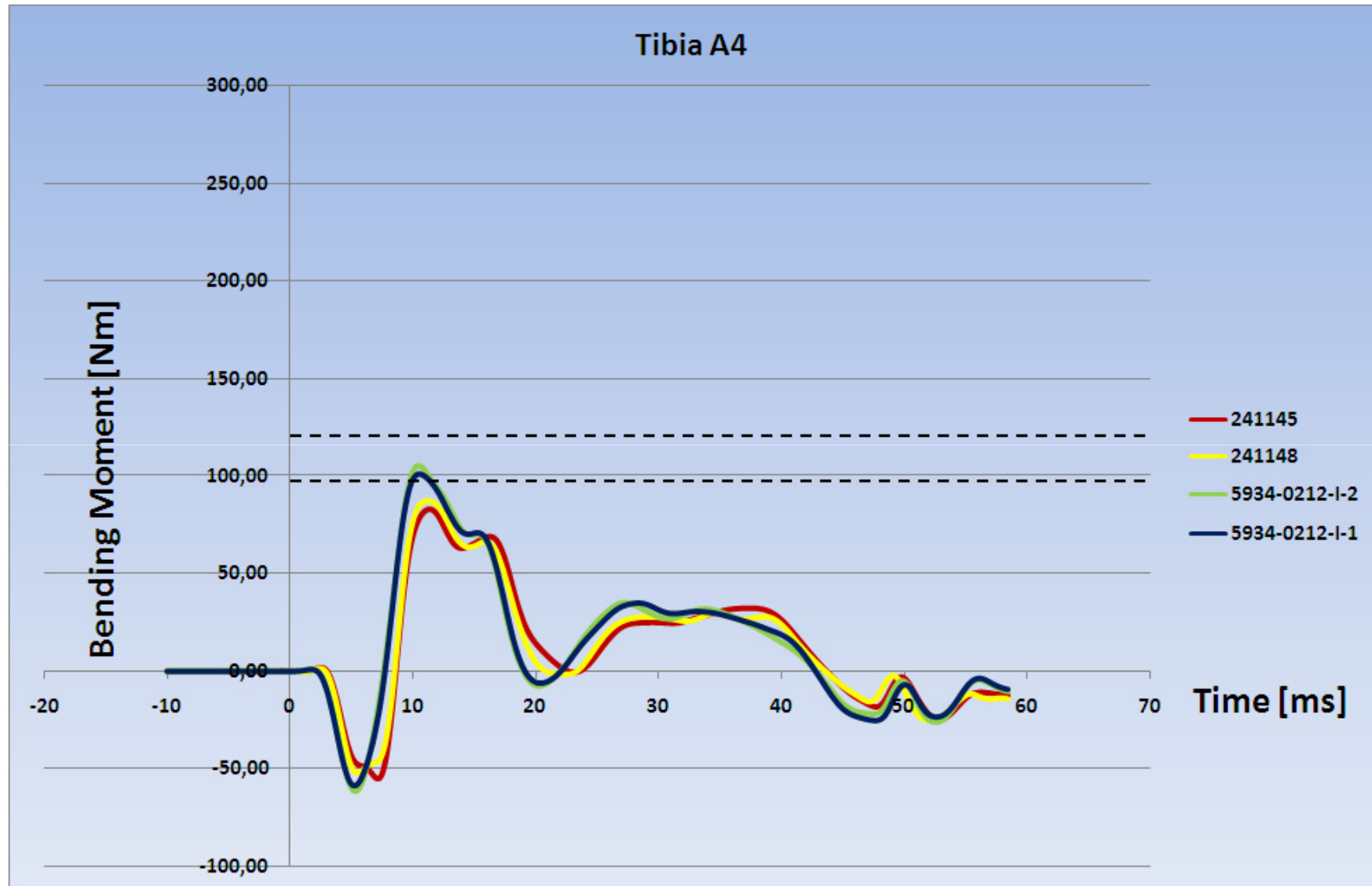


# Test results with production leg

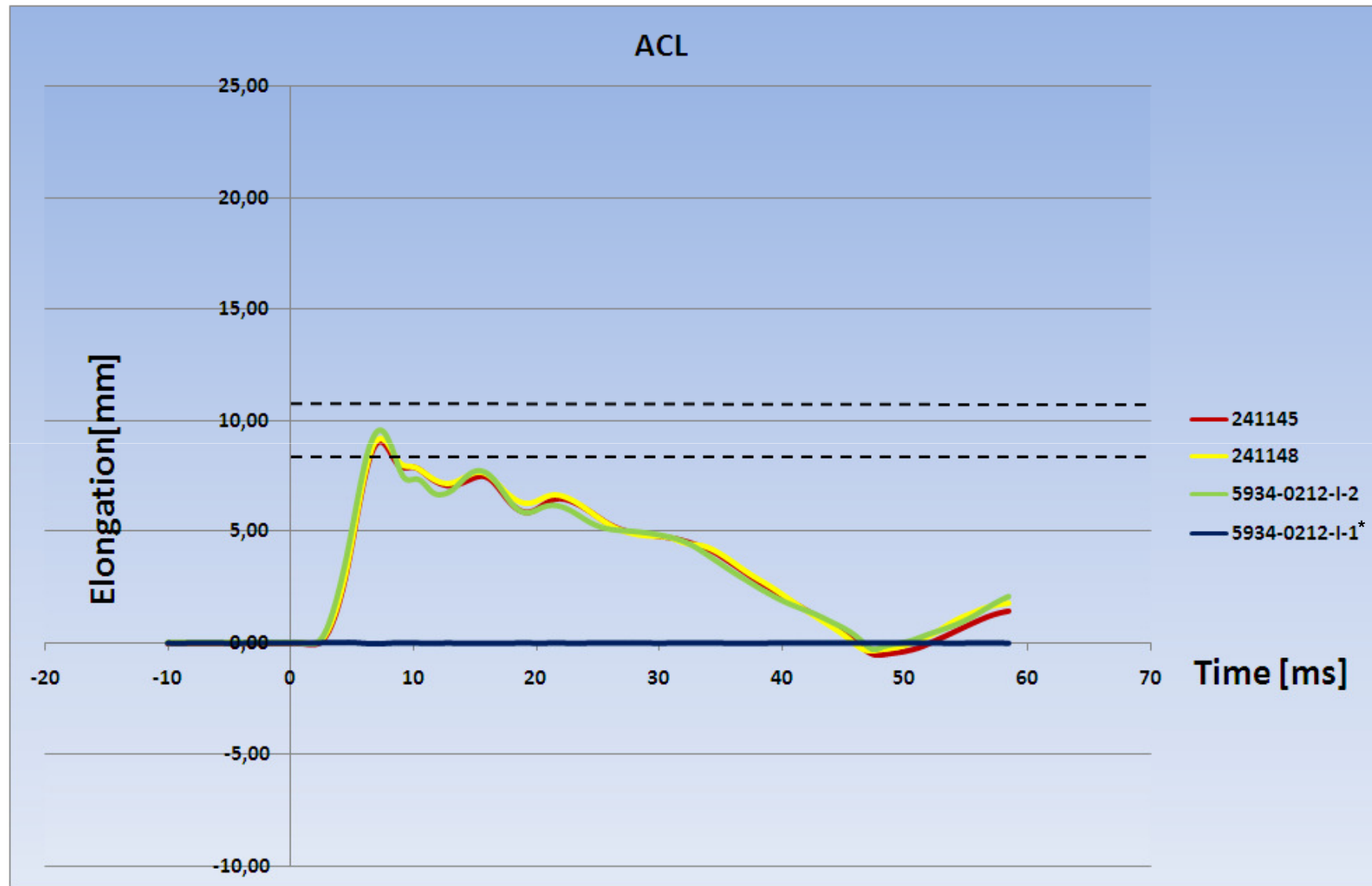




# Test results with production leg

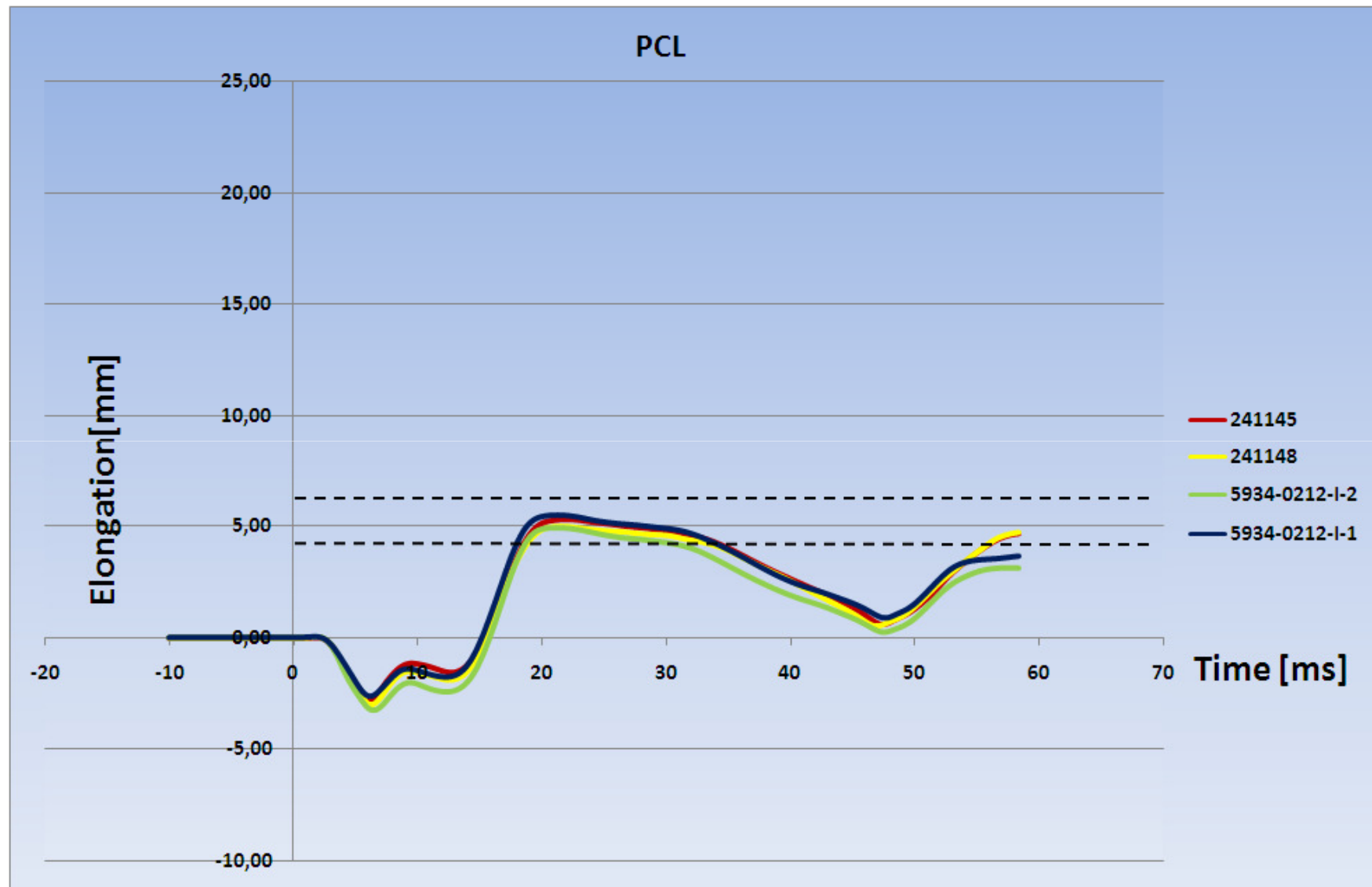


# Test results with production leg

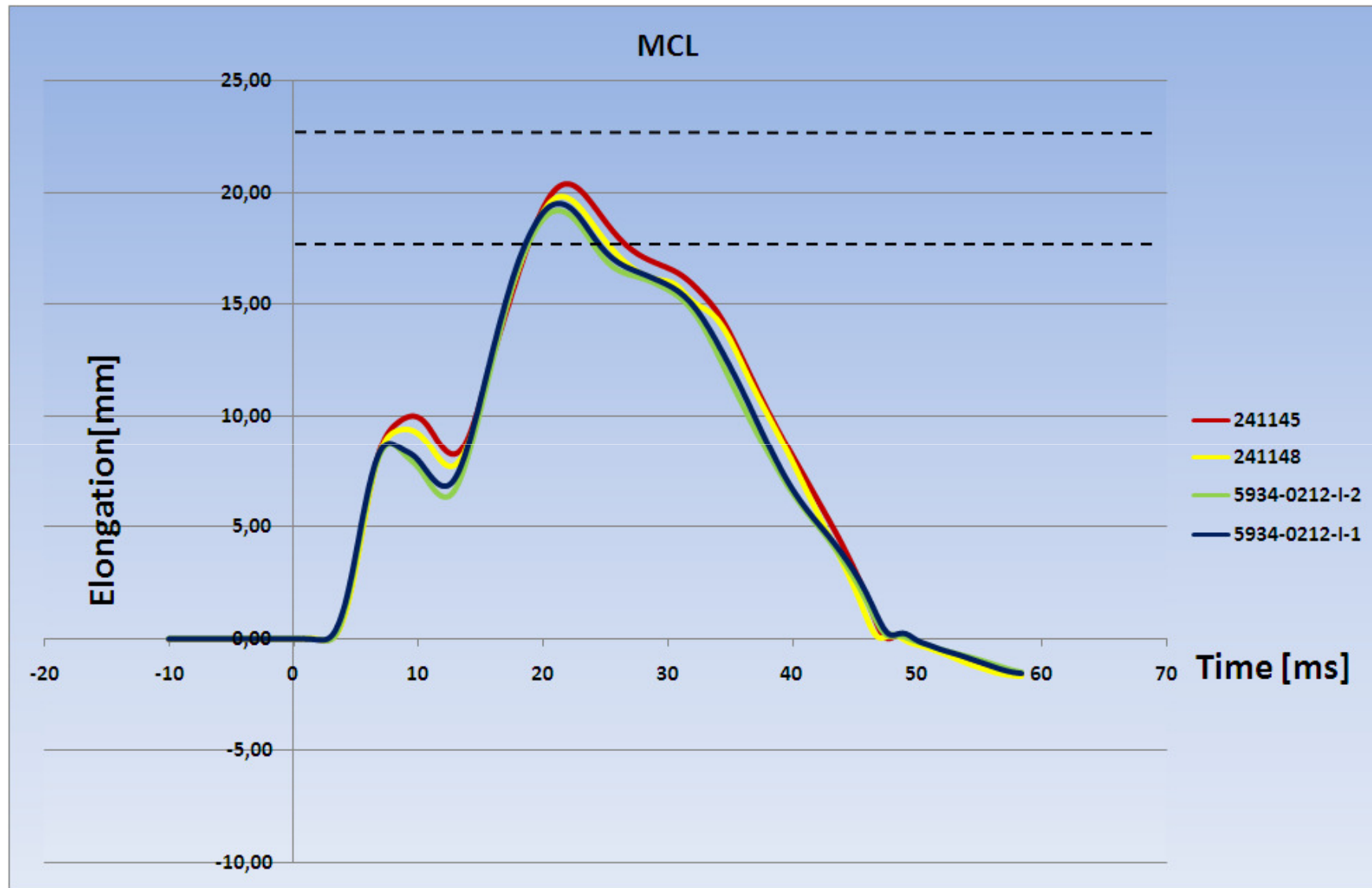


\*: ACL failure

# Test results with production leg



# Test results with production leg

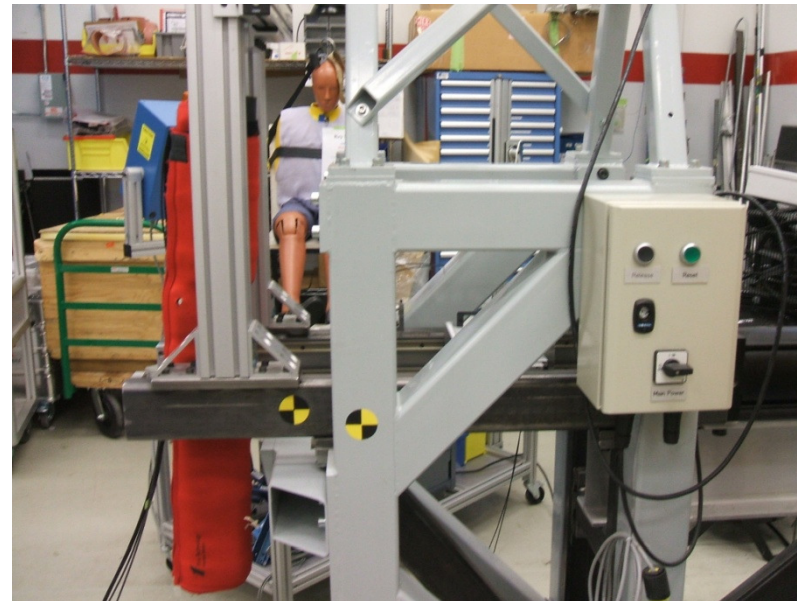
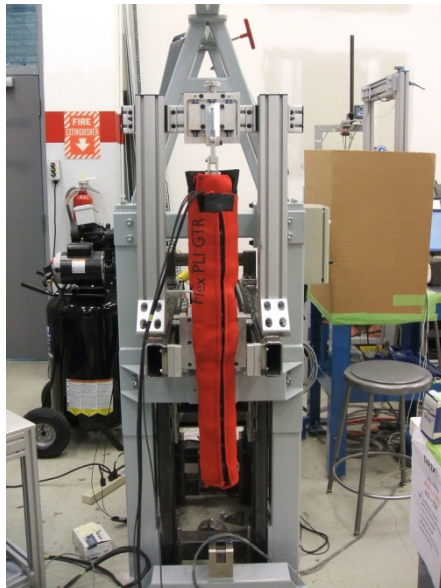


- The test results show significant differences in terms of femur and tibia peak loadings as well as time history curves.
- When tested at BAST, all inverse certification corridors were met without any problem:

	Femur A3	Femur A2	Femur A1	Tibia A1	Tibia A2	Tibia A3	Tibia A4	ACL	PCL	MCL
241145	101,11	168,52	218,91	223,68	204,11	142,55	82,83	9,03	5,33	20,42
241148	87,04	161,23	212,66	223,58	206,73	155,59	87,14	9,18	4,98	19,85
5934-0212-I-2	116,46	146,60	193,36	250,07	236,14	184,12	105,06	9,56	4,96	19,22
5934-0212-I-1	114,17	149,93	203,50	246,56	231,40	178,81	101,03	0,01	5,50	19,51

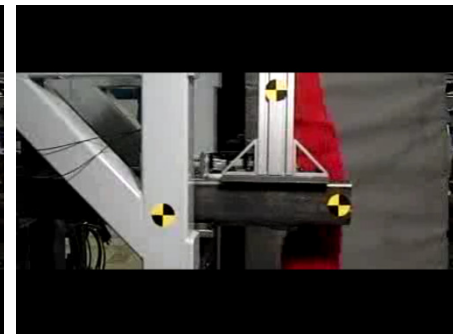
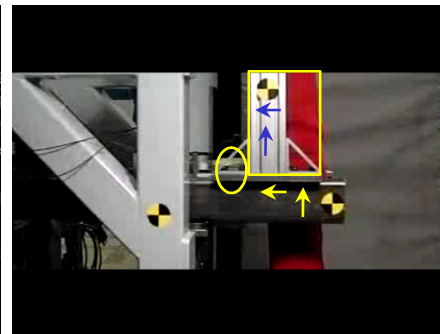
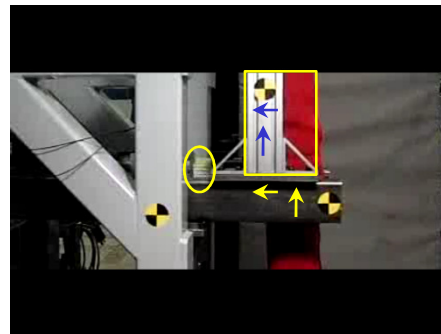
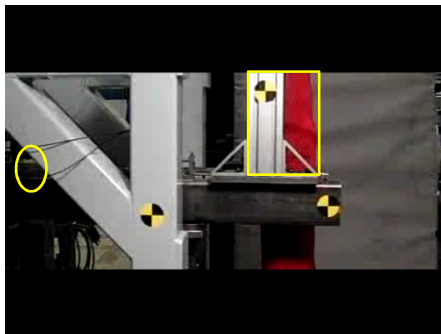
- Evidence is given that the differences result from differences in test setups and impact conditions.

# Inverse Test Setup - HUM



**FlexPLI  
suspension frame  
mounted on  
test stand**

**At the time of first contact FlexPLI is in motion  
(direction upwards and towards moving ram):**

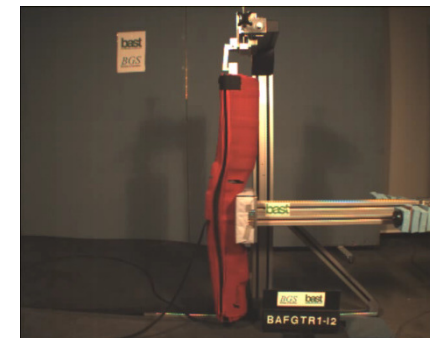
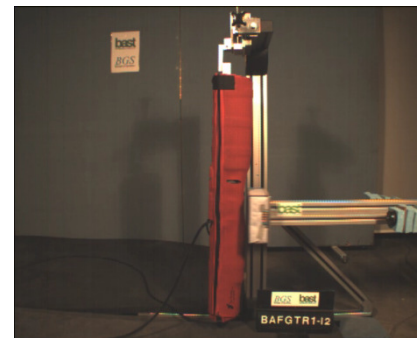
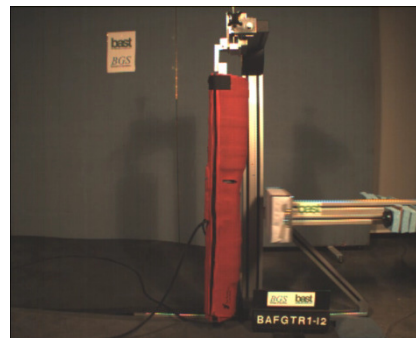
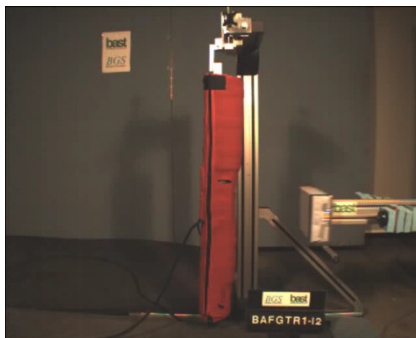


# Inverse Test Setup - BAST



**FlexPLI  
suspension frame  
stand alone  
solution**

**At the time of first contact FlexPLI is in static condition:**



- The work of solving issues with Humanetics test stand is currently ongoing.
- At the current stage it seems possible to produce legforms meeting both inverse as well as pendulum corridors without them having to be redefined or shifted.
- Any update or (even slight) shift of the current inverse certification corridors need to be considered with care.



**Thank you !**