



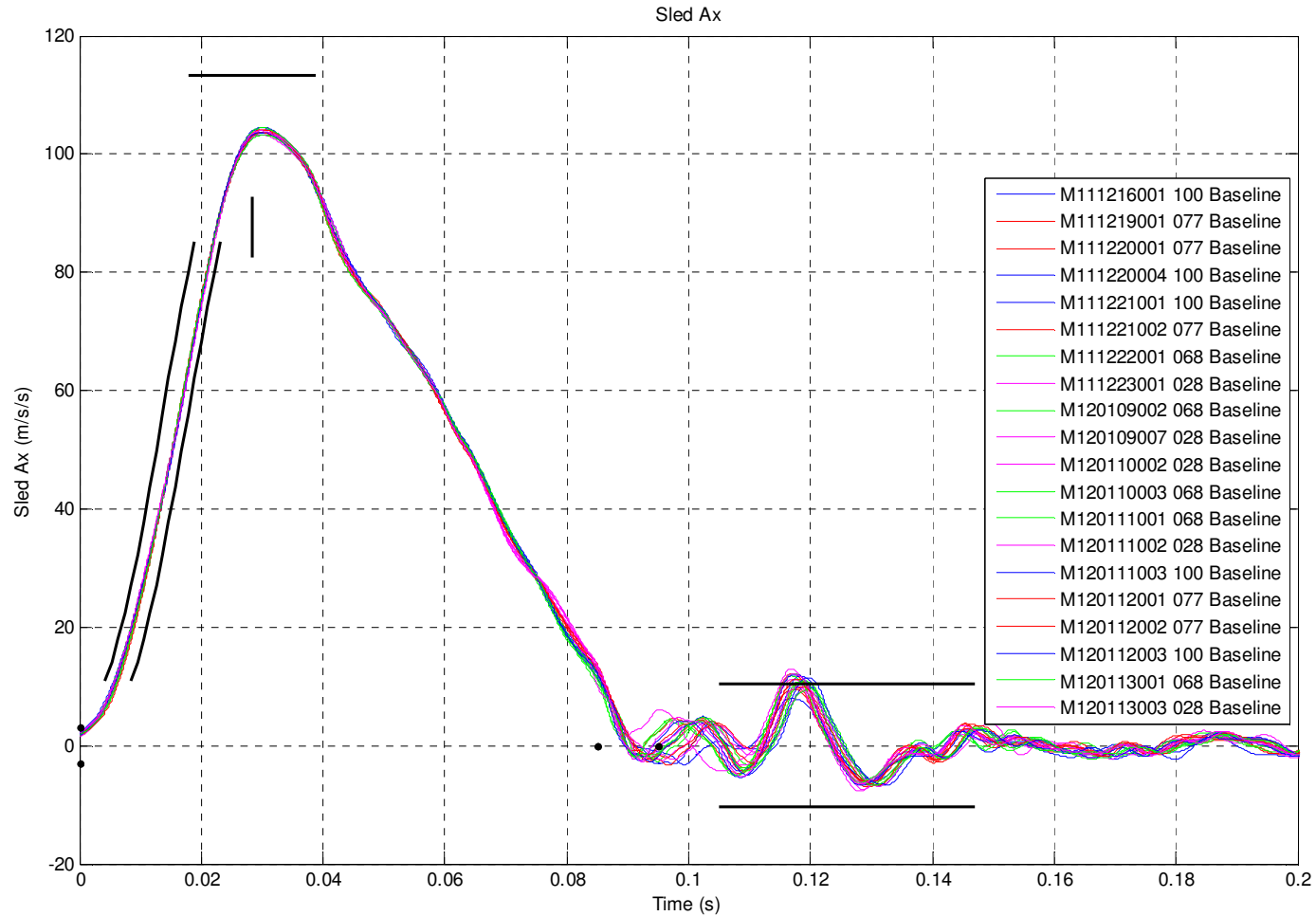
Progress update – TRL/EC Test Programme

Presented by David Hynd
23 February, 2012



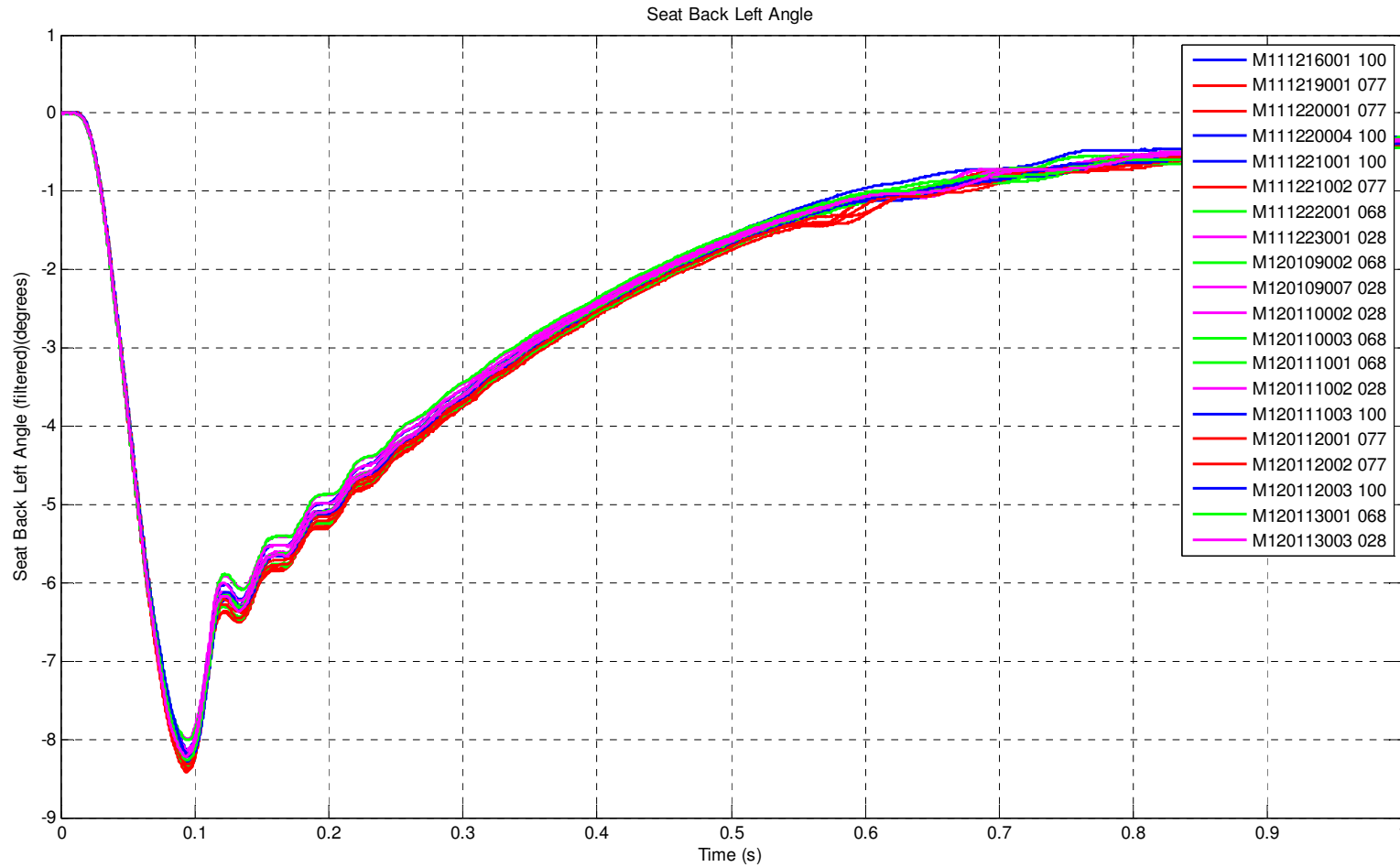
Seat Test Results

20 baseline tests with 028, 068, 077 and 100



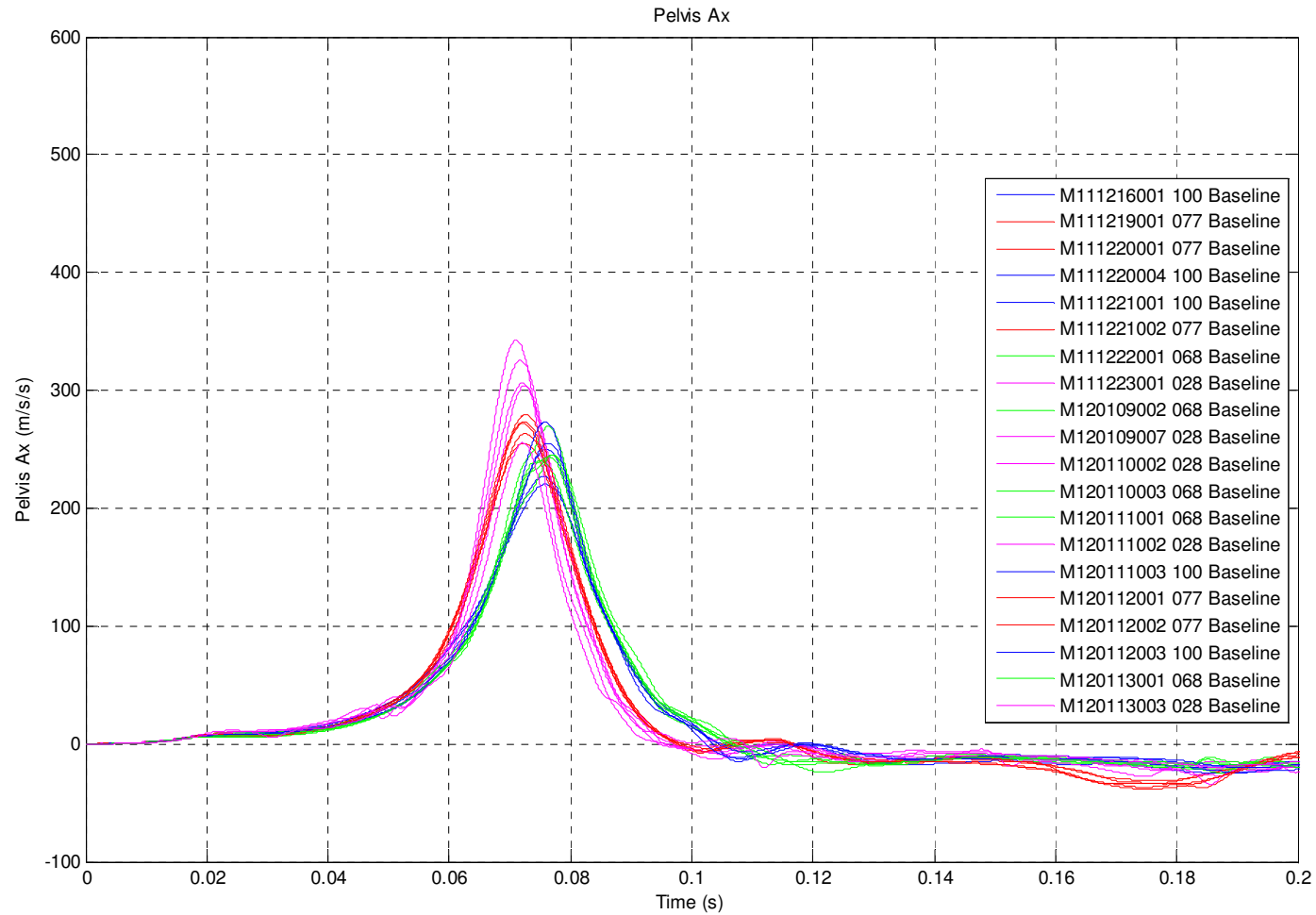
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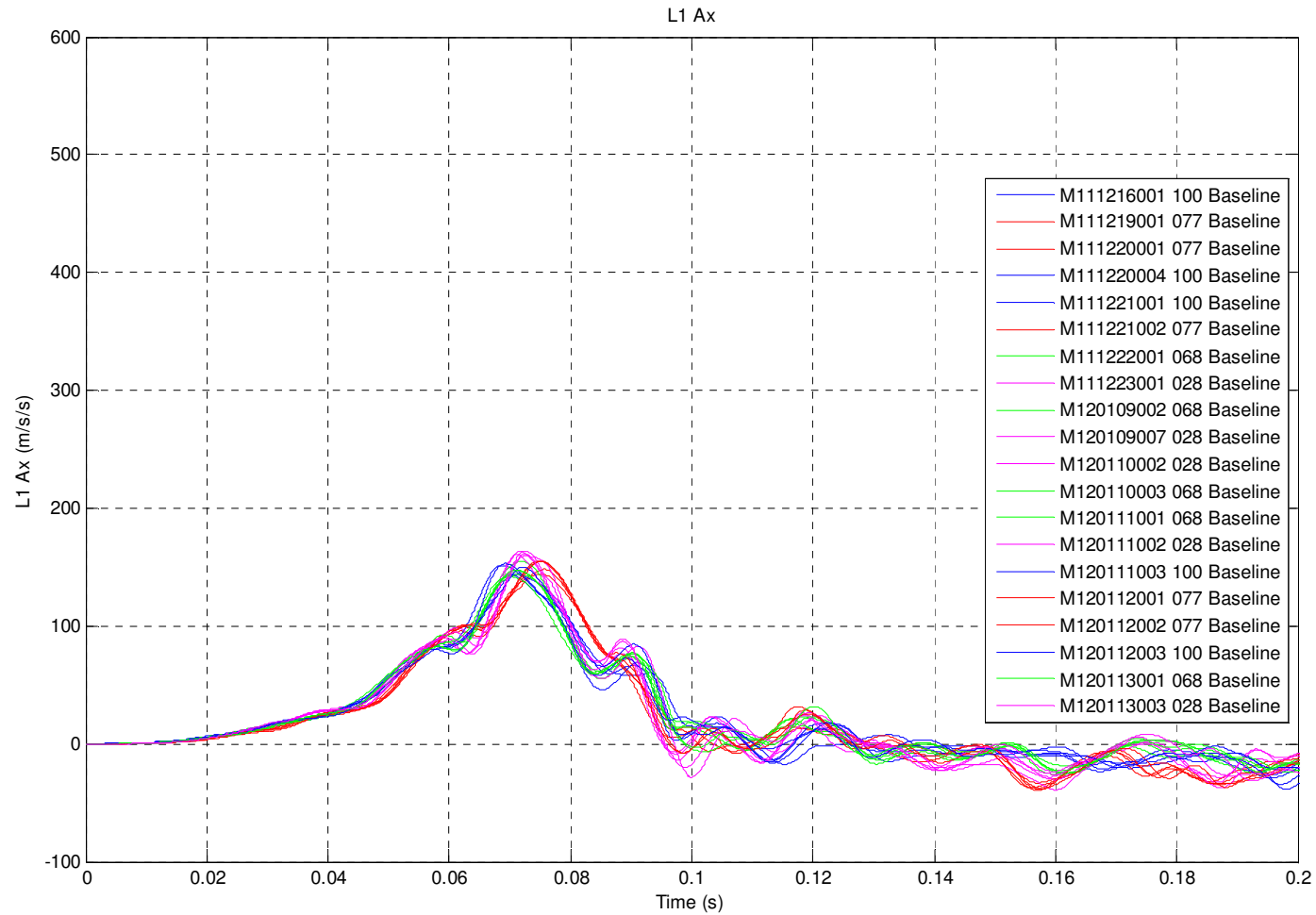
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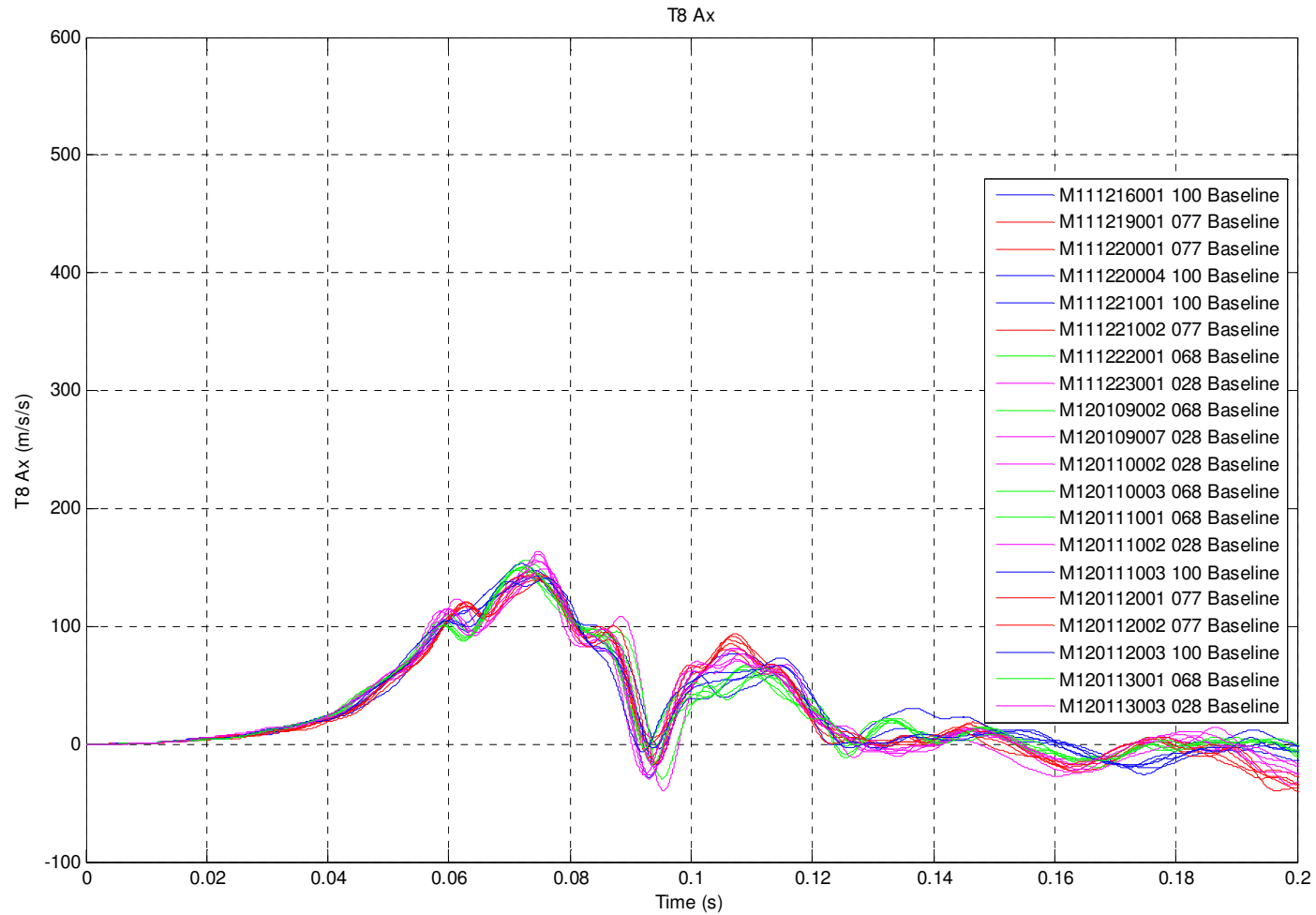
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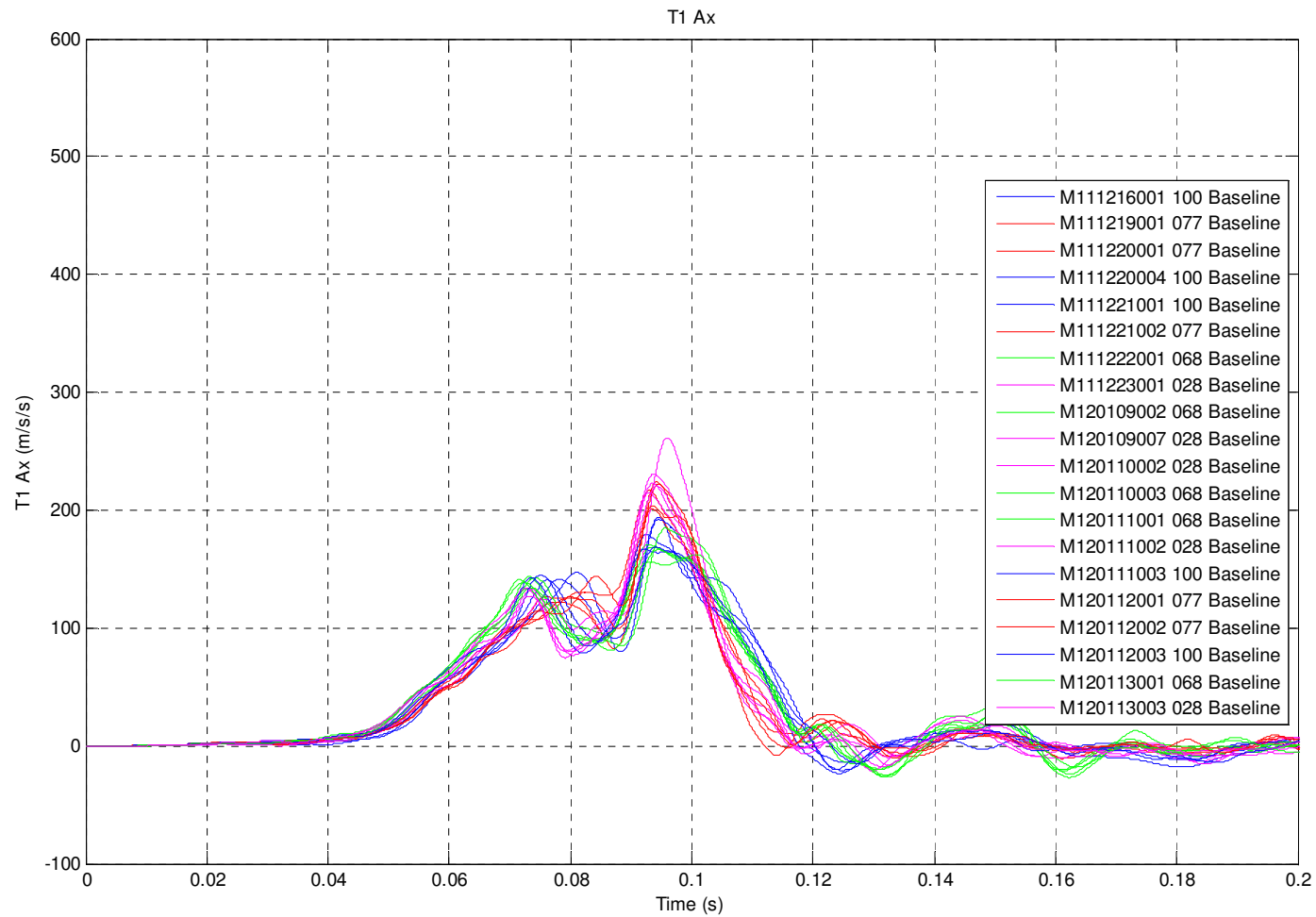
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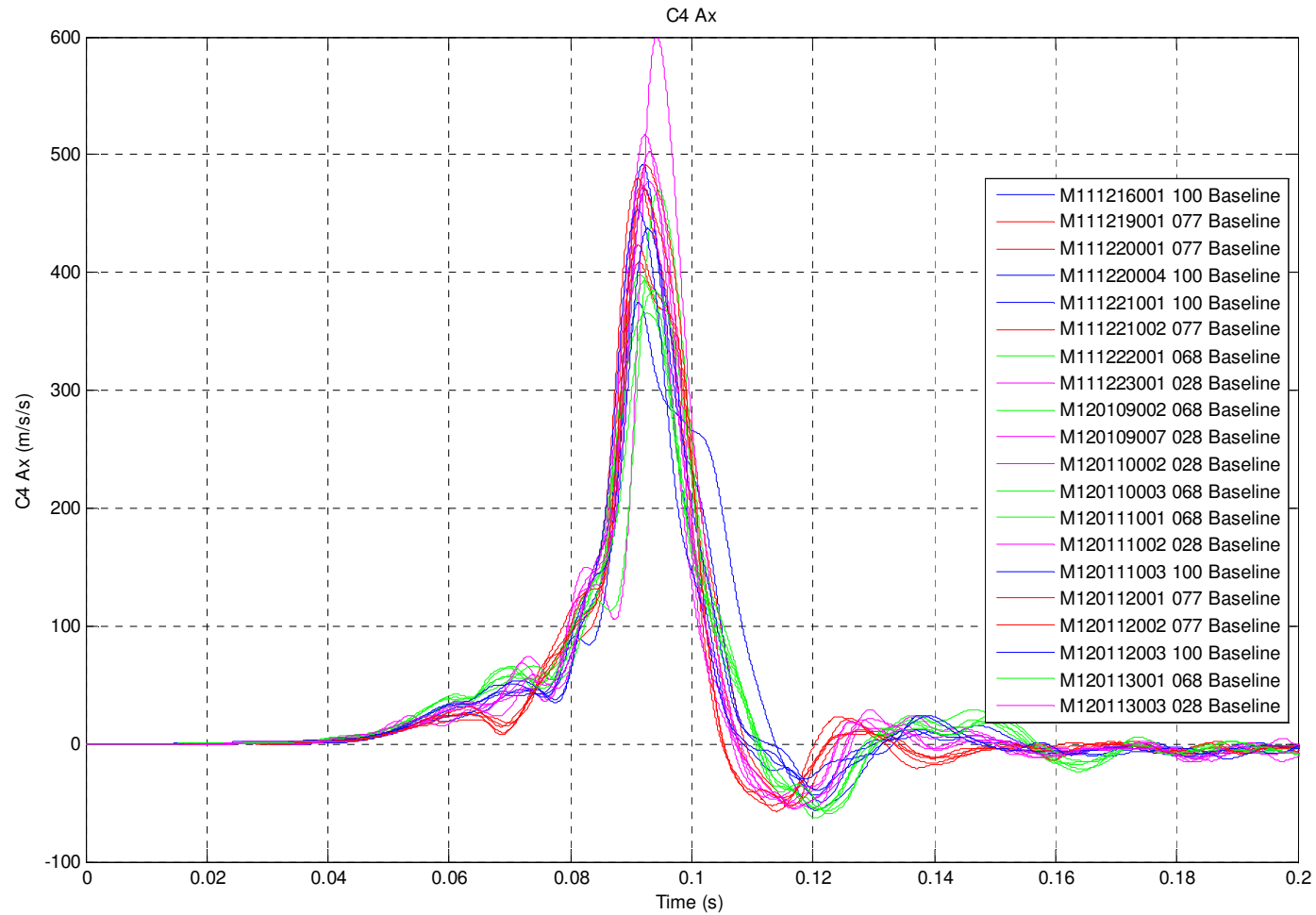
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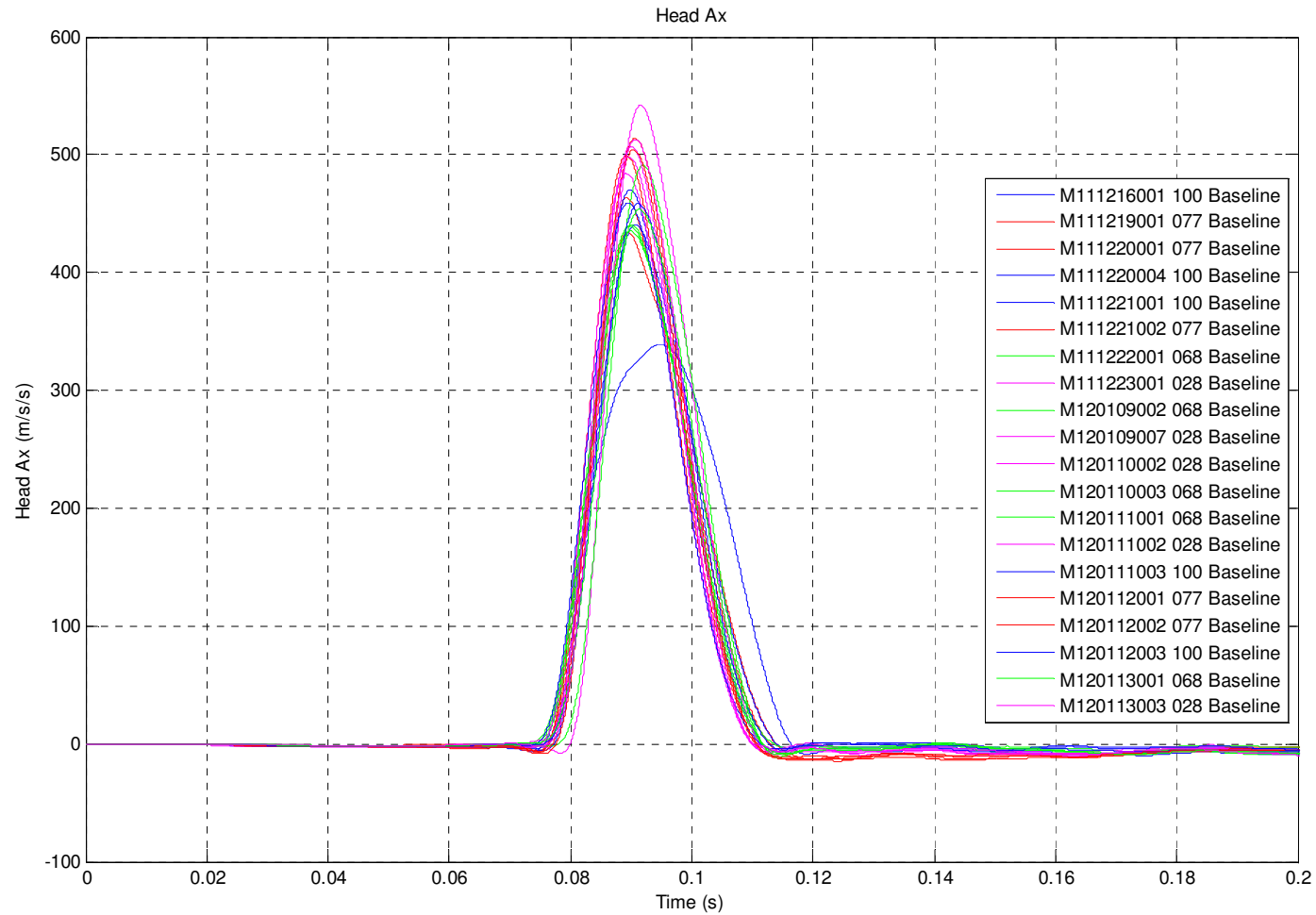
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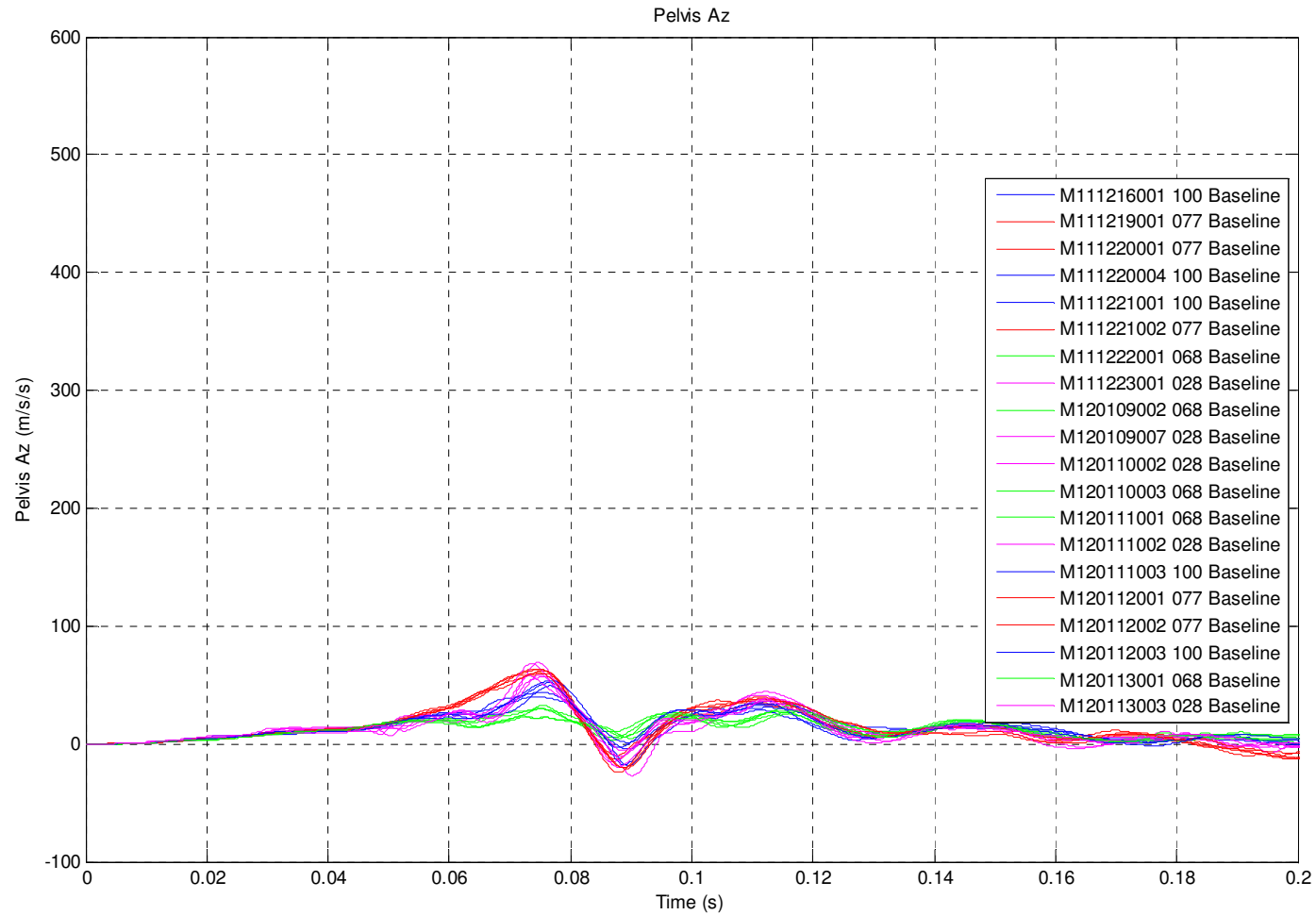
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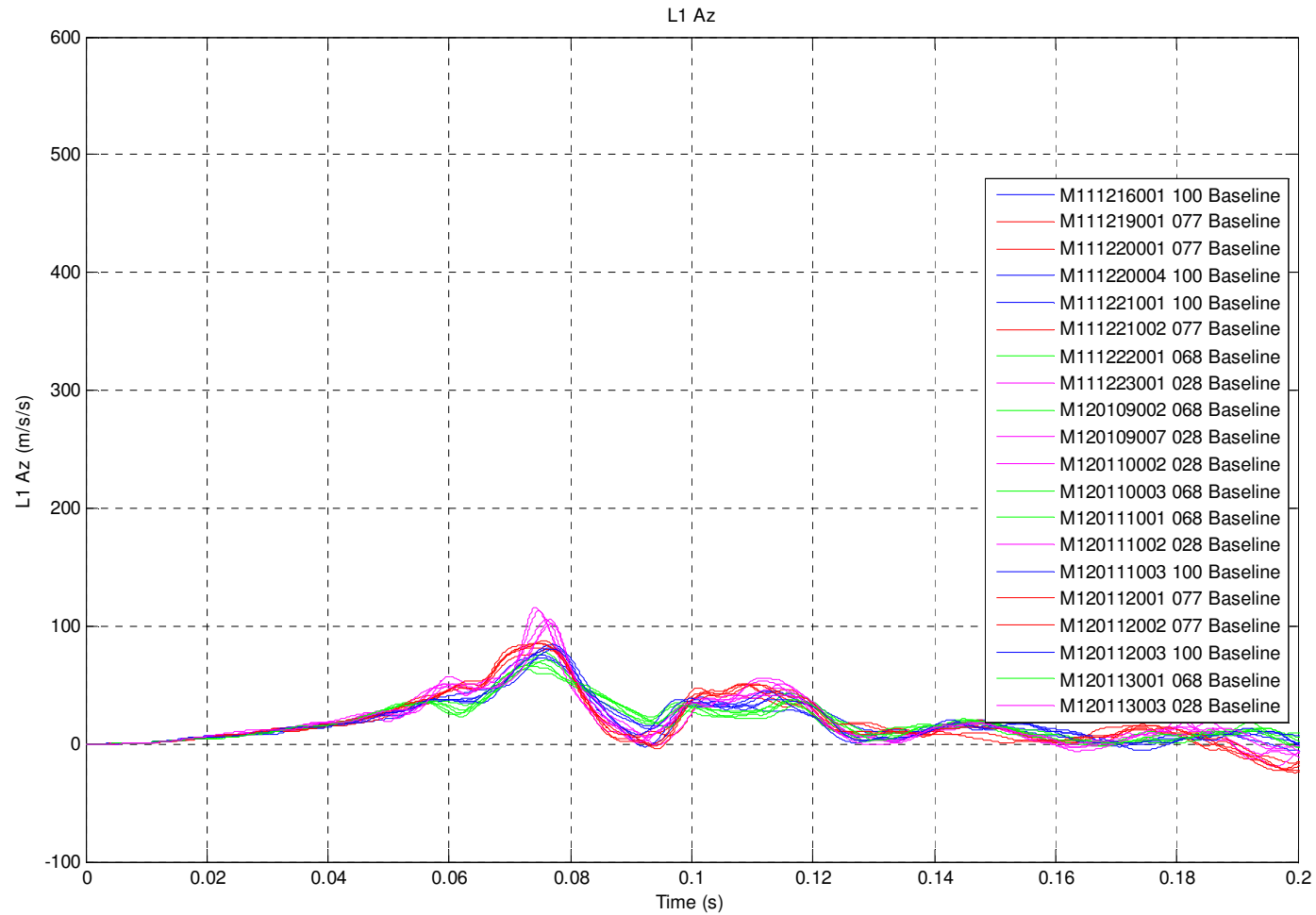
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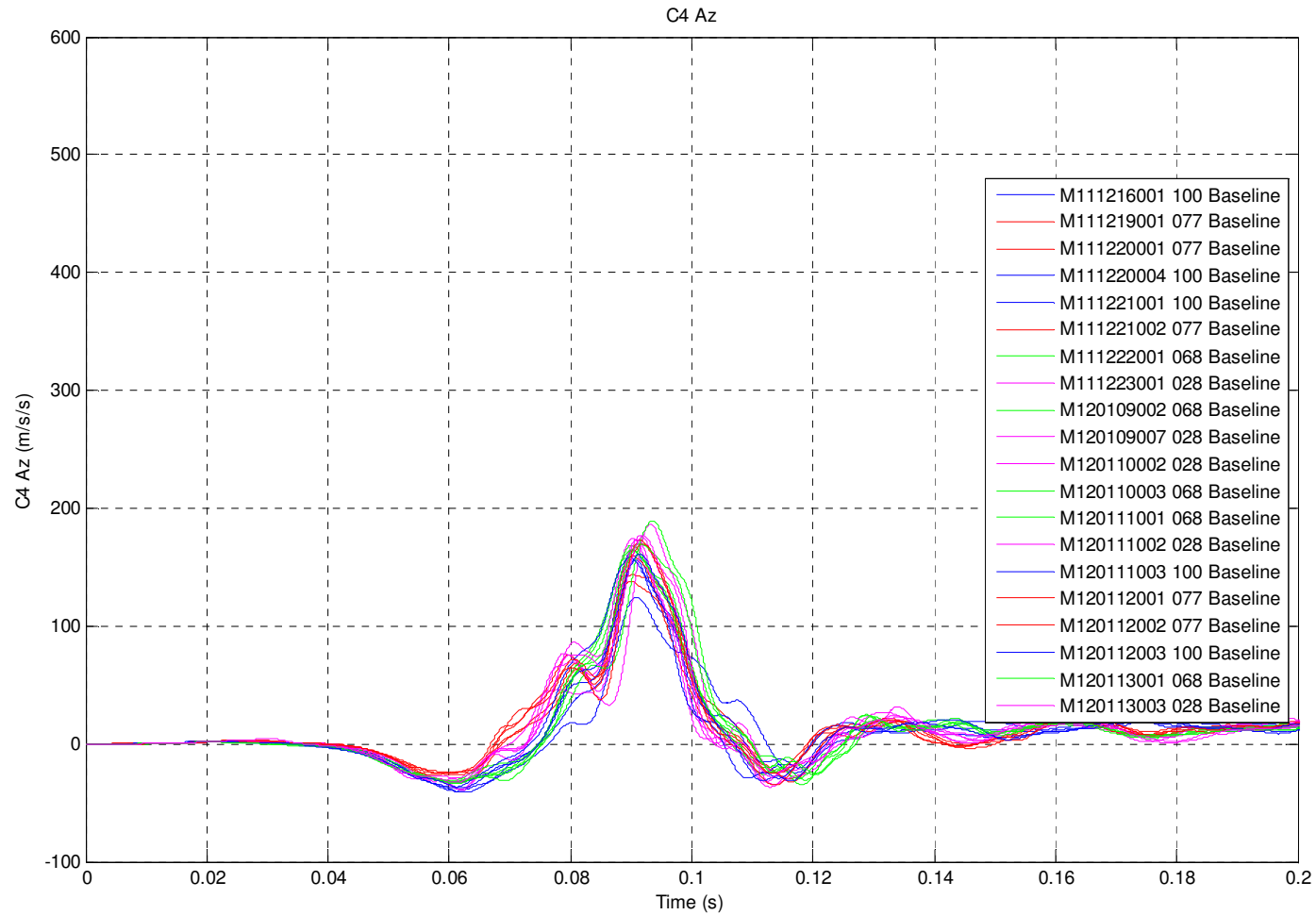
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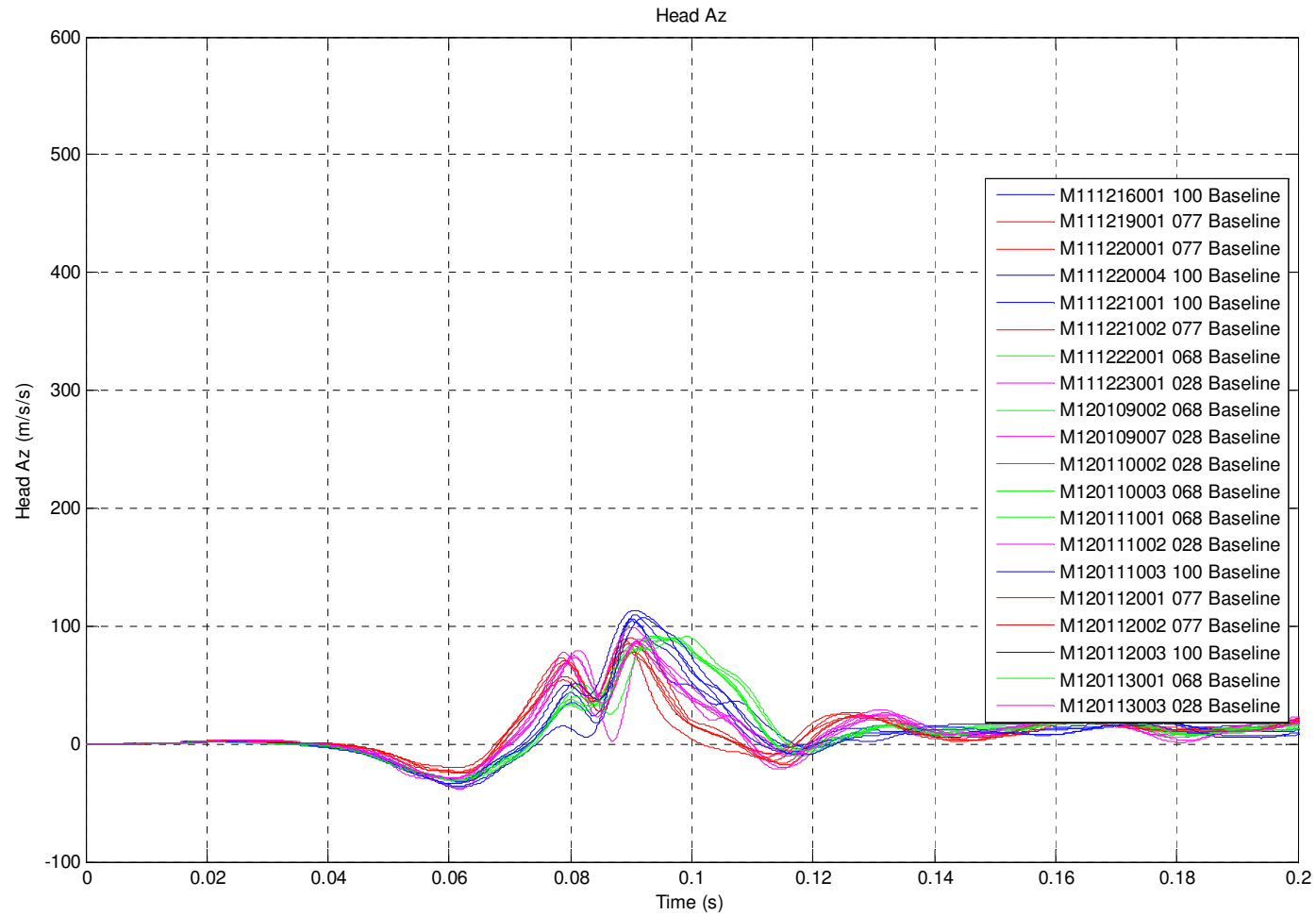
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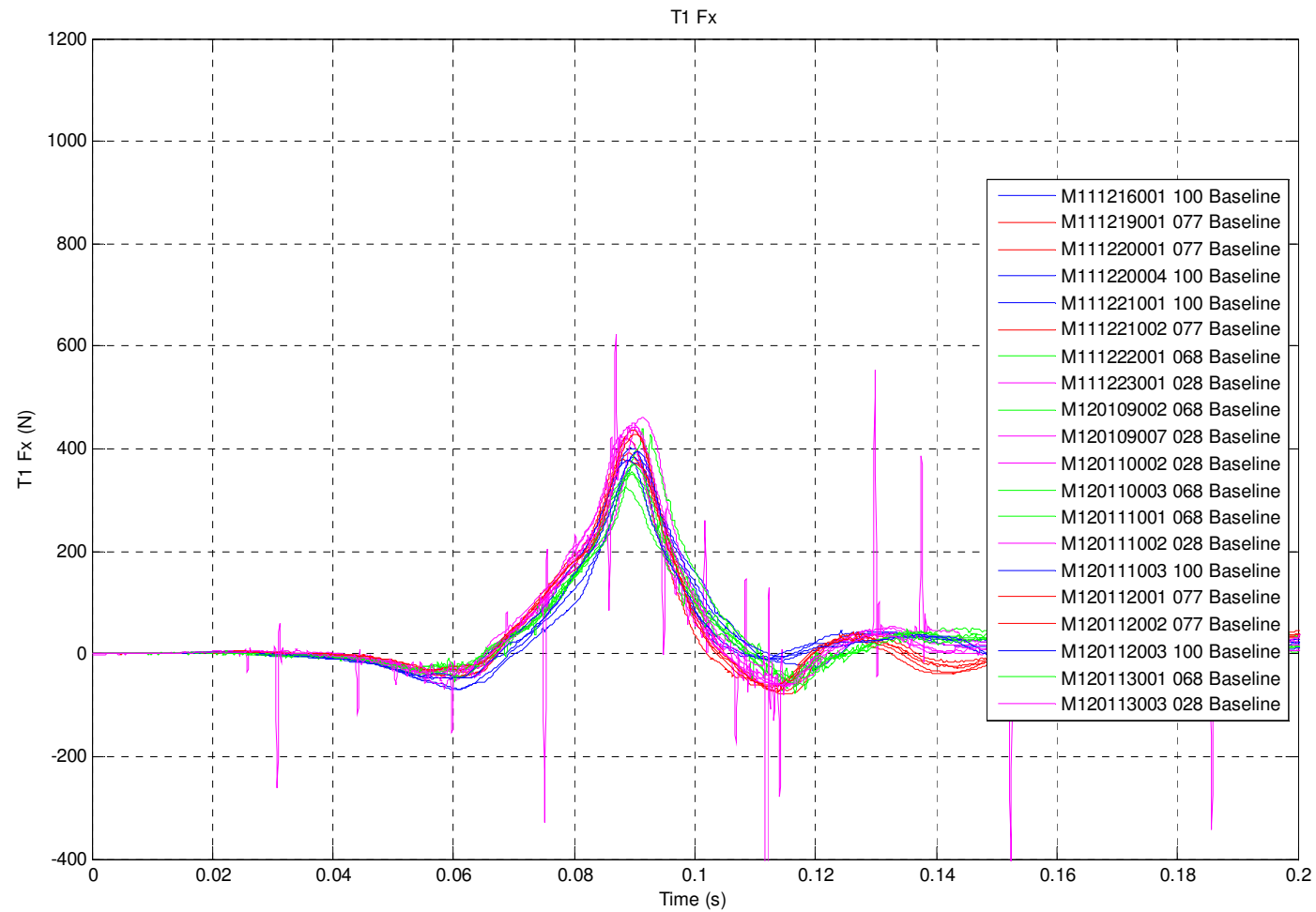
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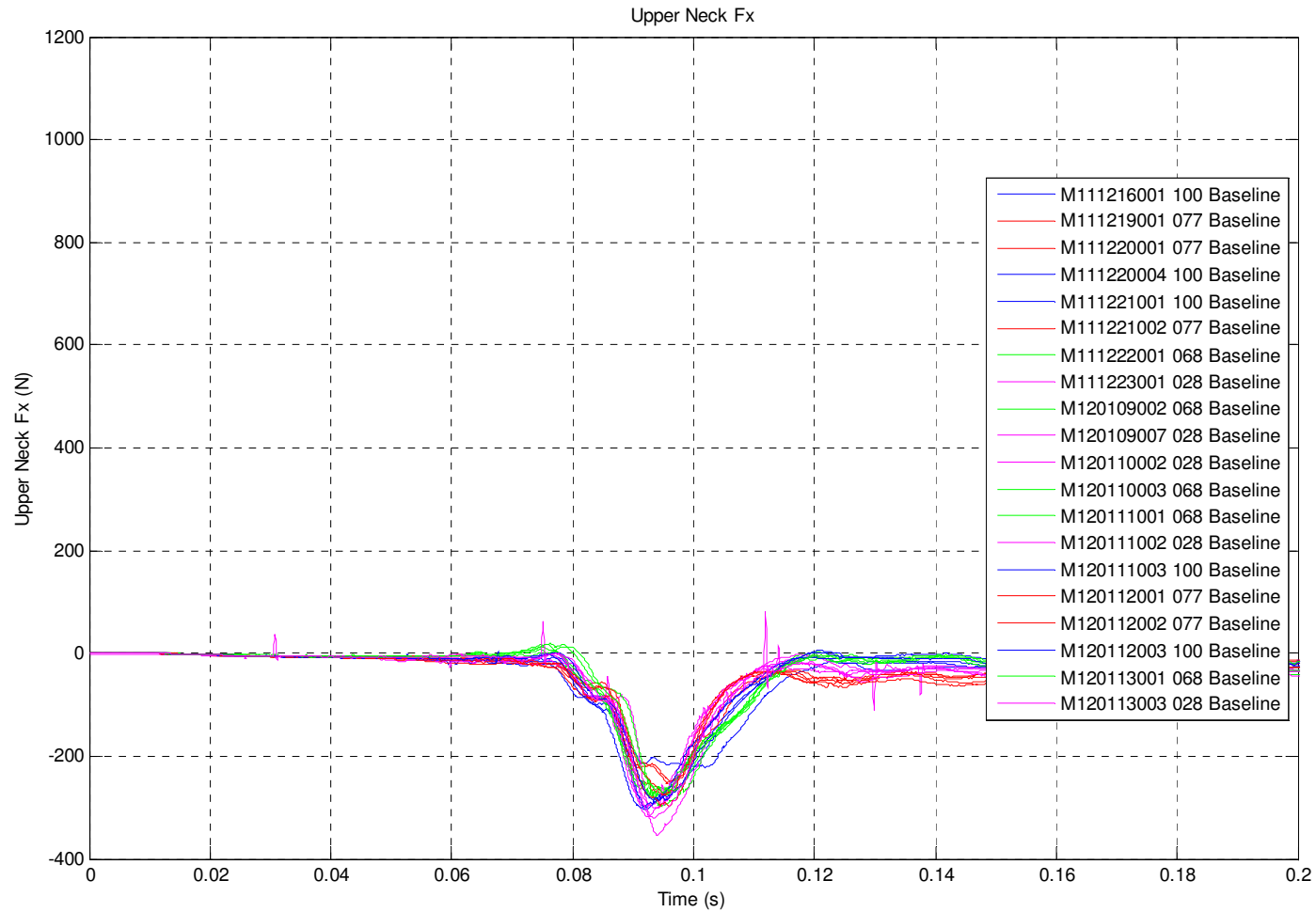
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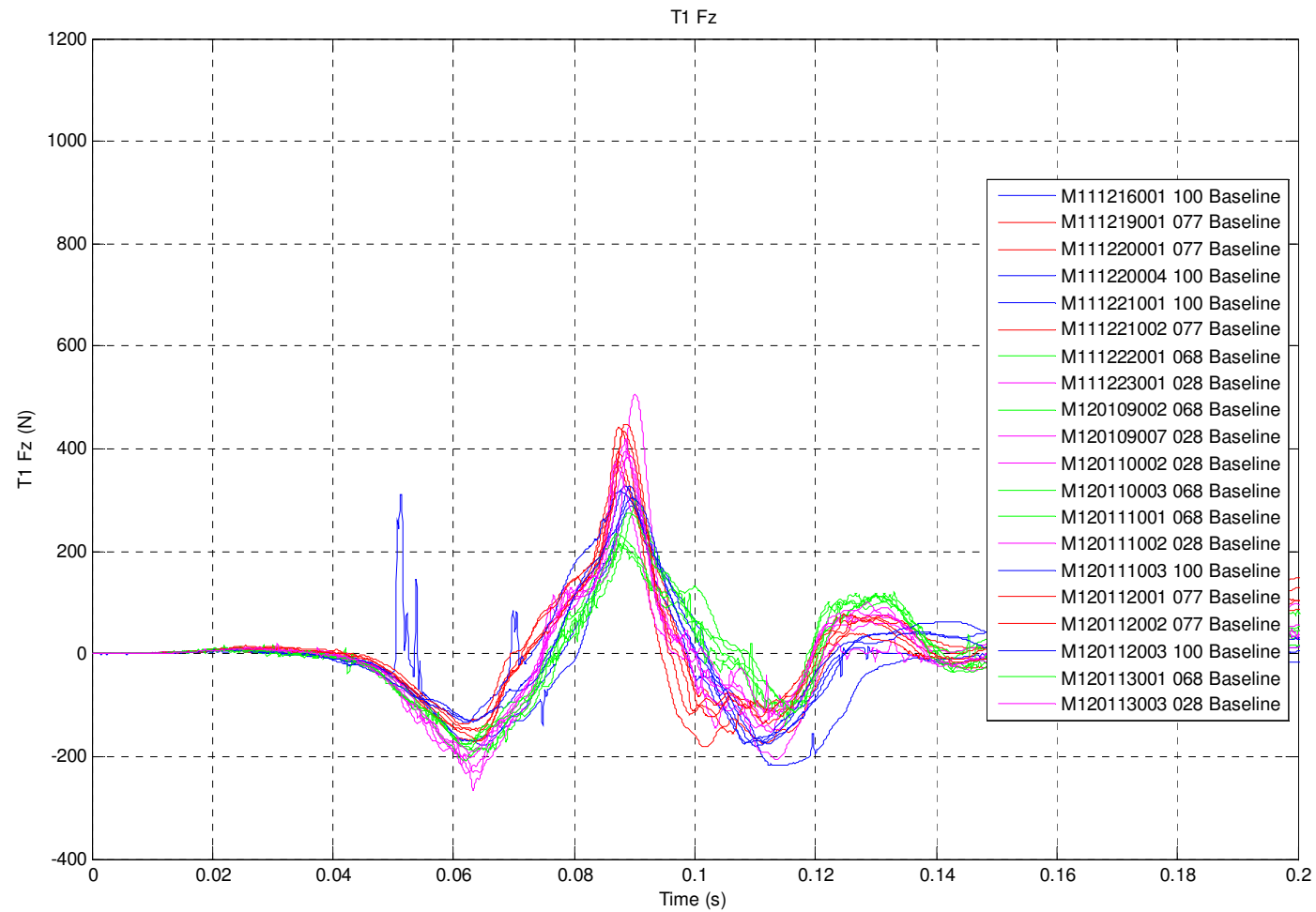
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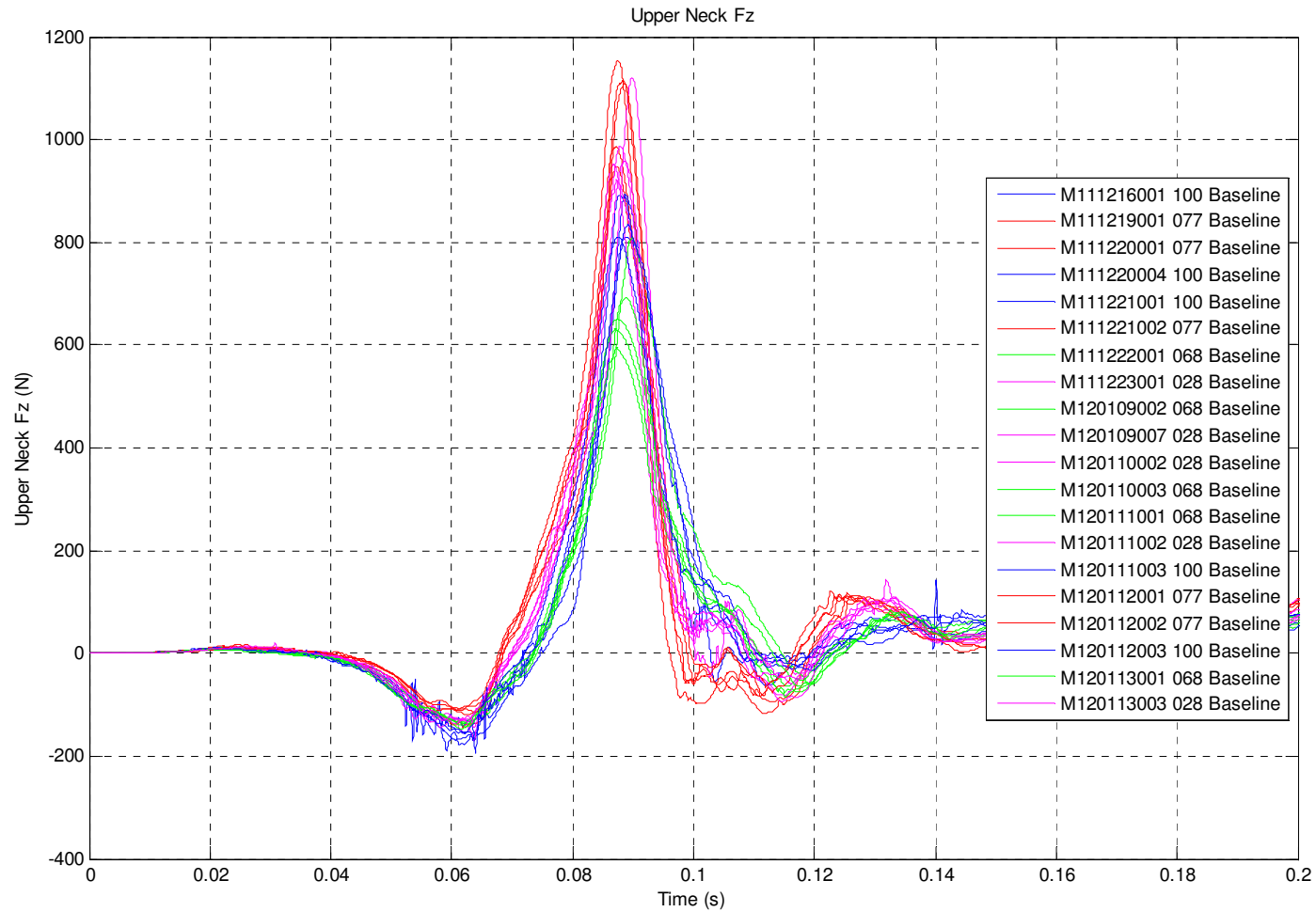
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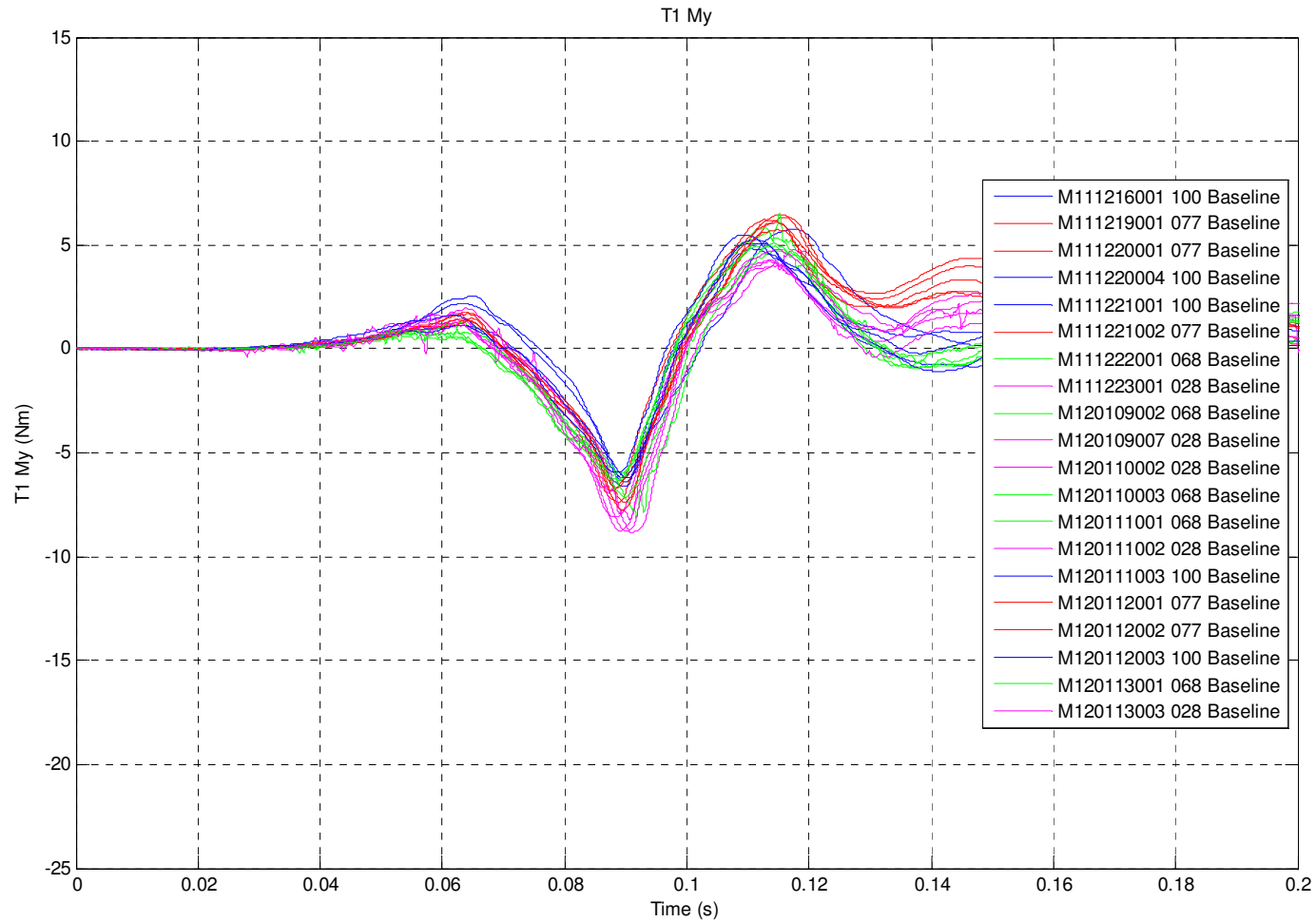
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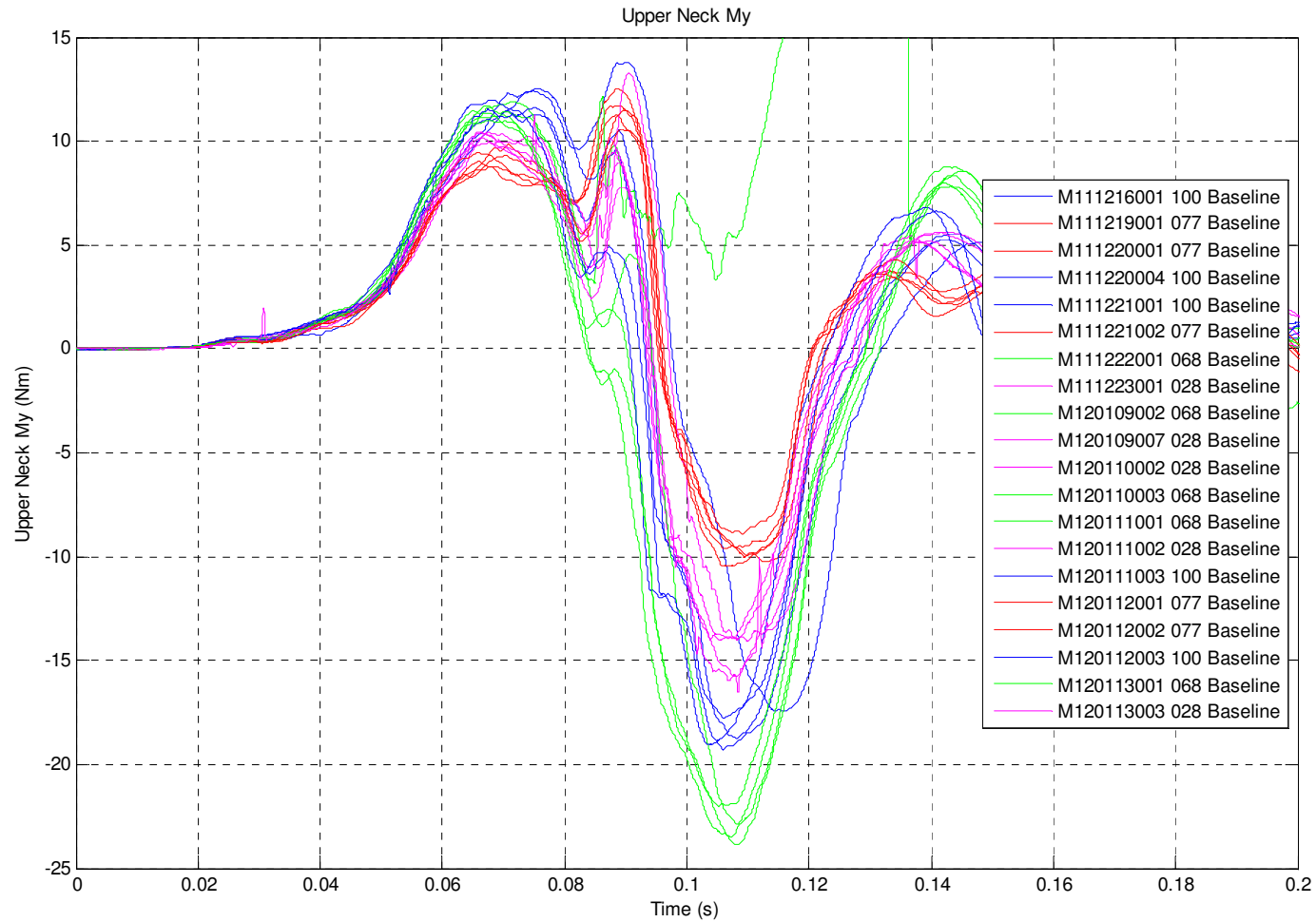
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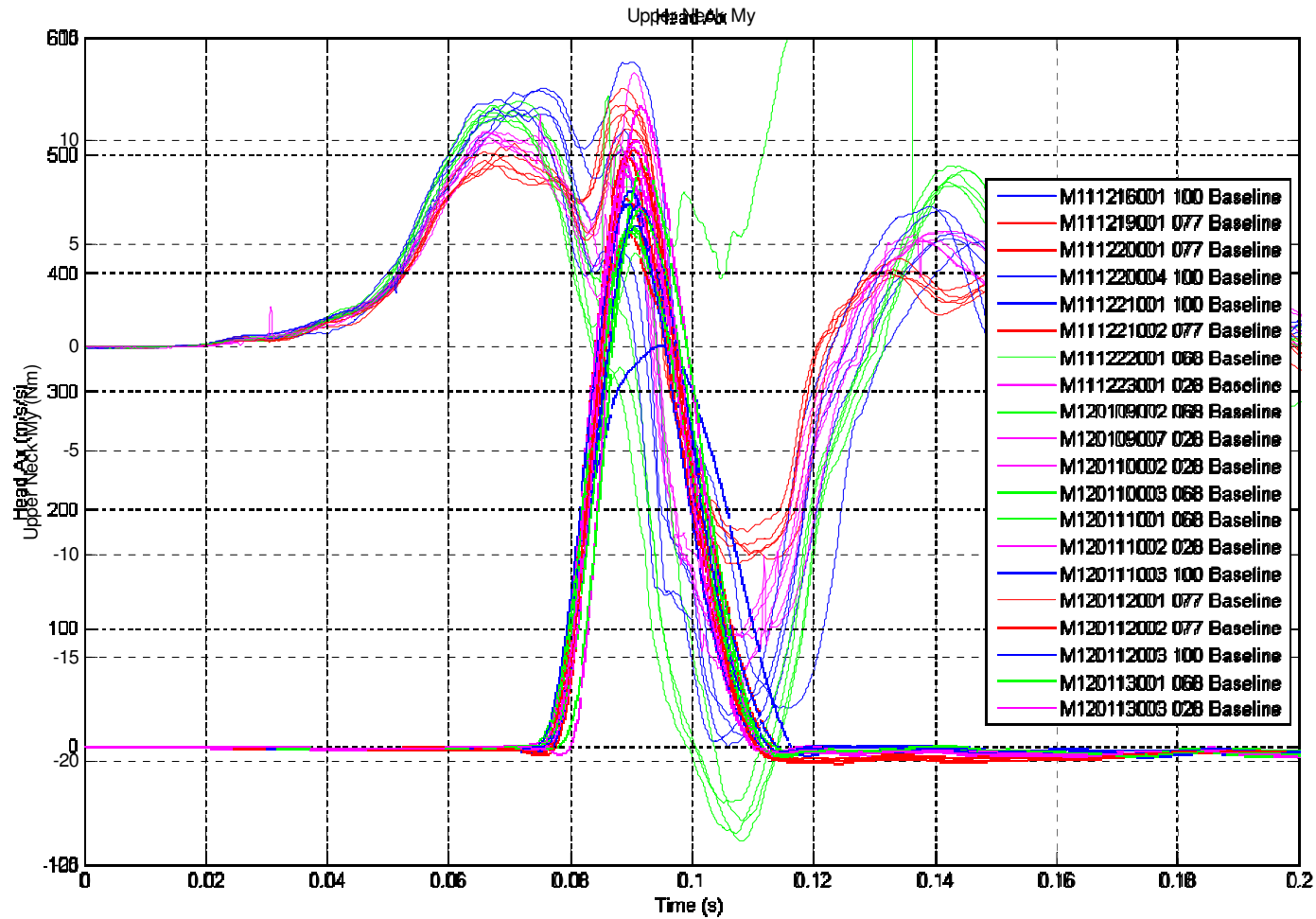
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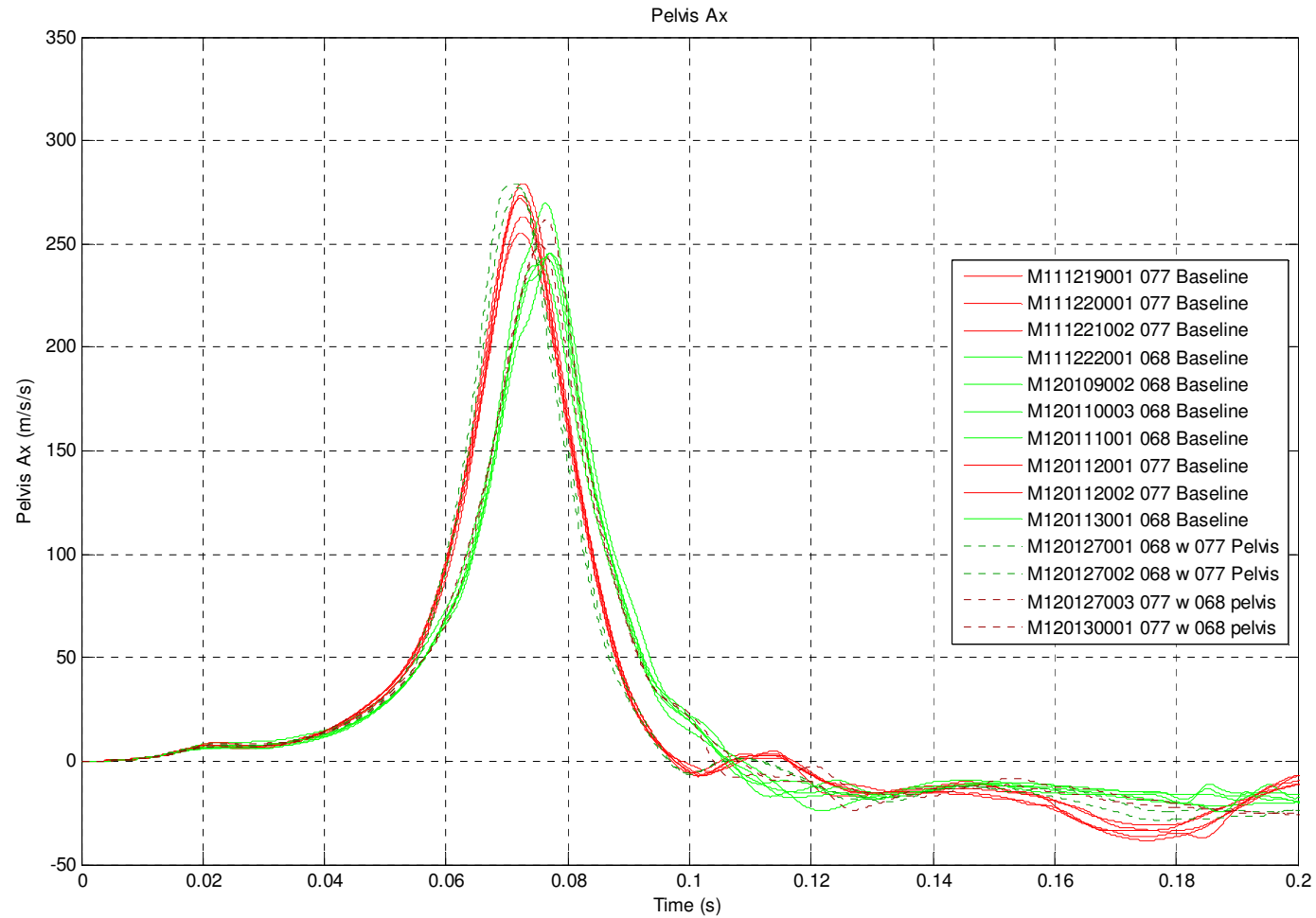
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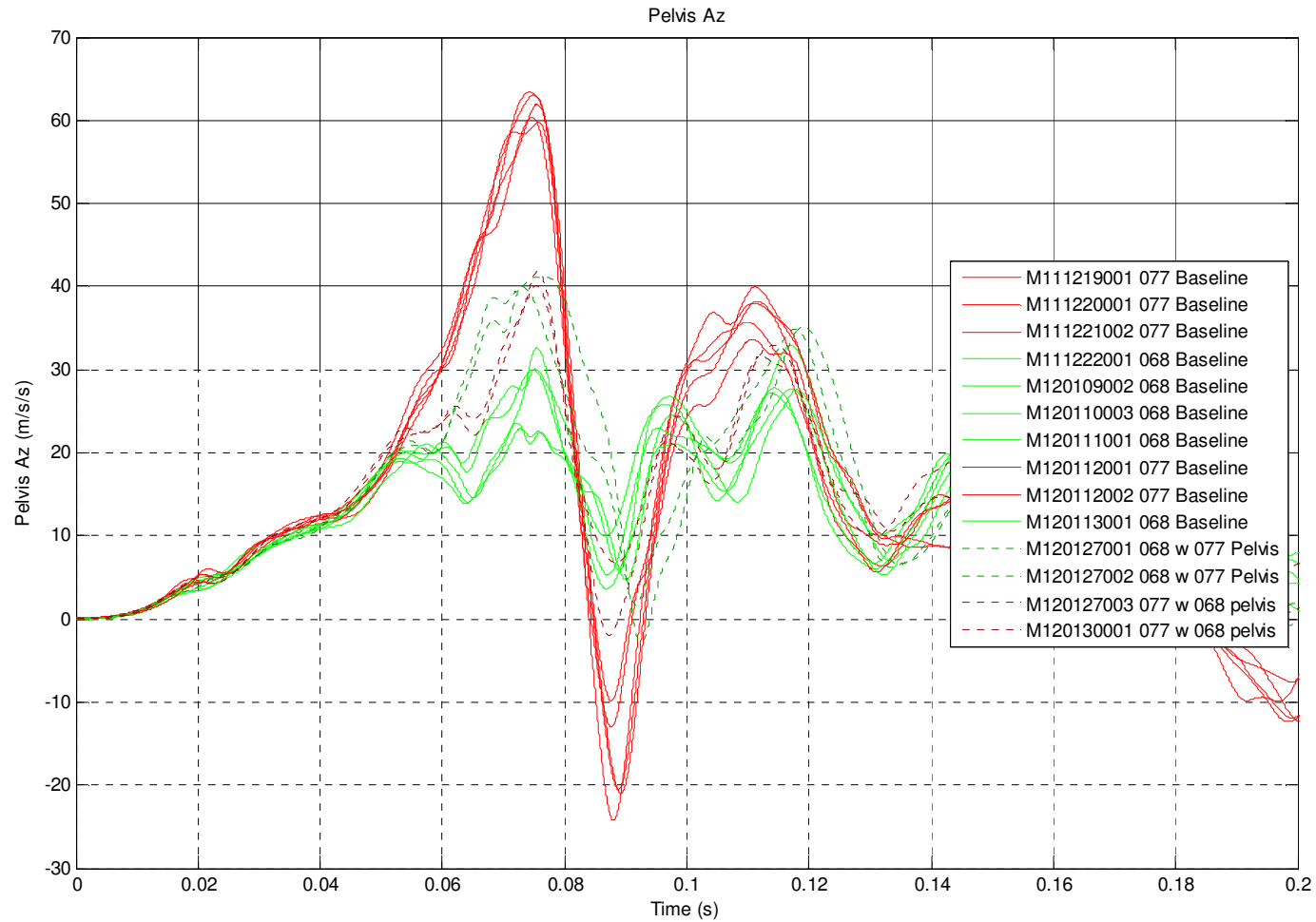
Seat Test Results

Baseline tests with 068 and 077 + pelvis swap



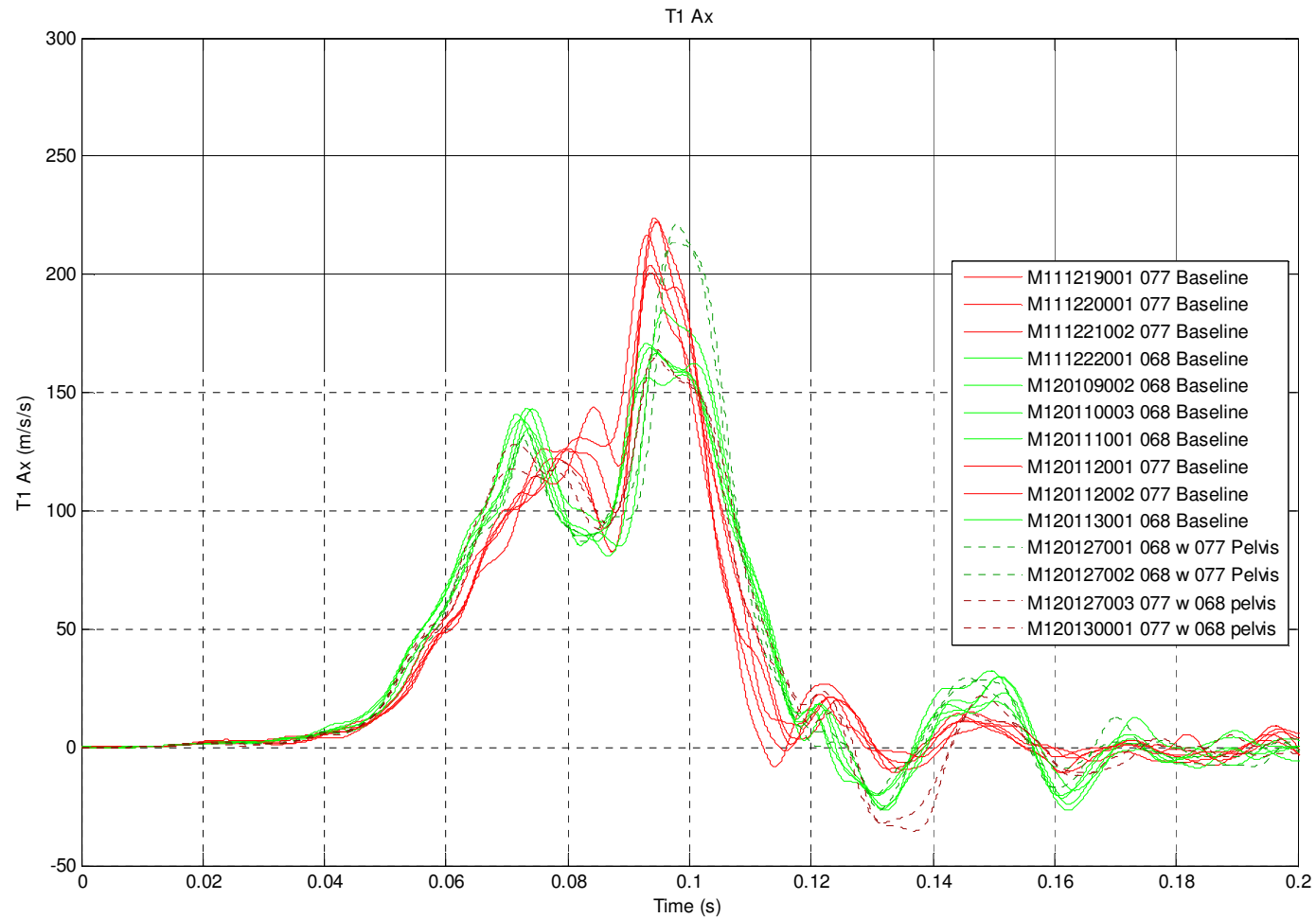
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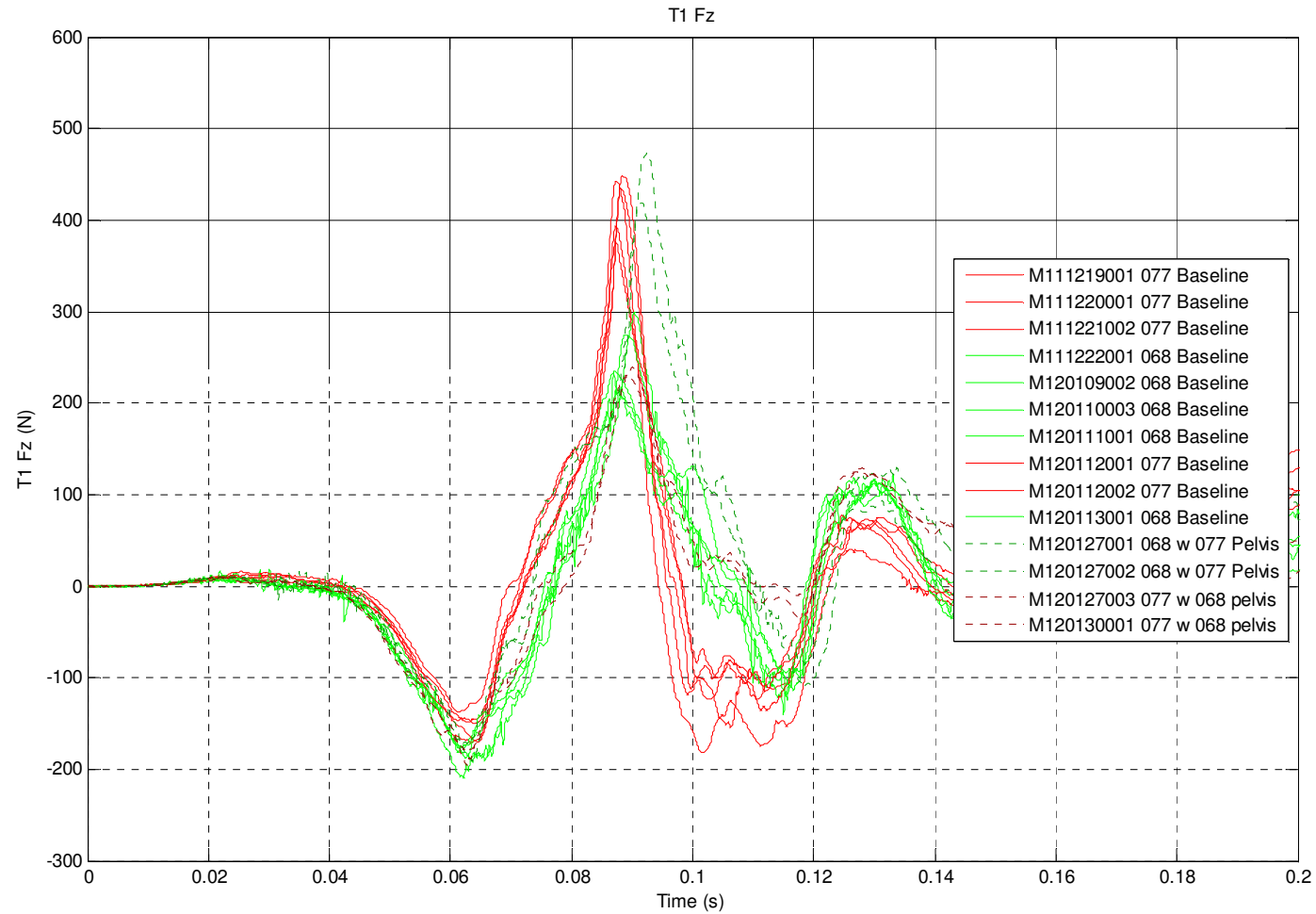
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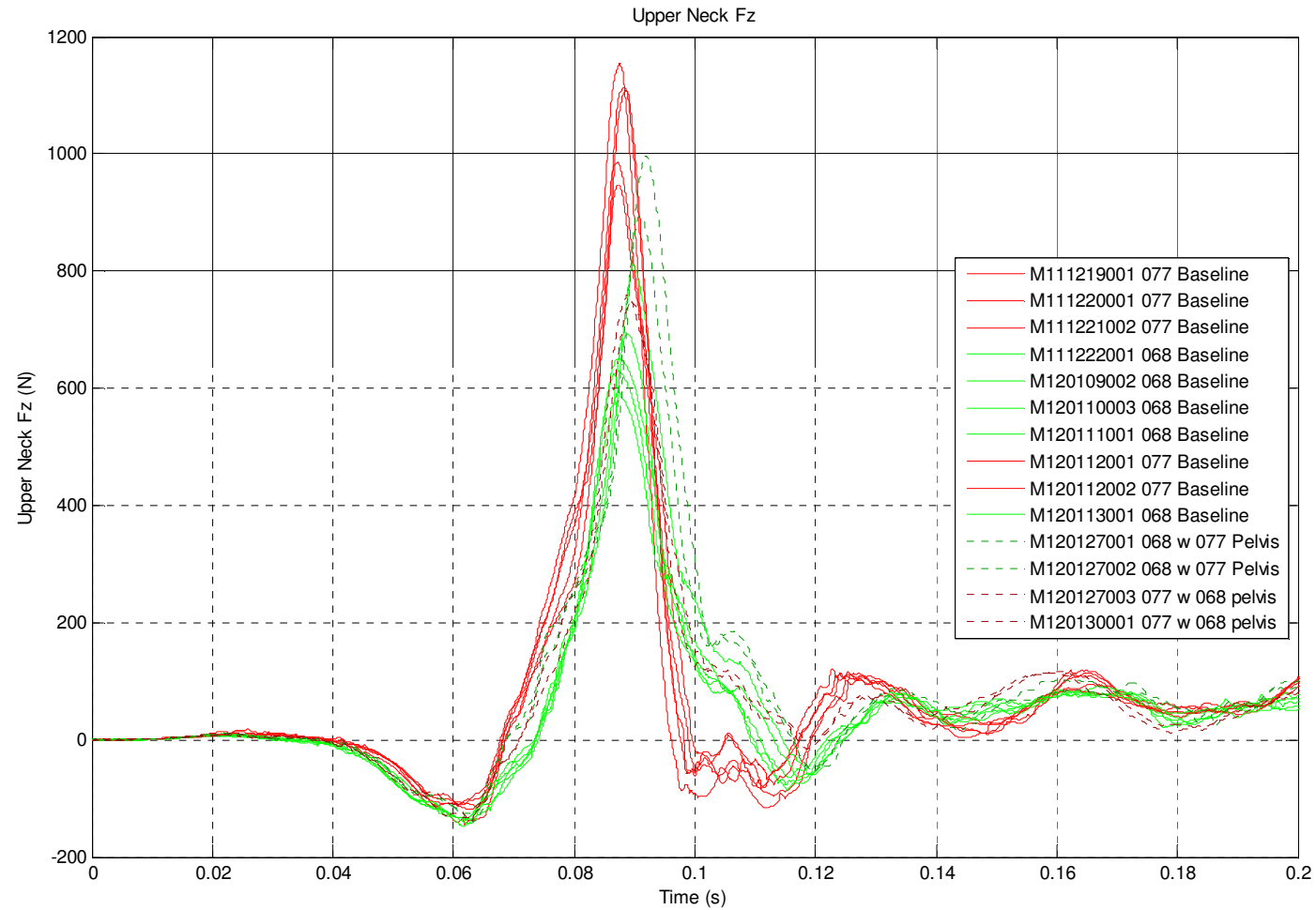
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Baseline tests with 068 and 077 + pelvis swap



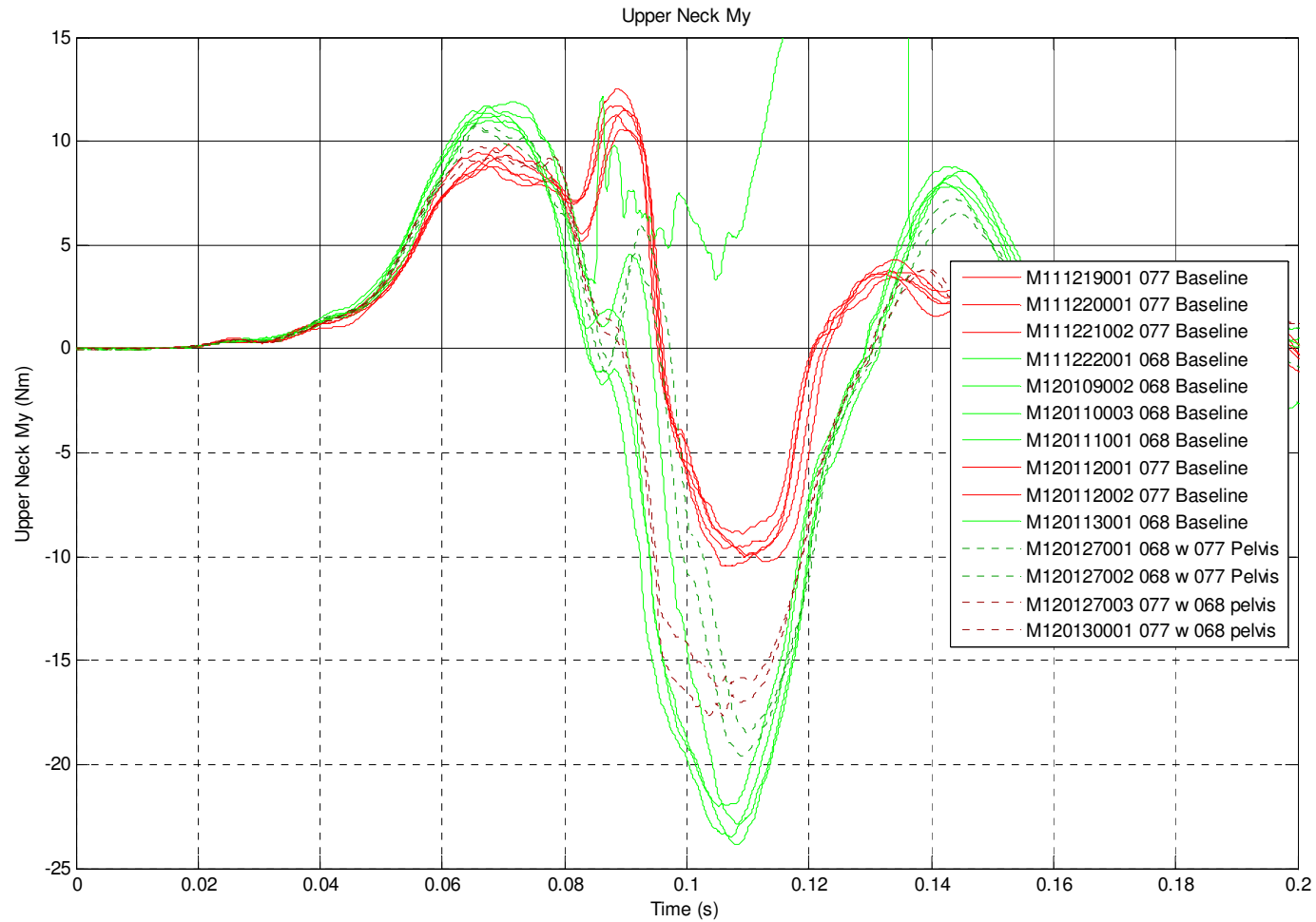
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Baseline tests with 068 and 077 + pelvis swap



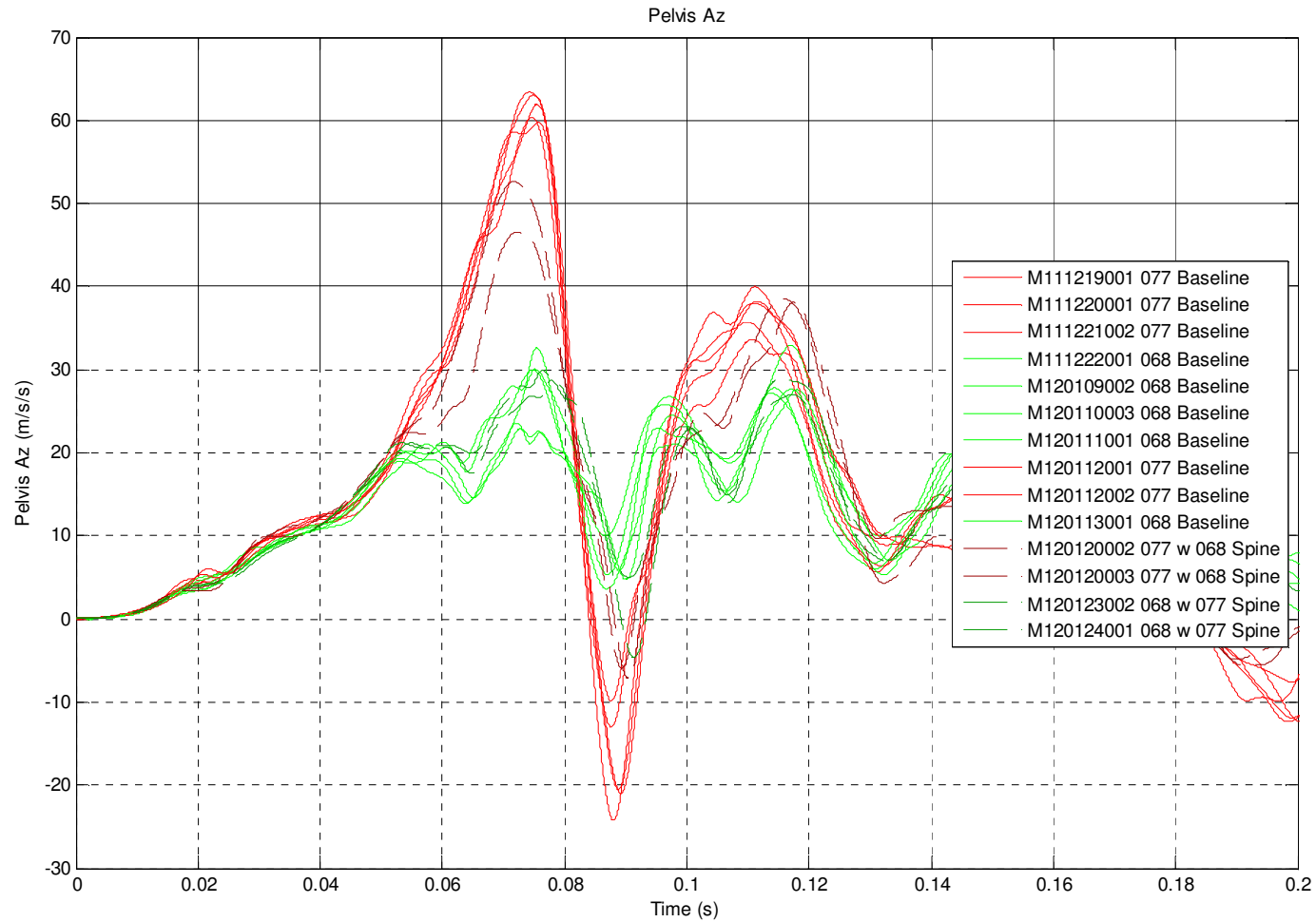
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Baseline tests with 068 and 077 + pelvis swap



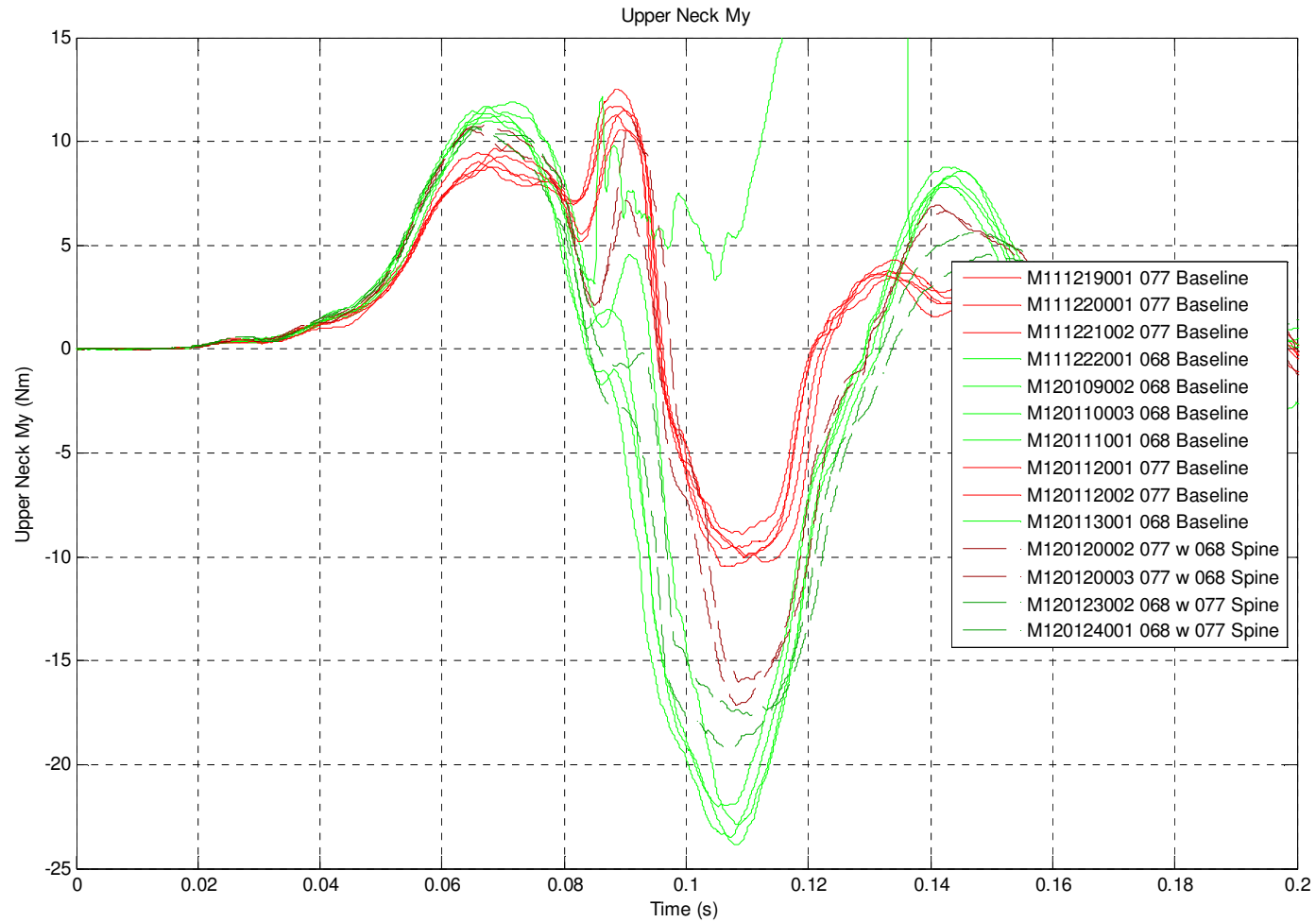
Seat Test Results

Baseline tests with 068 and 077 + spine swap



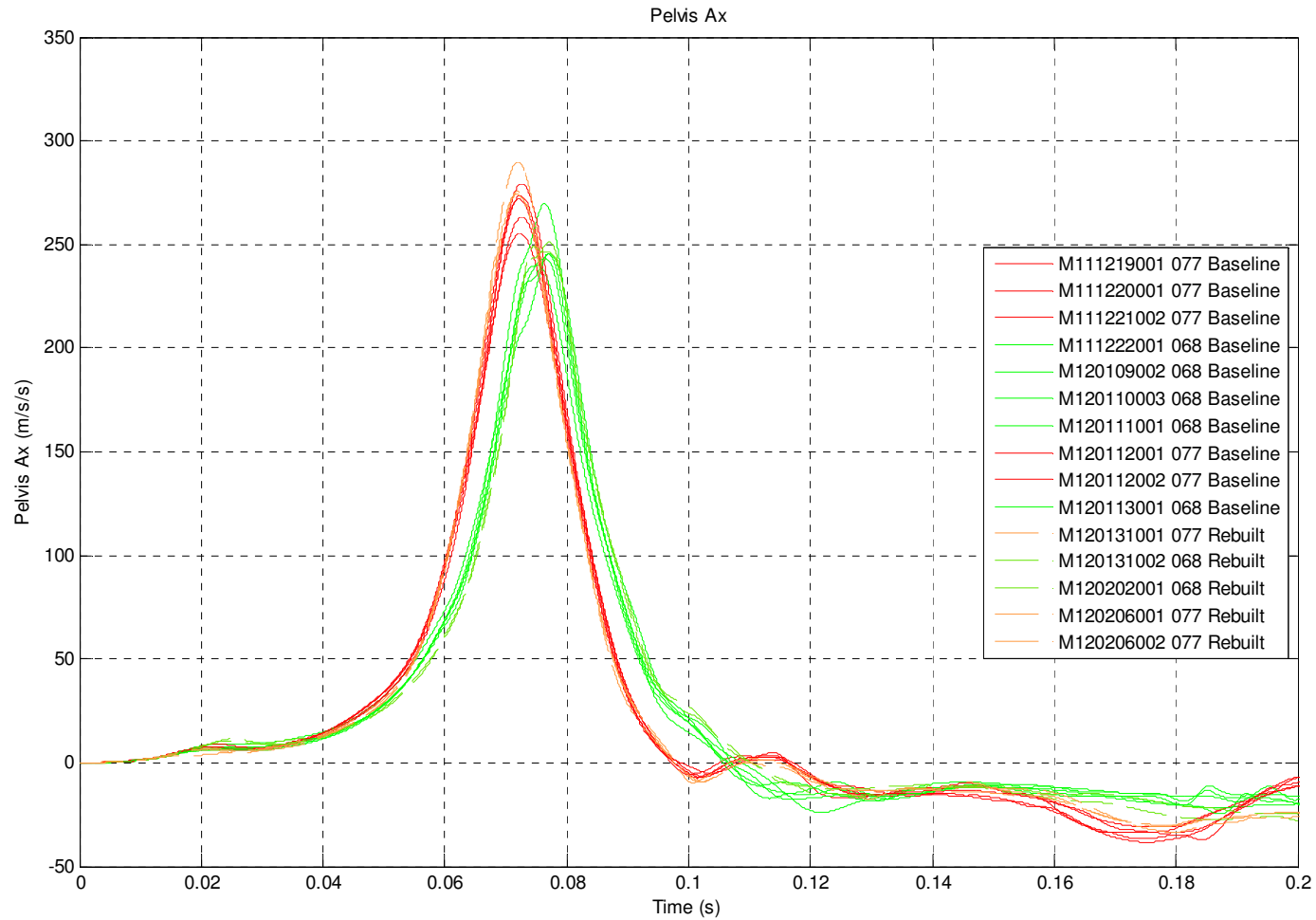
Seat Test Results

Baseline tests with 068 and 077 + spine swap



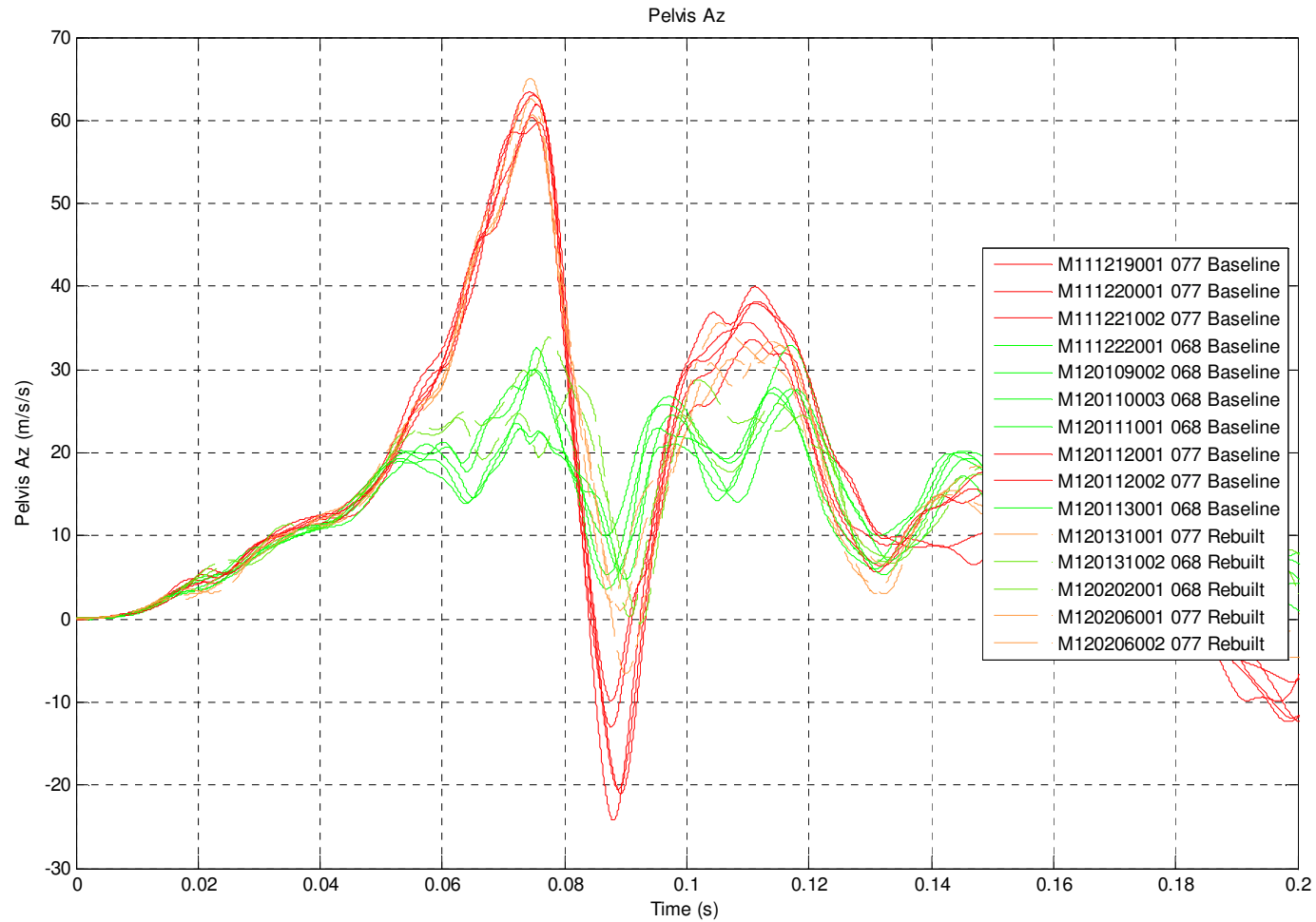
Seat Test Results

Baseline tests with 068 and 077 + rebuilt



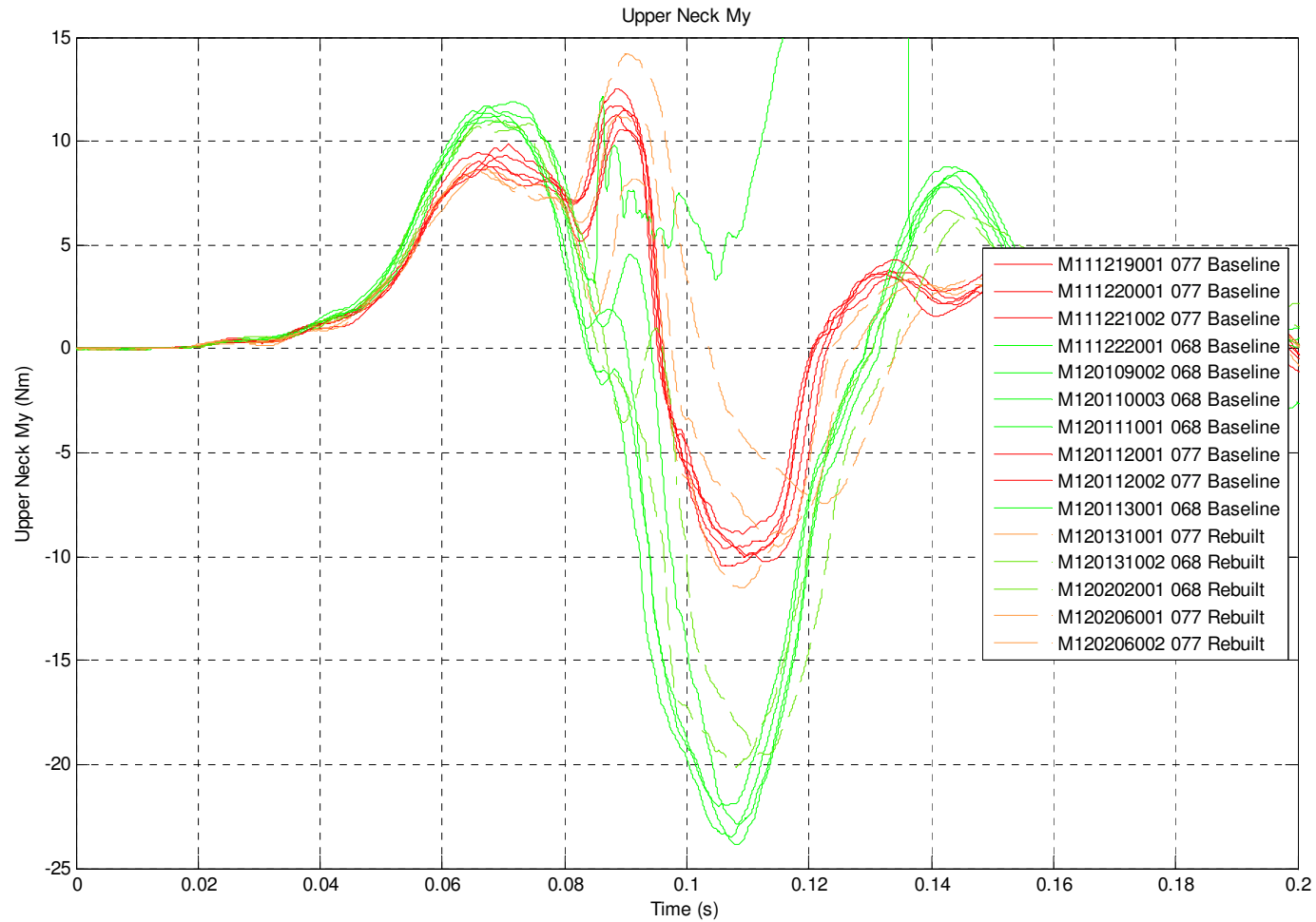
Seat Test Results

Baseline tests with 068 and 077 + rebuilt



Seat Test Results

Baseline tests with 068 and 077 + rebuilt

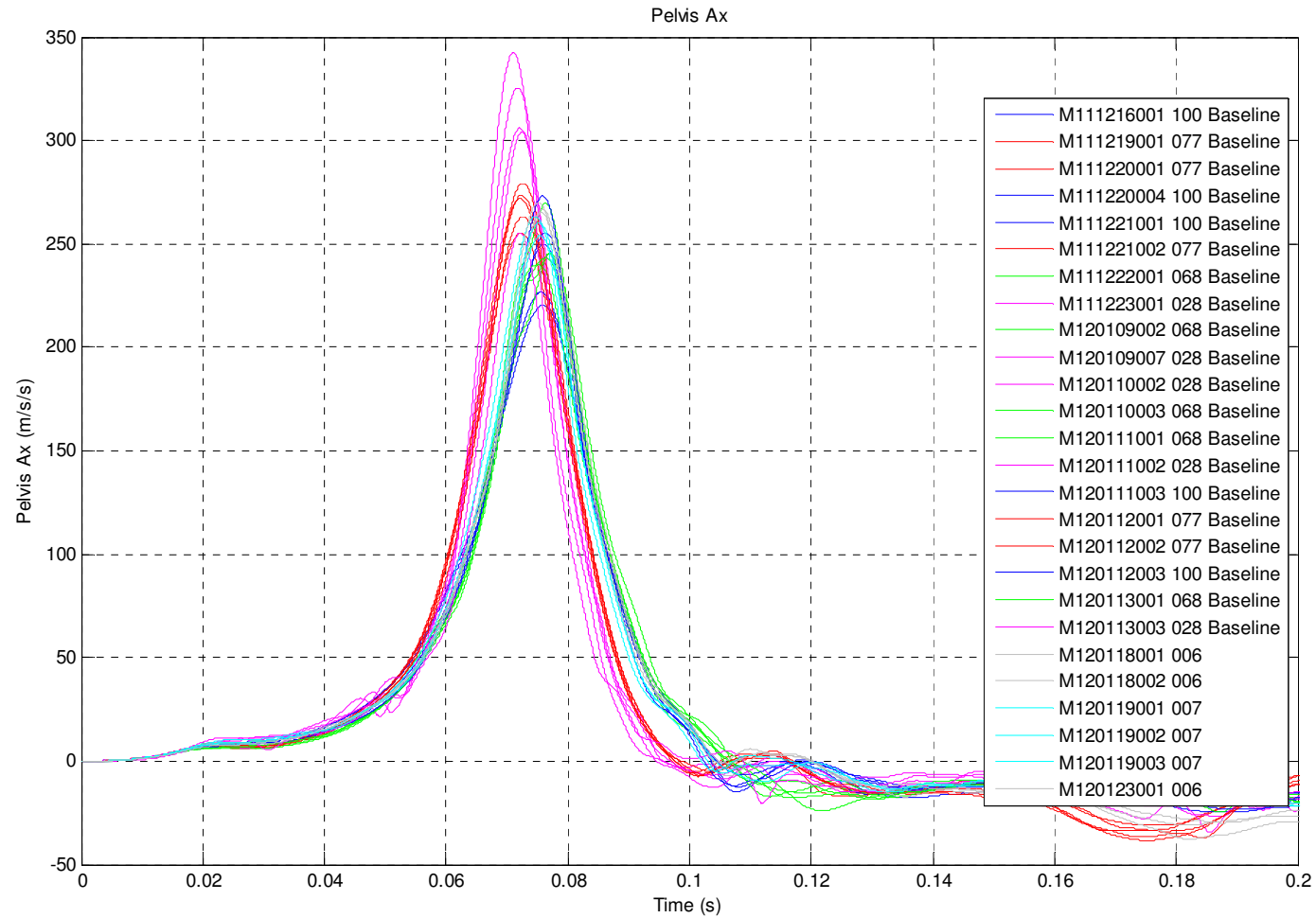


Take 5...



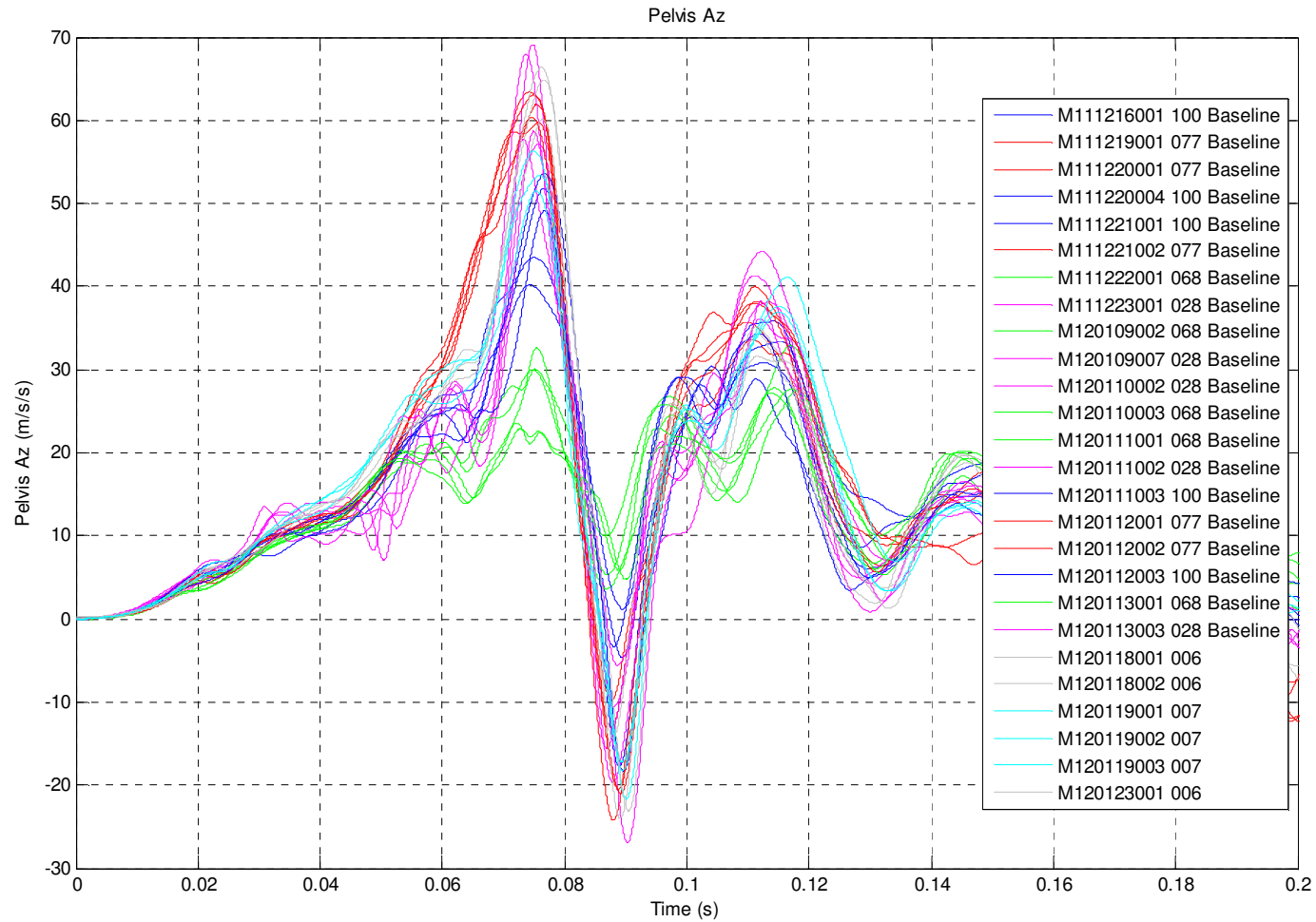
Seat Test Results

Baseline tests + refurbished 006 and 007



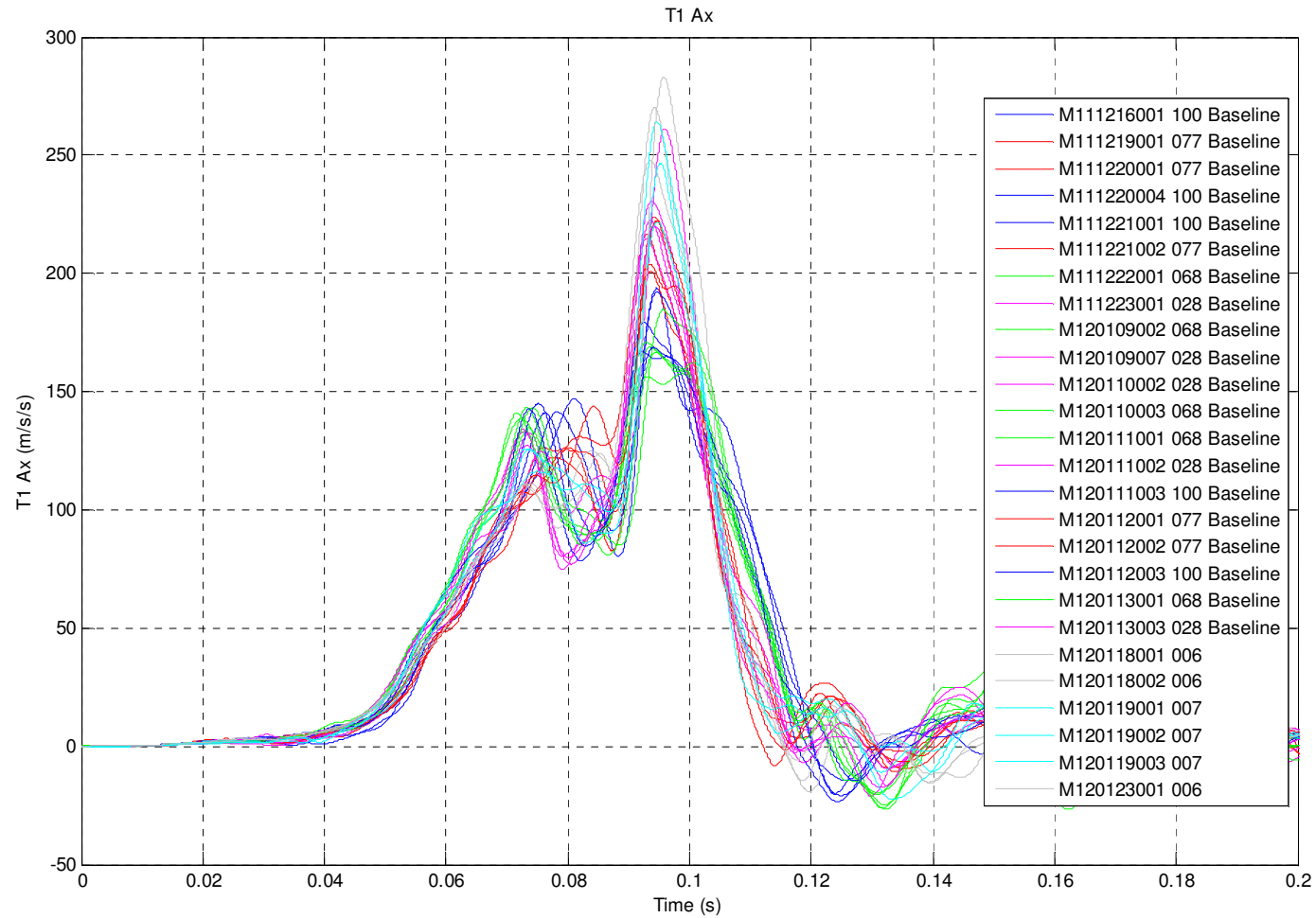
Seat Test Results

Baseline tests + refurbished 006 and 007



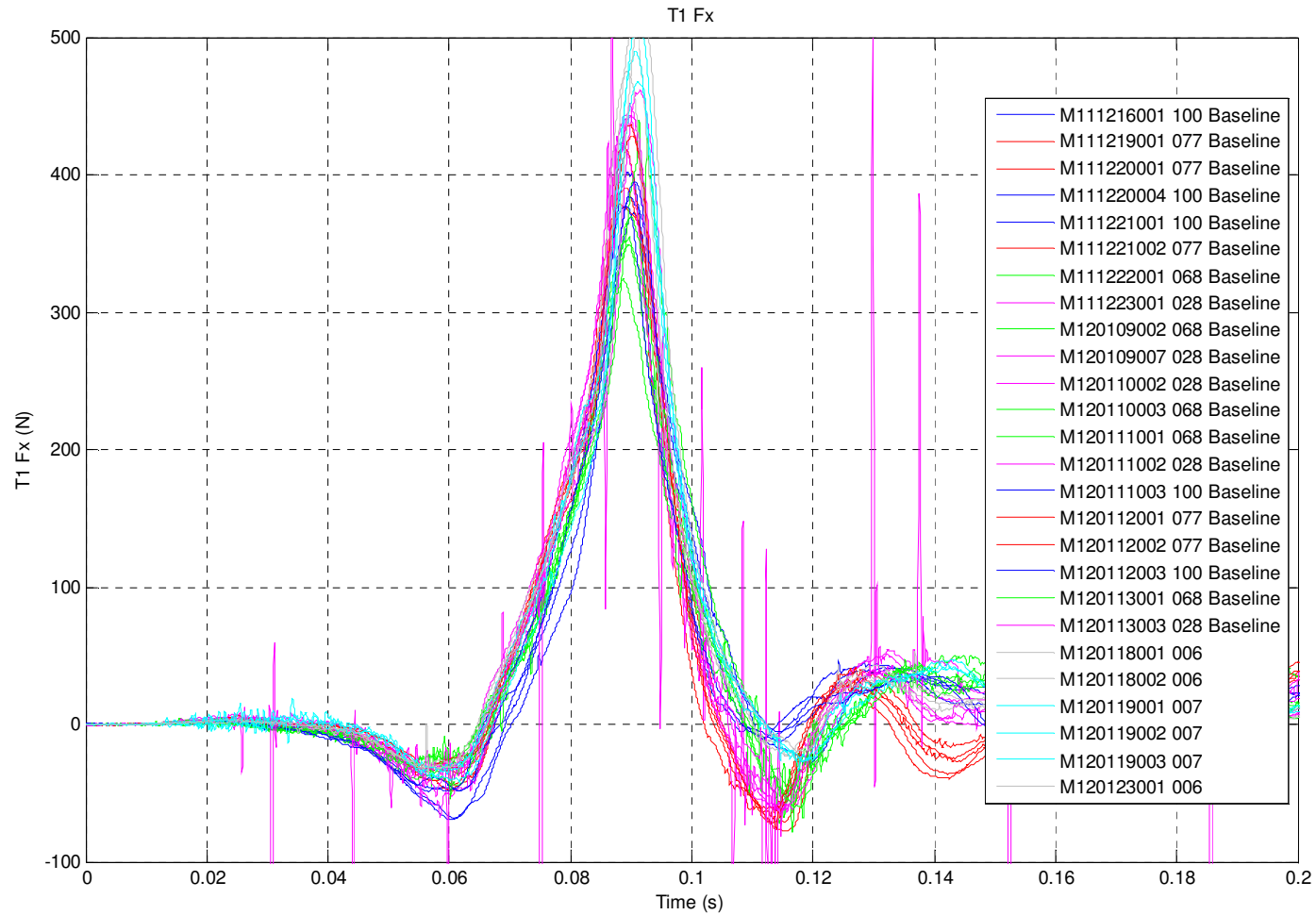
Seat Test Results

Baseline tests + refurbished 006 and 007



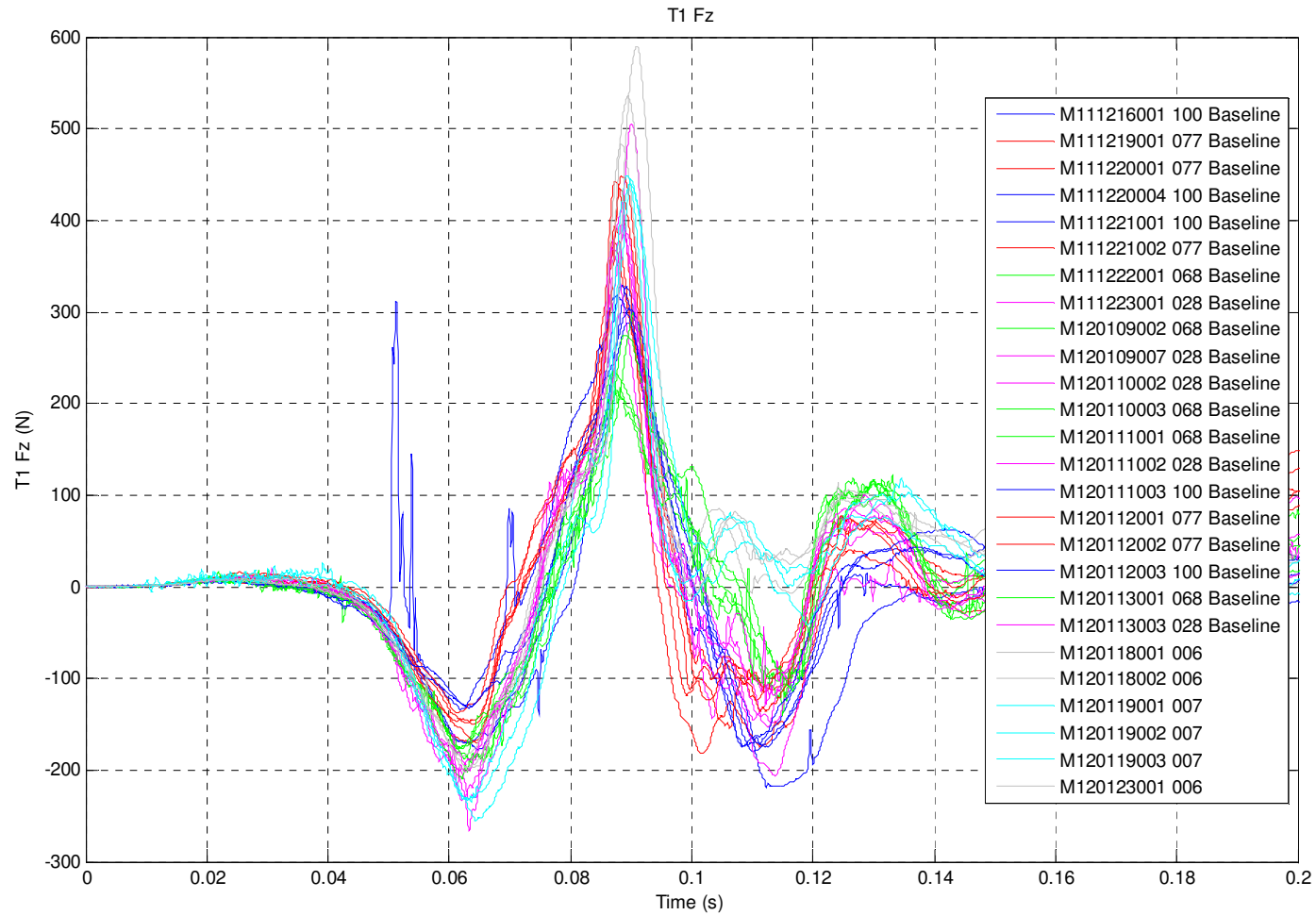
Seat Test Results

Basel



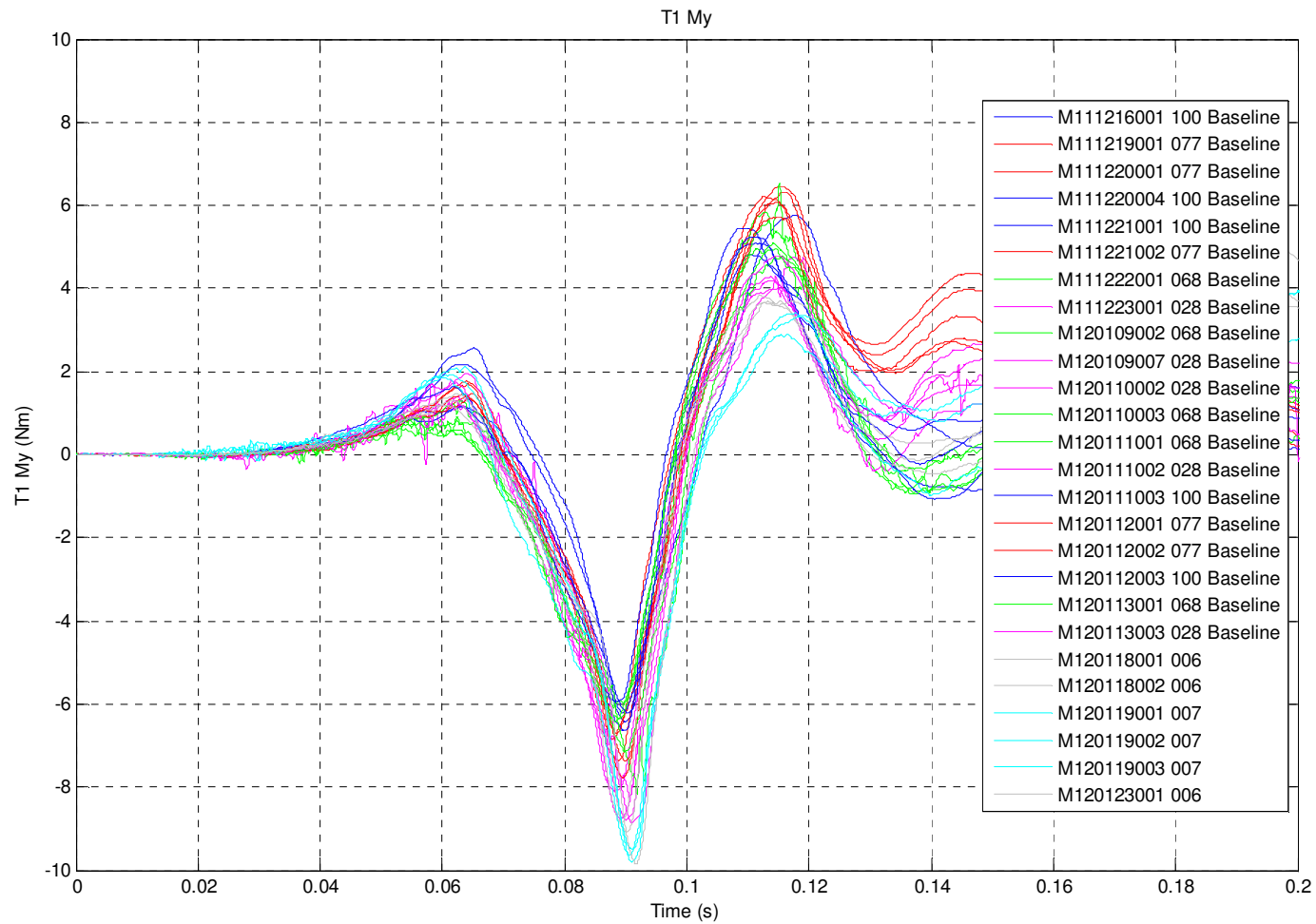
Seat Test Results

Baseline tests + refurbished 006 and 007



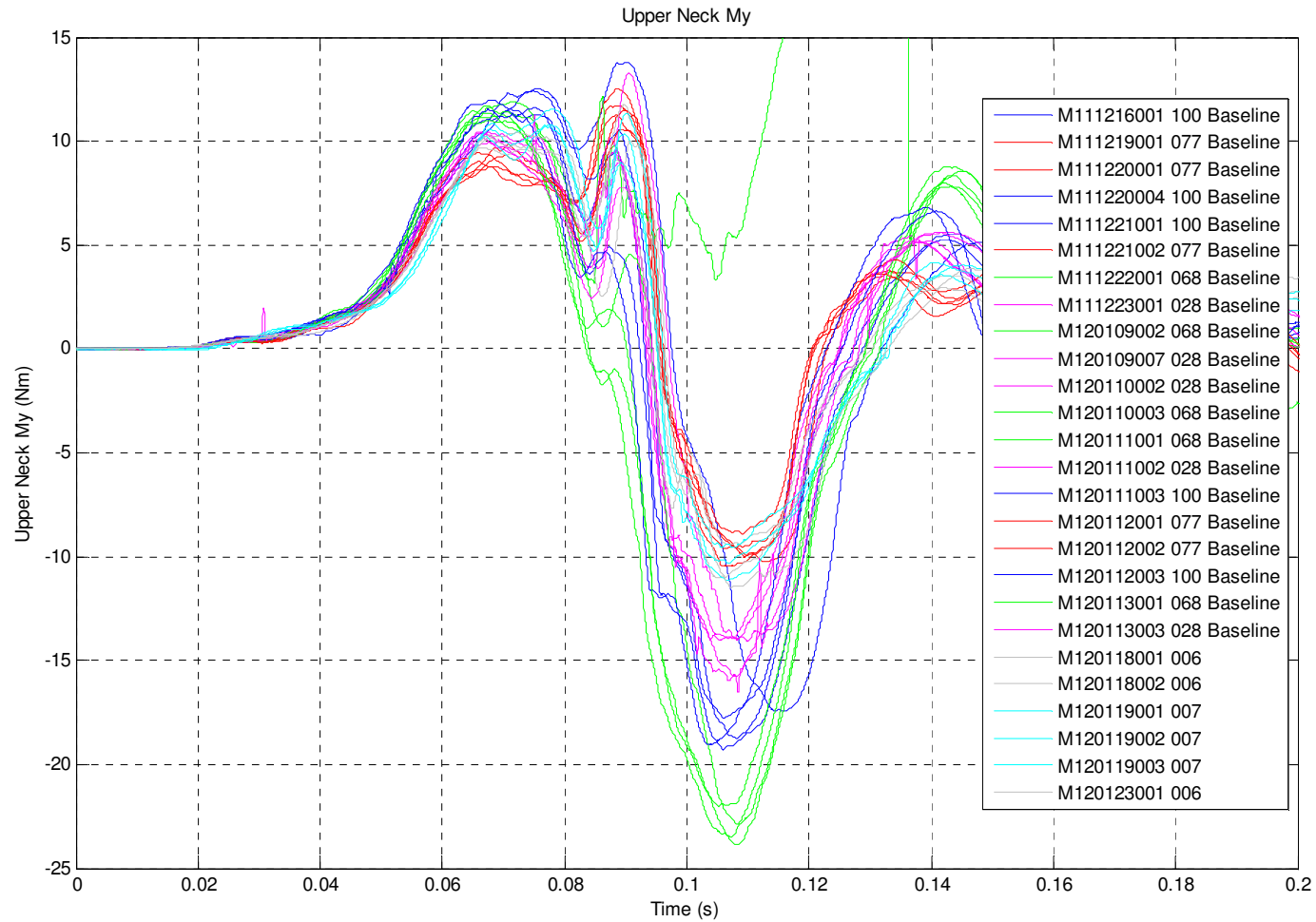
Seat Test Results

Baseline tests + refurbished 006 and 007



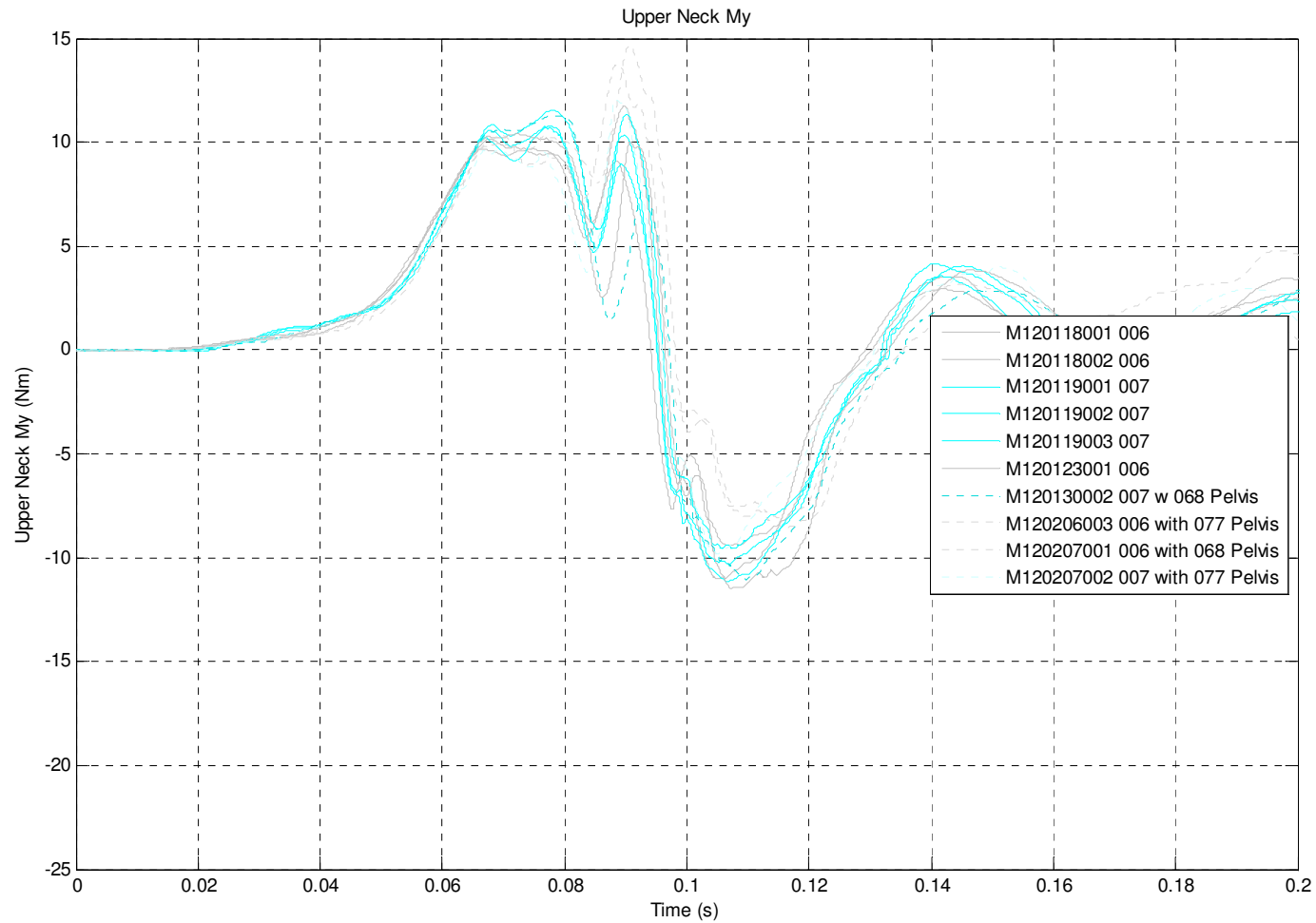
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Baseline tests + refurbished 006 and 007



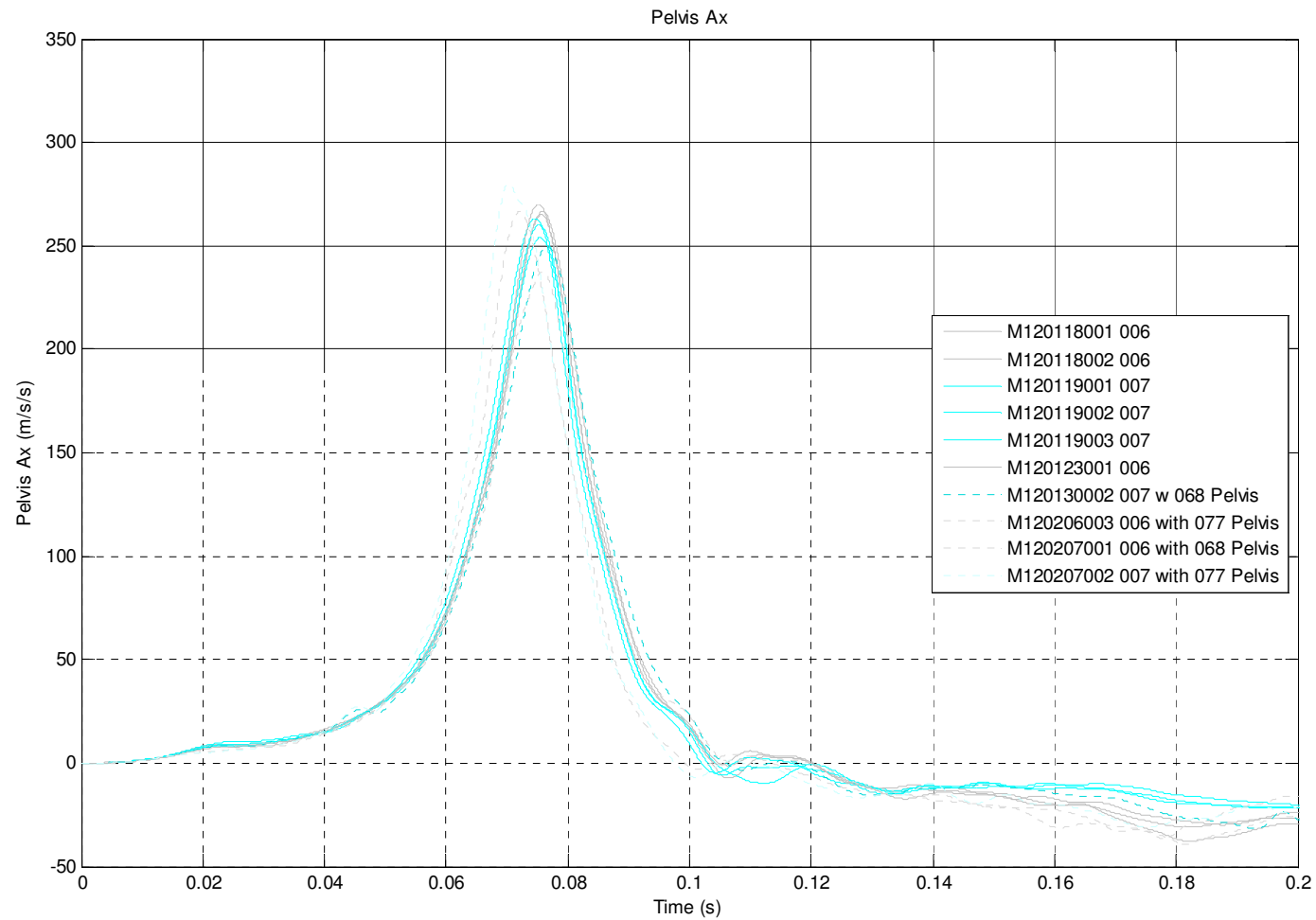
Introduction

006 and 007 with 068 and 077 pelvis



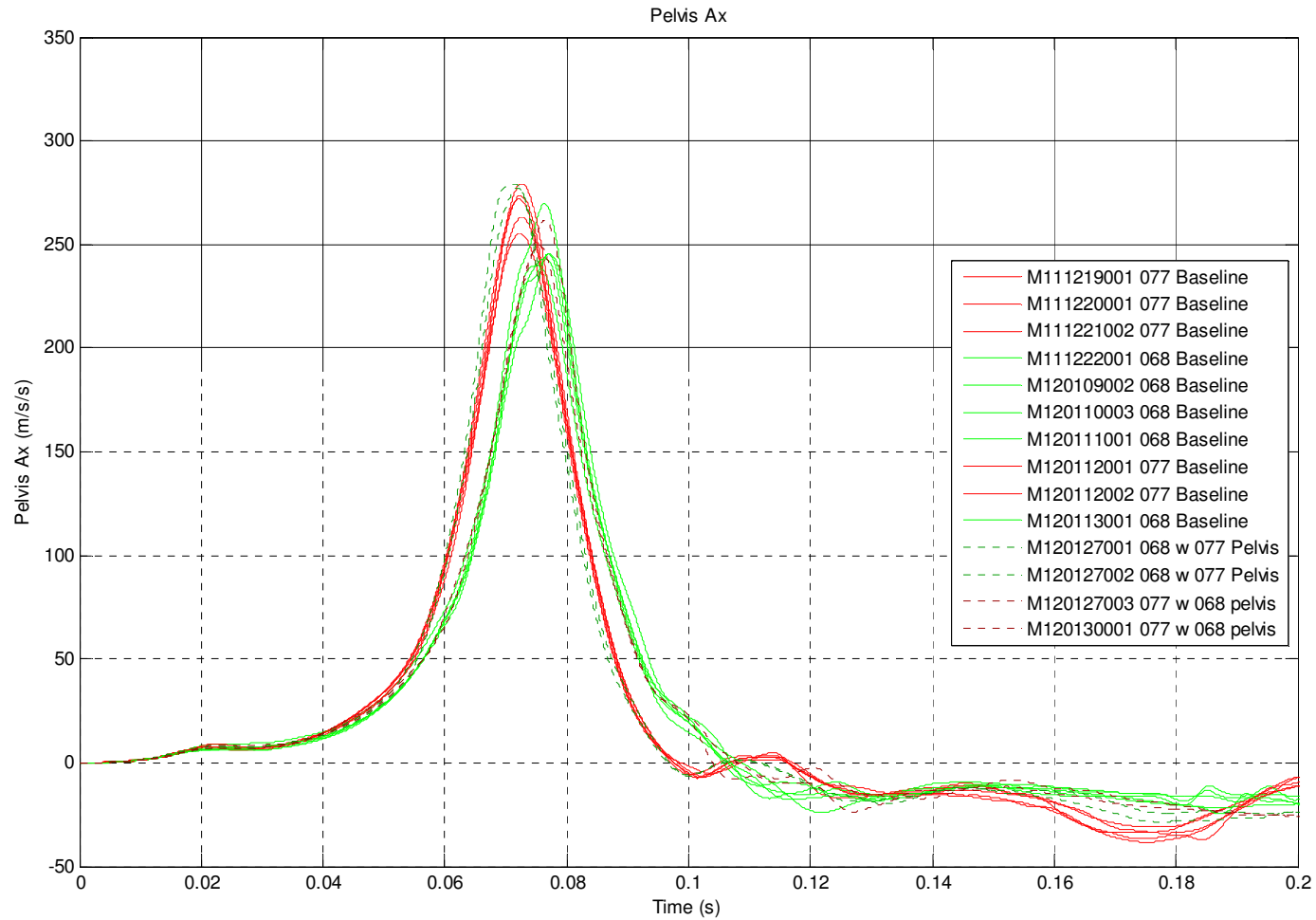
Introduction

006 and 007 with 068 and 077 pelvis



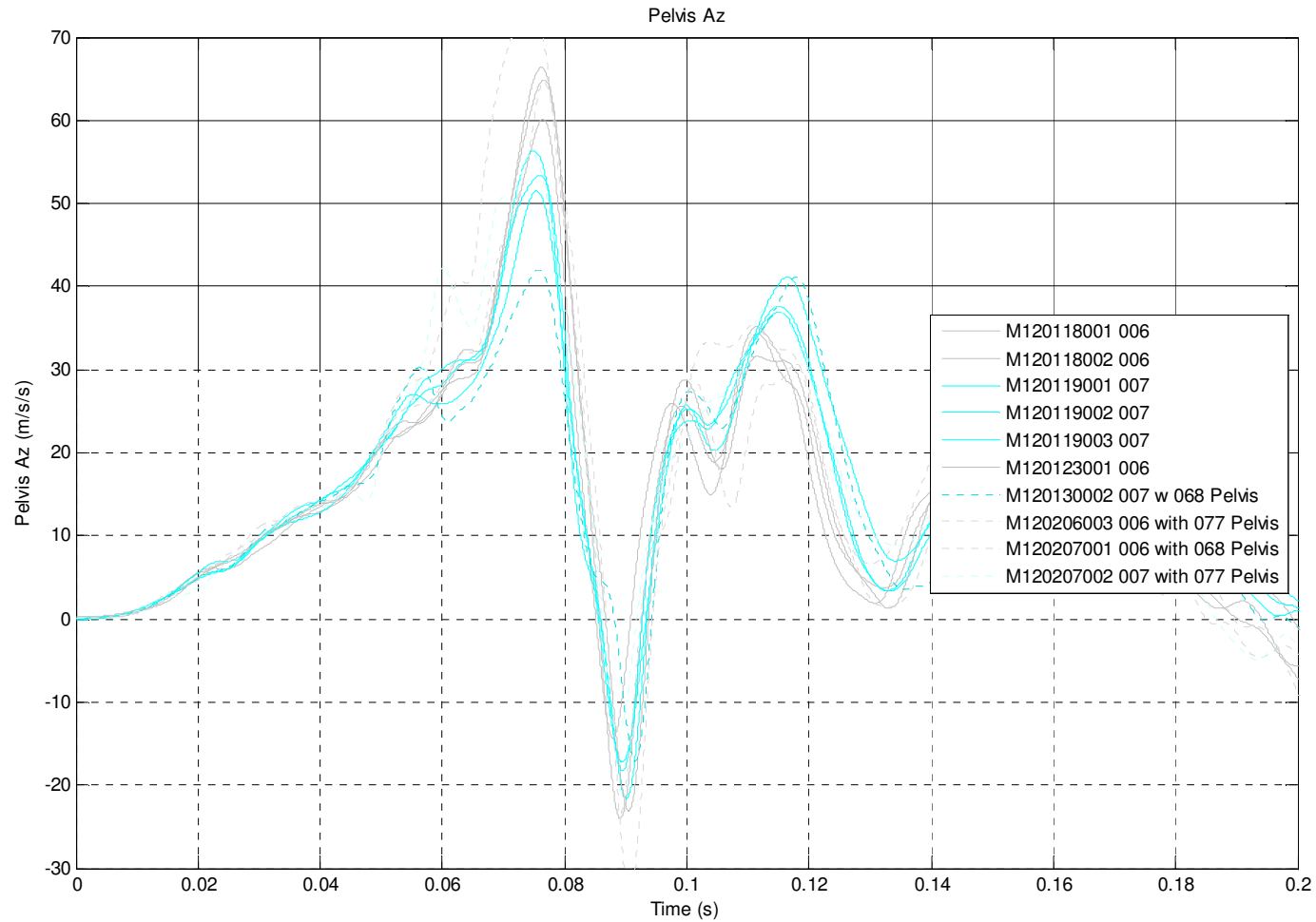
Seat Test Results

Baseline tests with 068 and 077 + pelvis swap



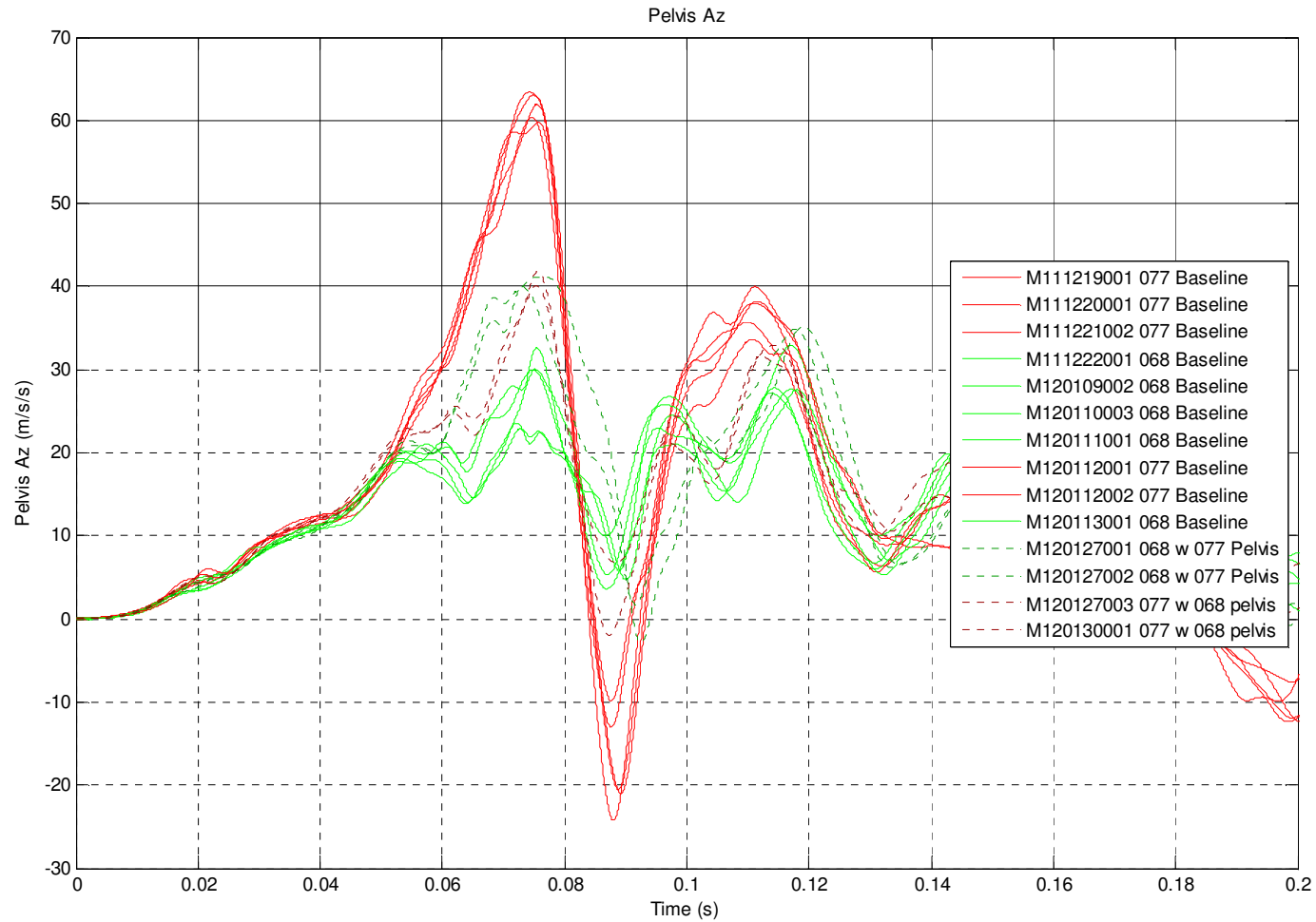
Introduction

006 and 007 with 068 and 077 pelvis



Seat Test Results

Baseline tests with 068 and 077 + pelvis swap

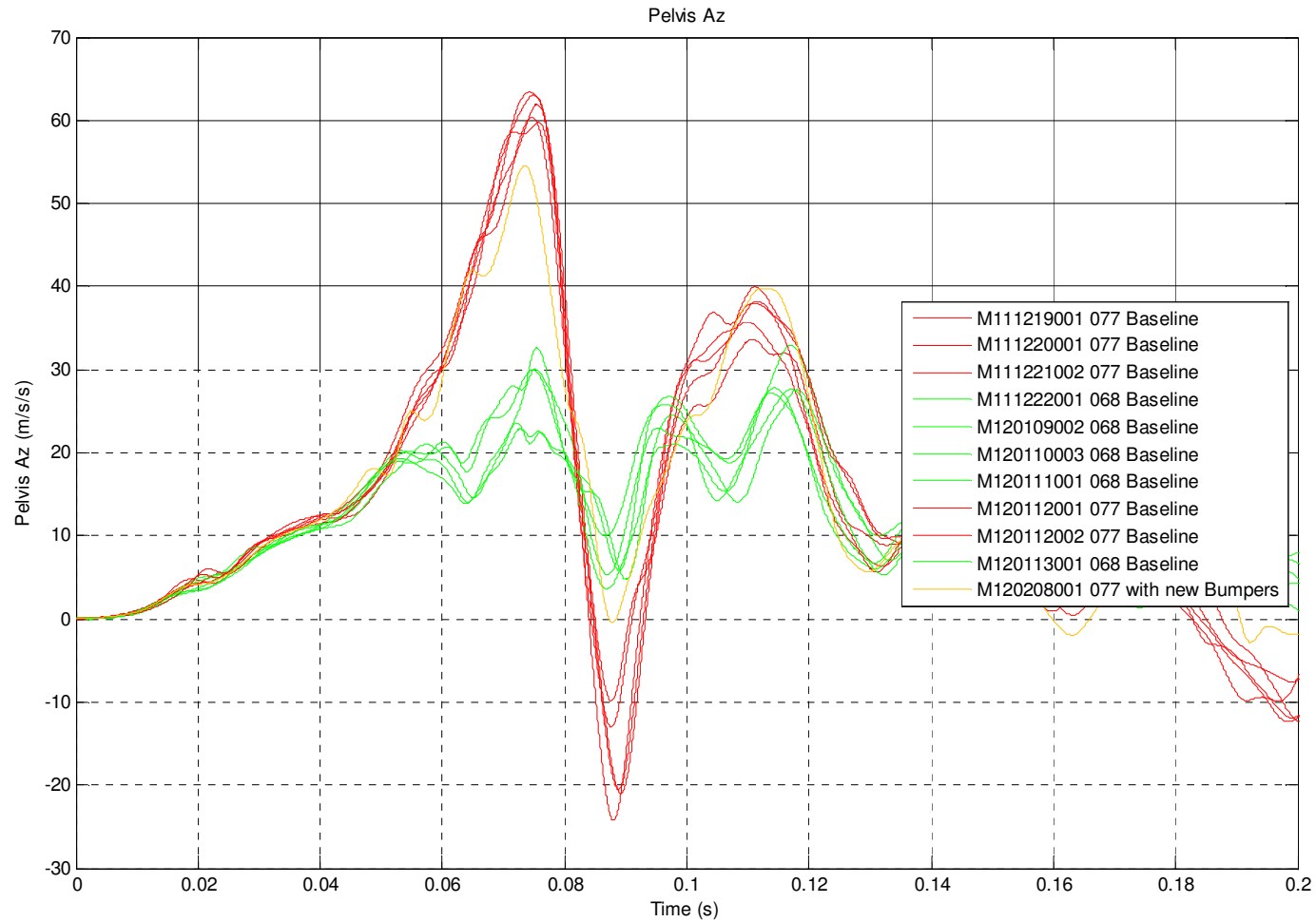


Take 5...



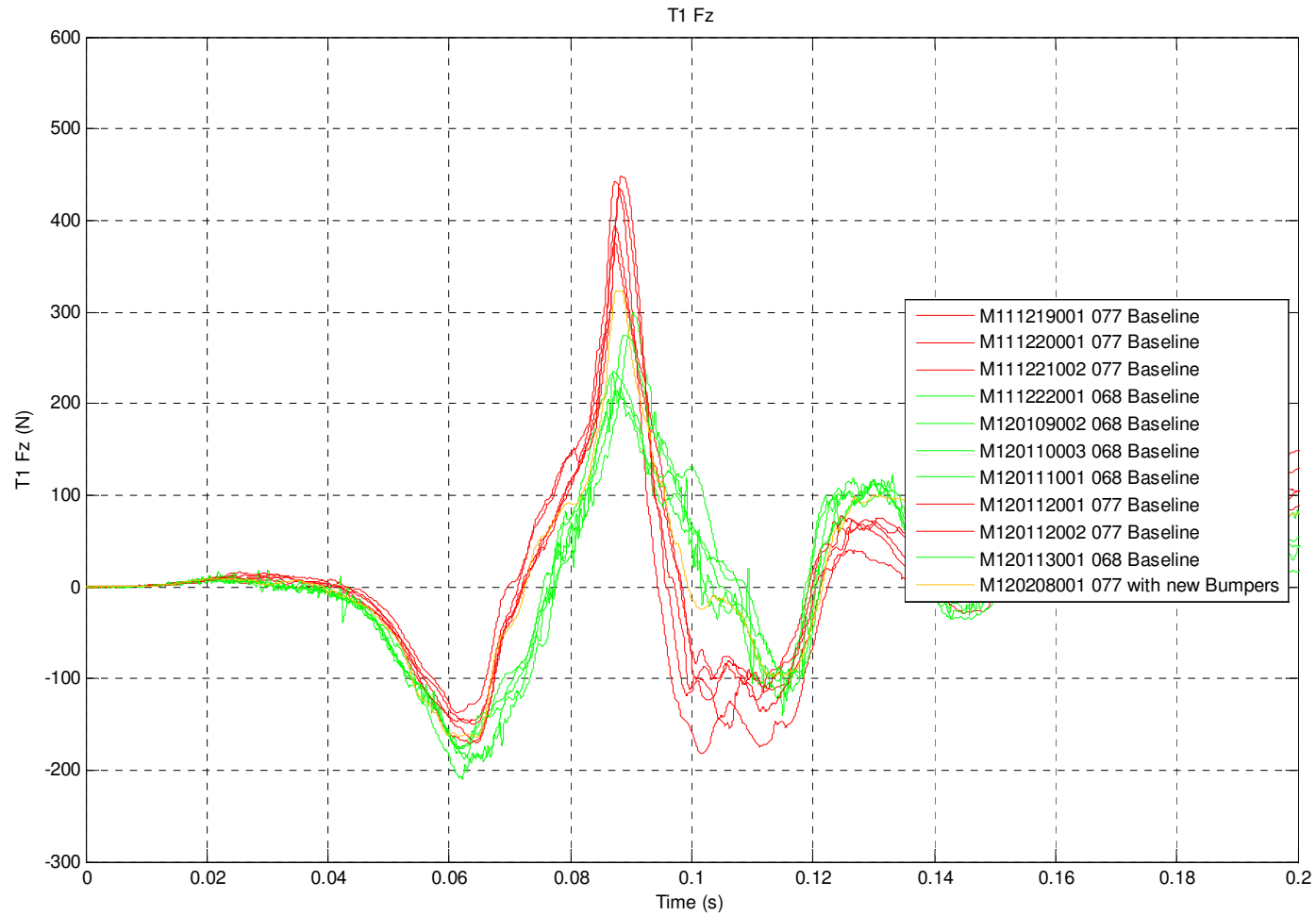
Seat Test Results

Baseline tests with 068 and 077 + bumper swap 007



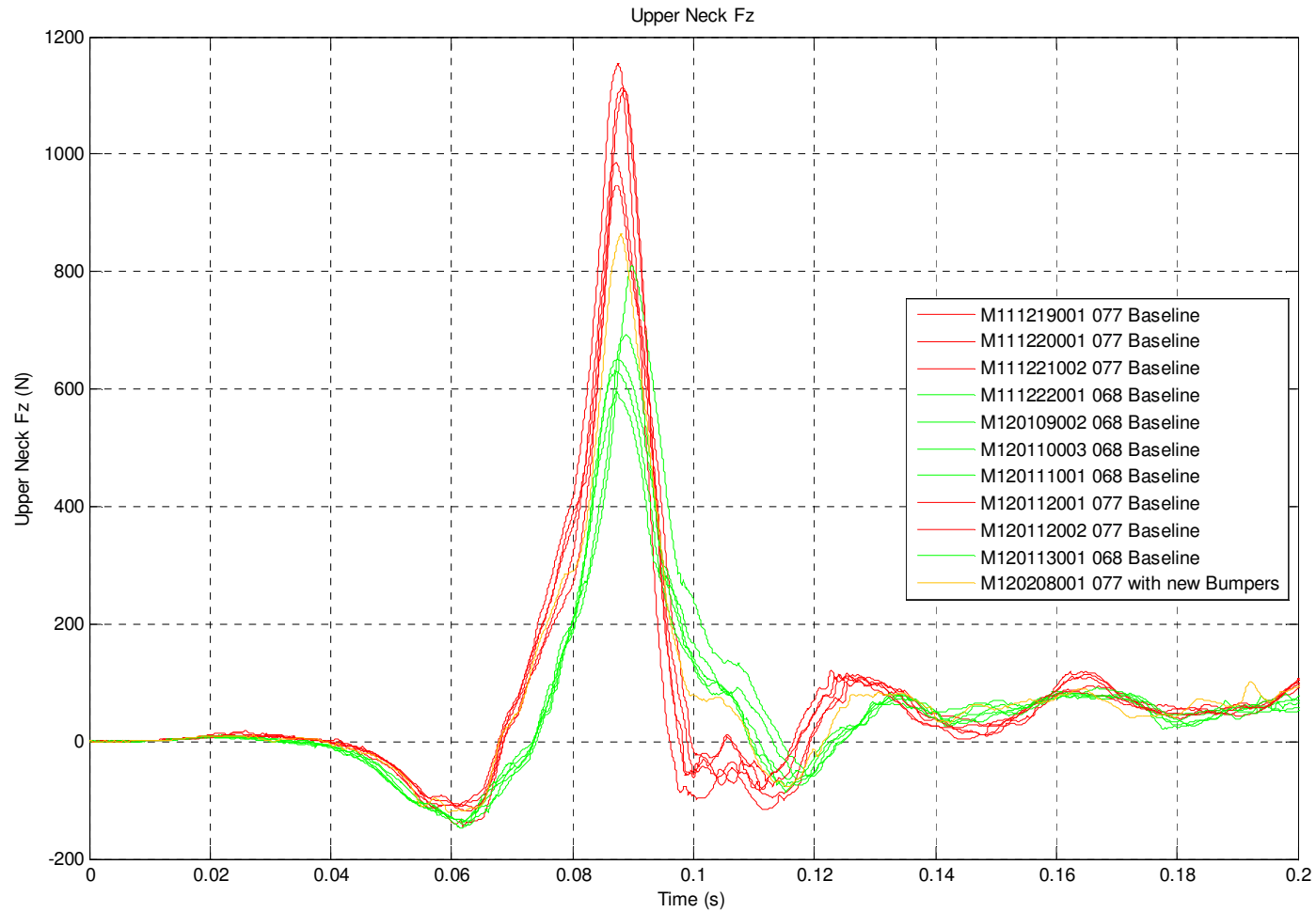
Seat Test Results

Baseline tests with 068 and 077 + bumper swap 007



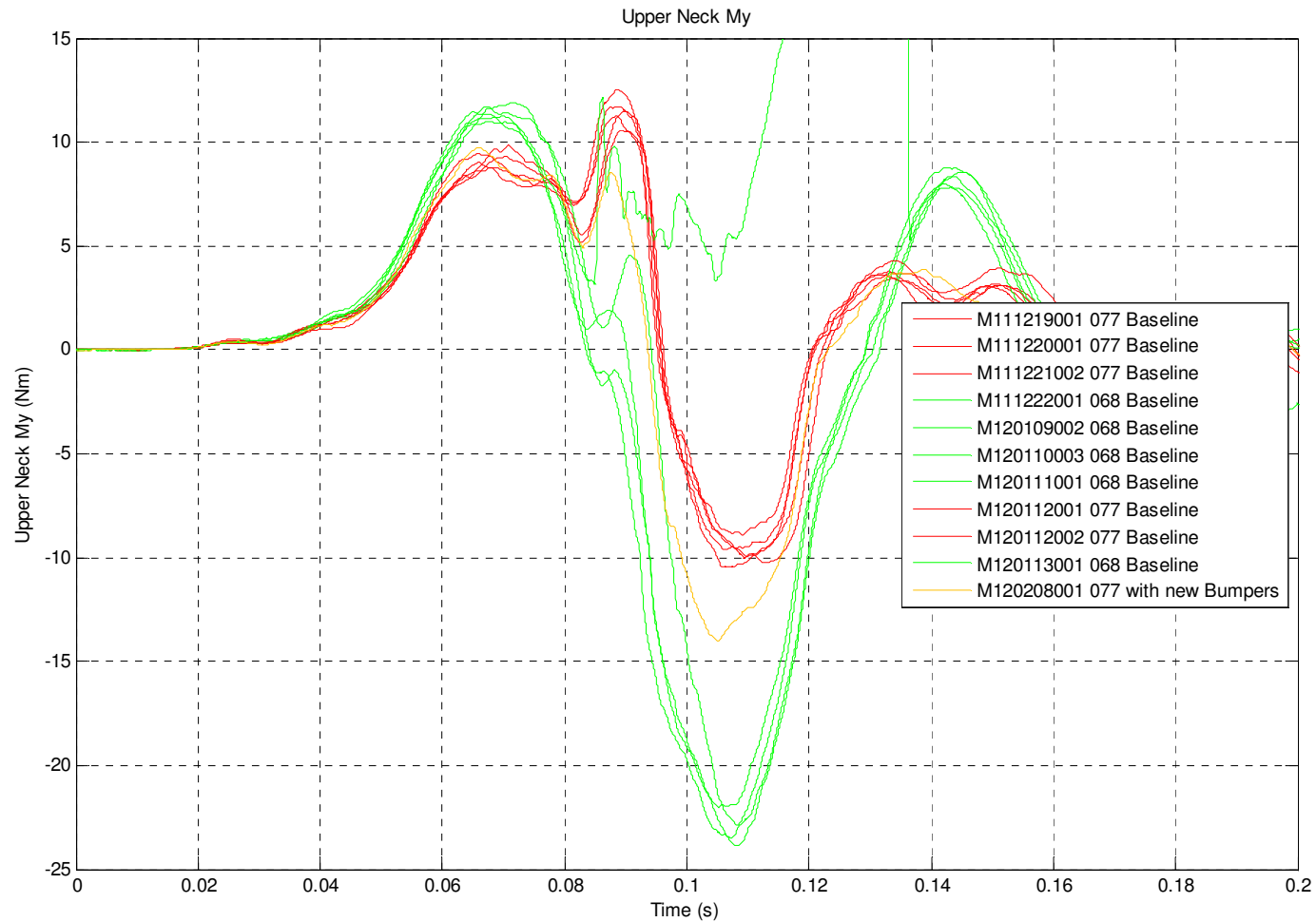
Seat Test Results

Baseline tests with 068 and 077 + bumper swap 007



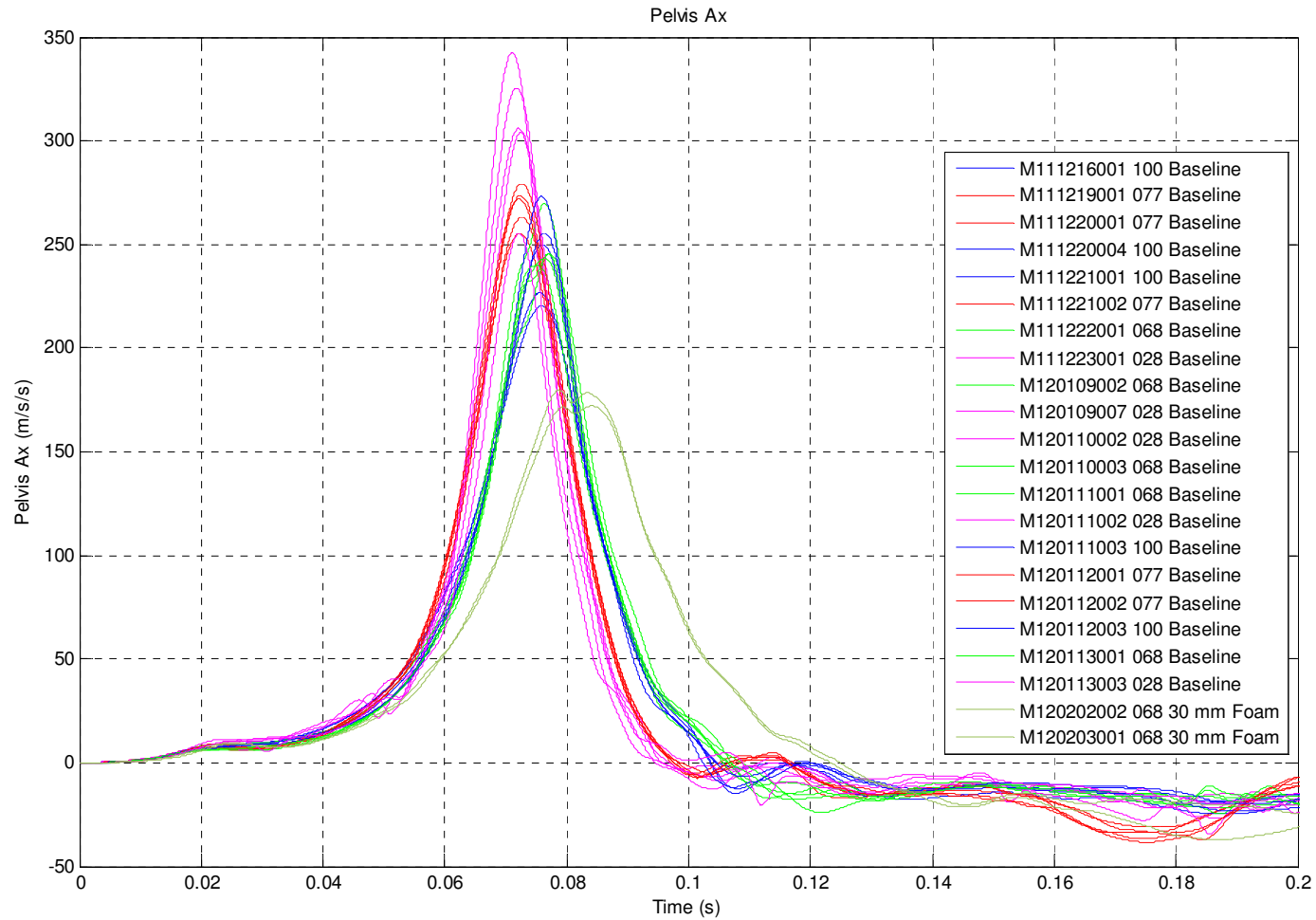
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Baseline tests with 068 and 077 + bumper swap 007



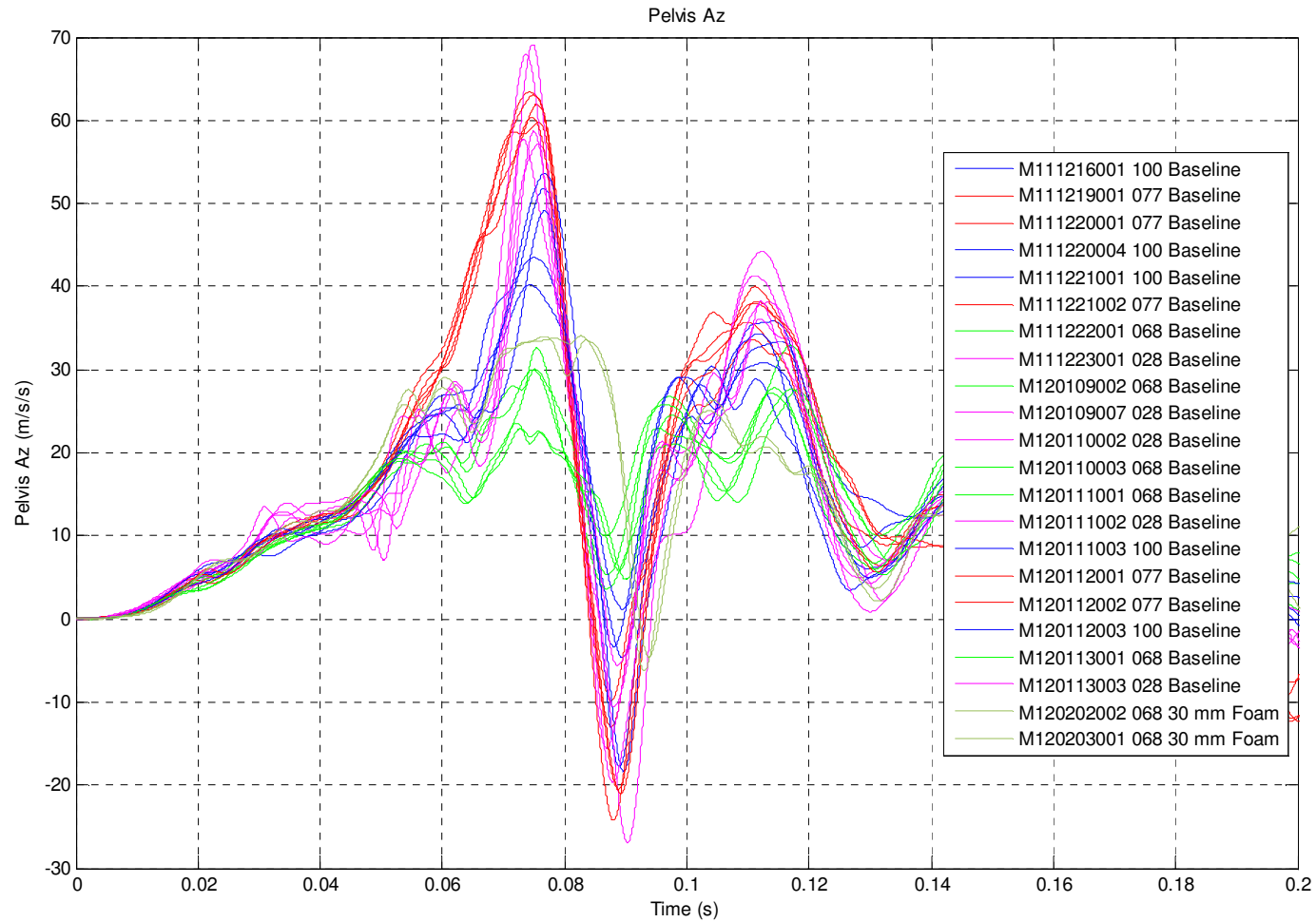
Seat Test Results

Baseline tests with + 068 with 30 mm foam on seat base



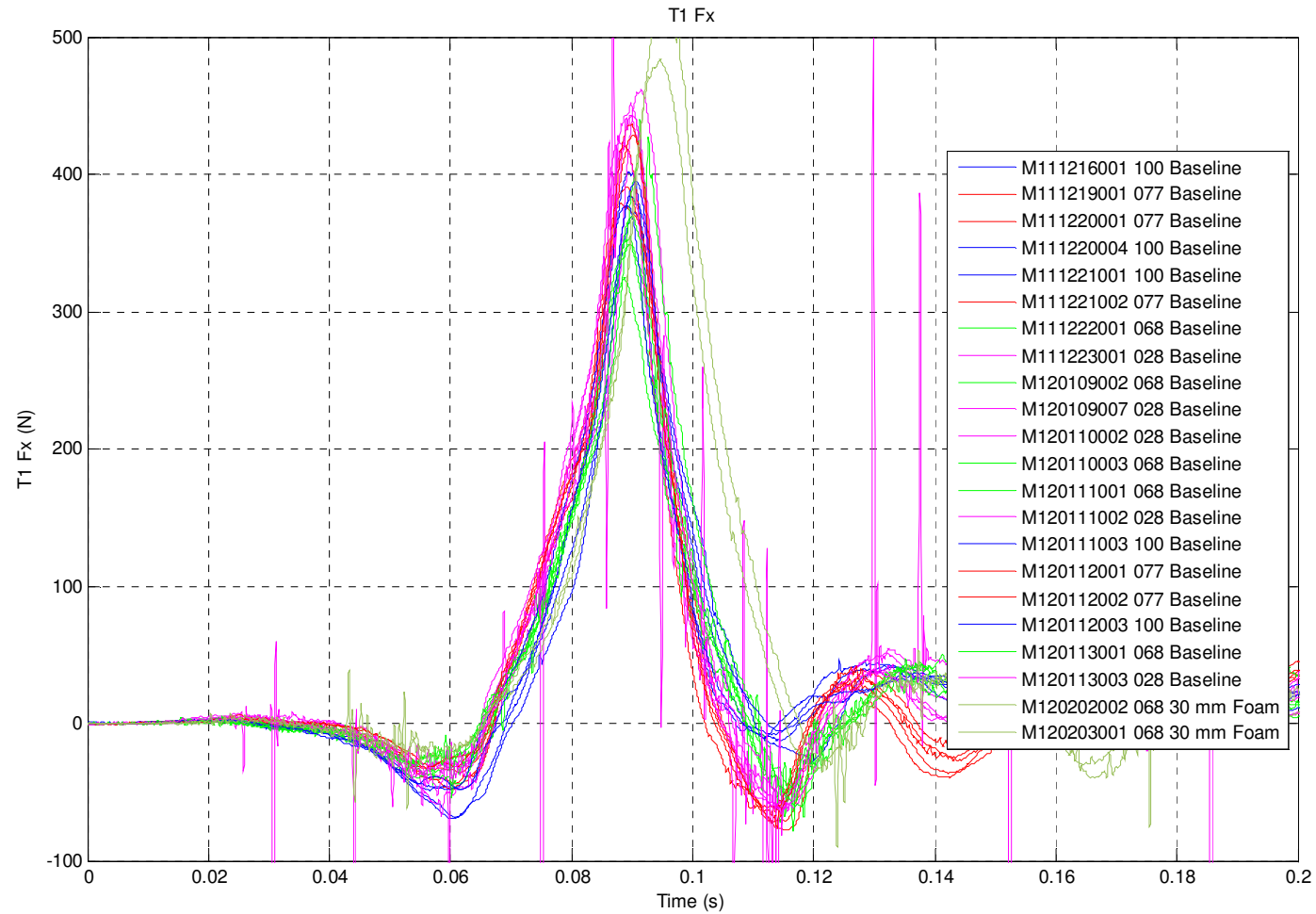
Seat Test Results

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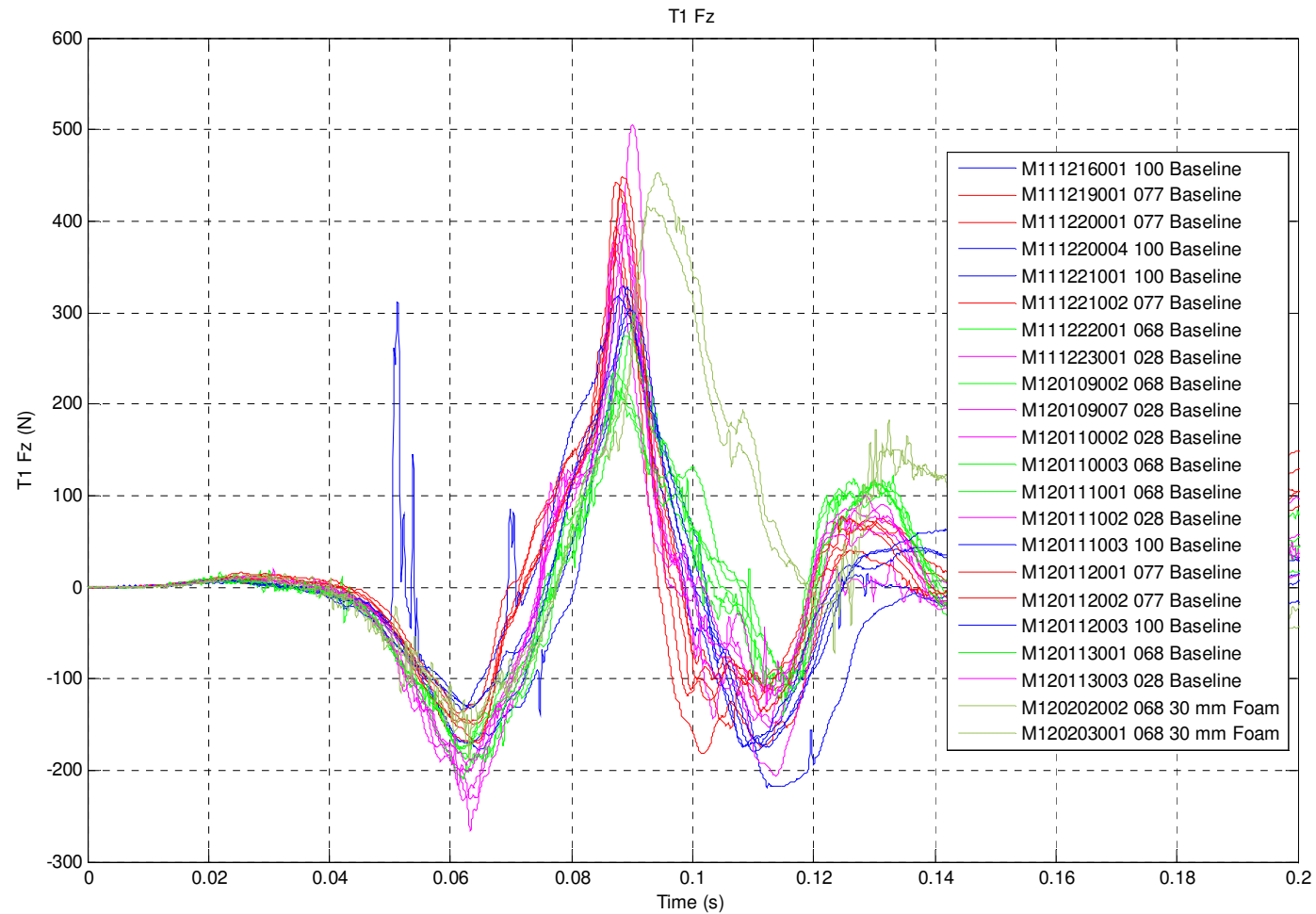
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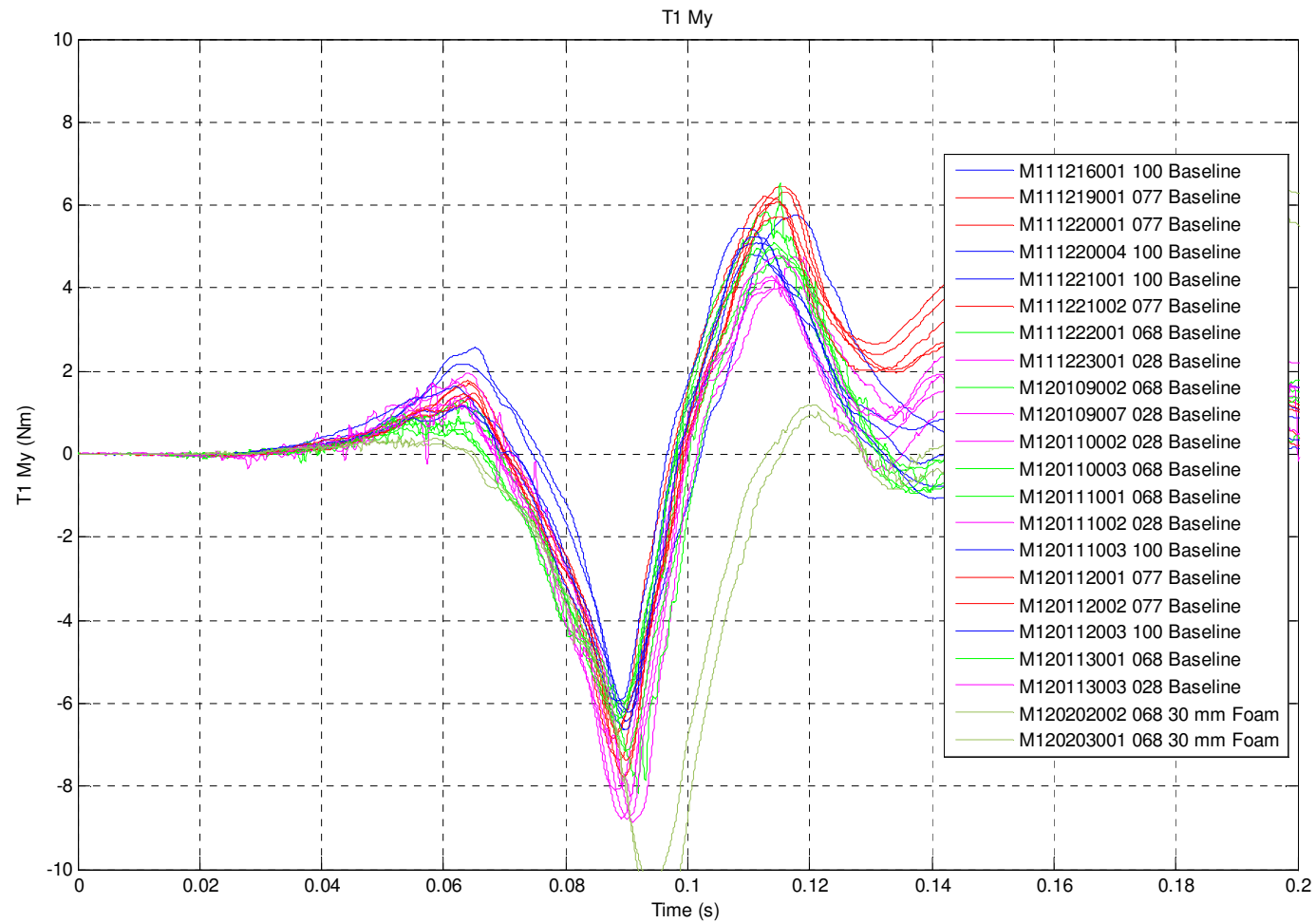
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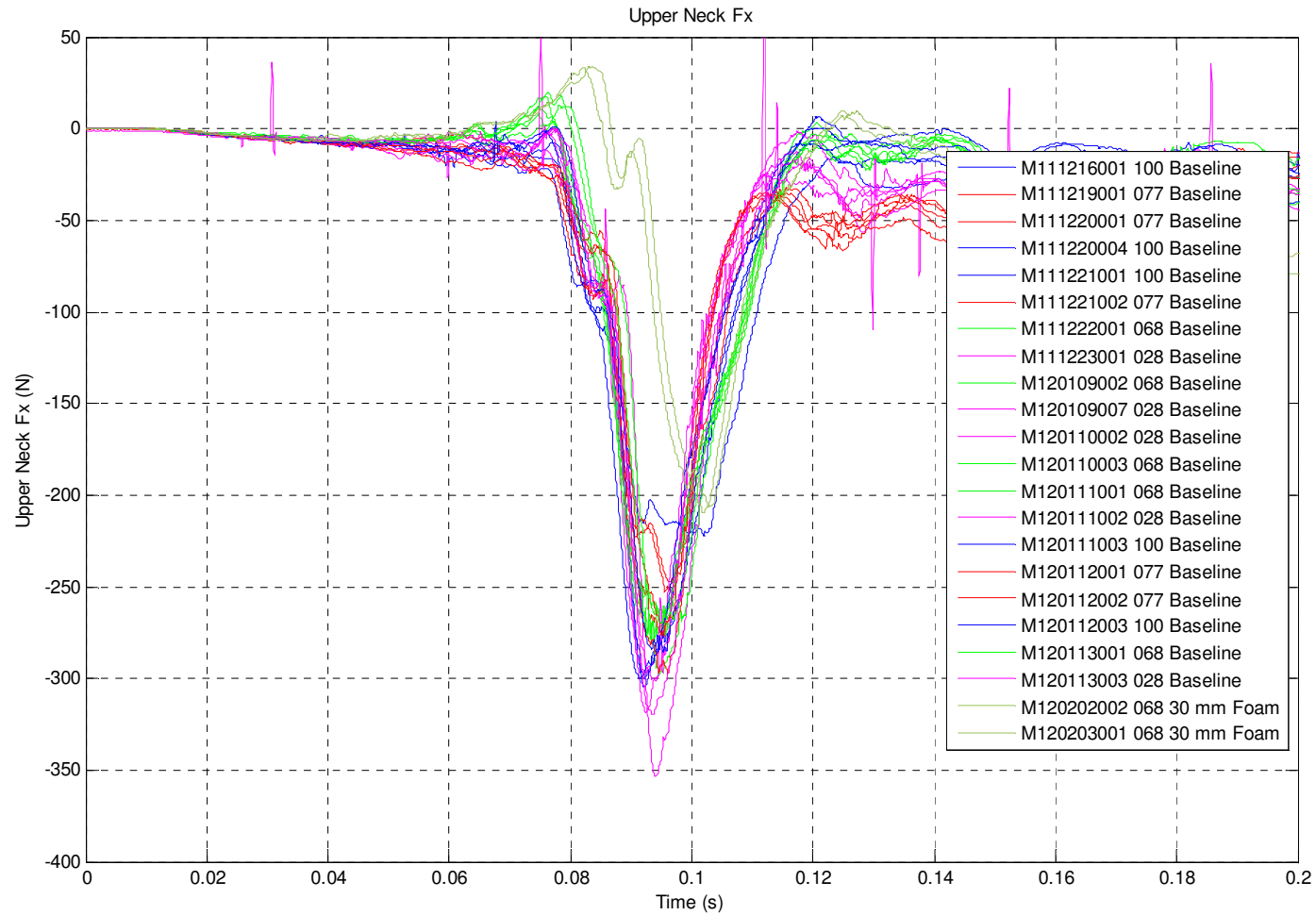
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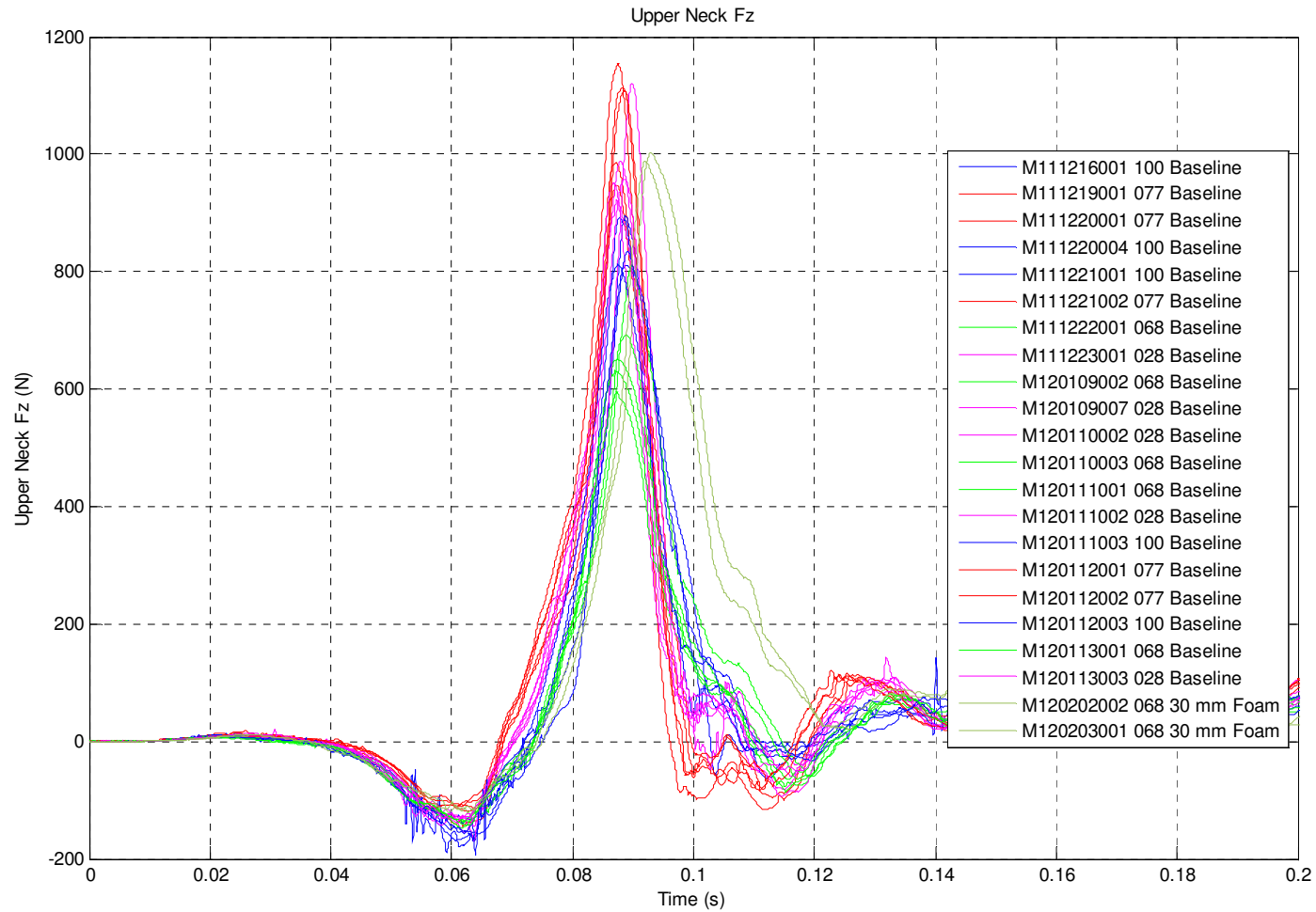
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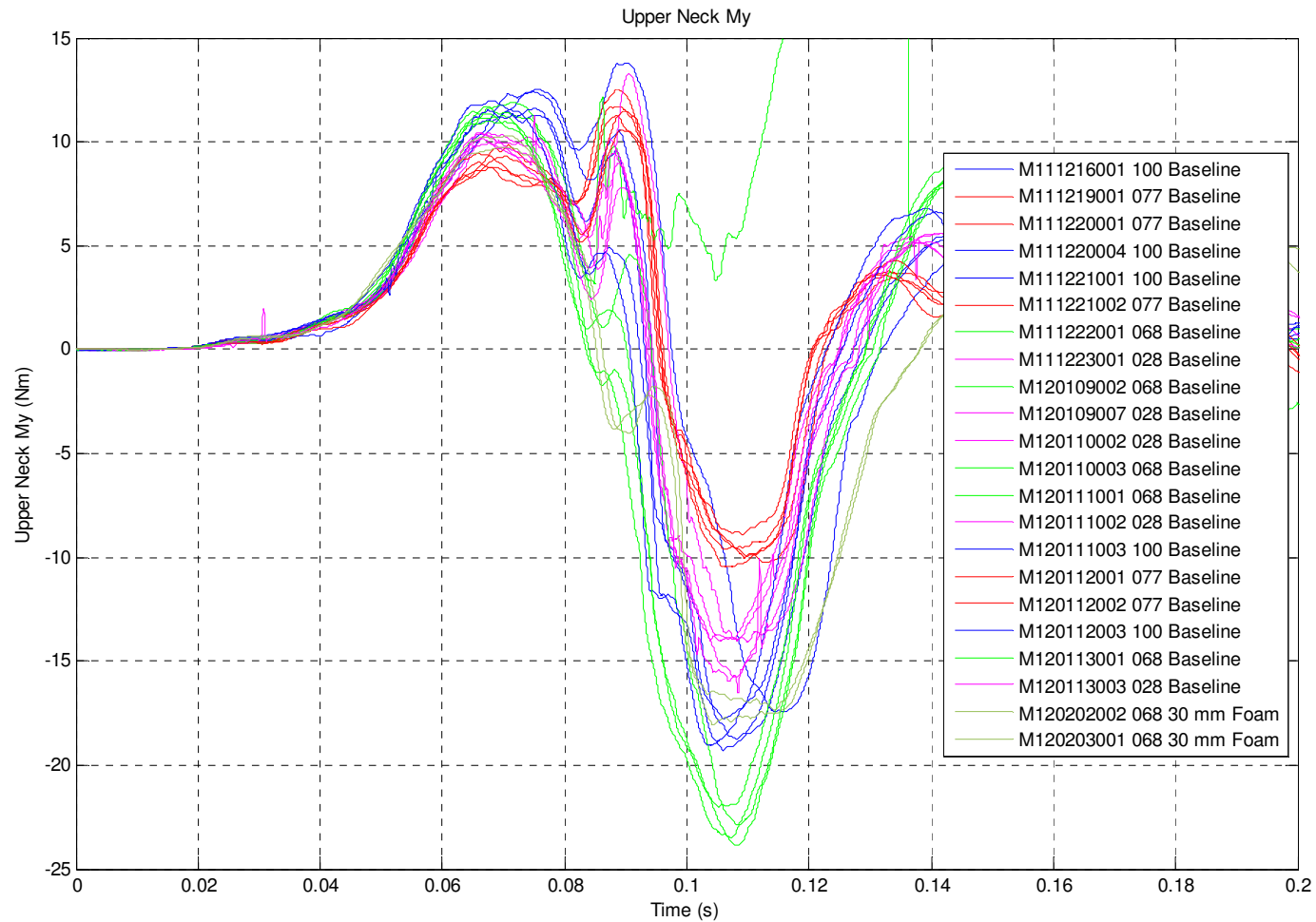
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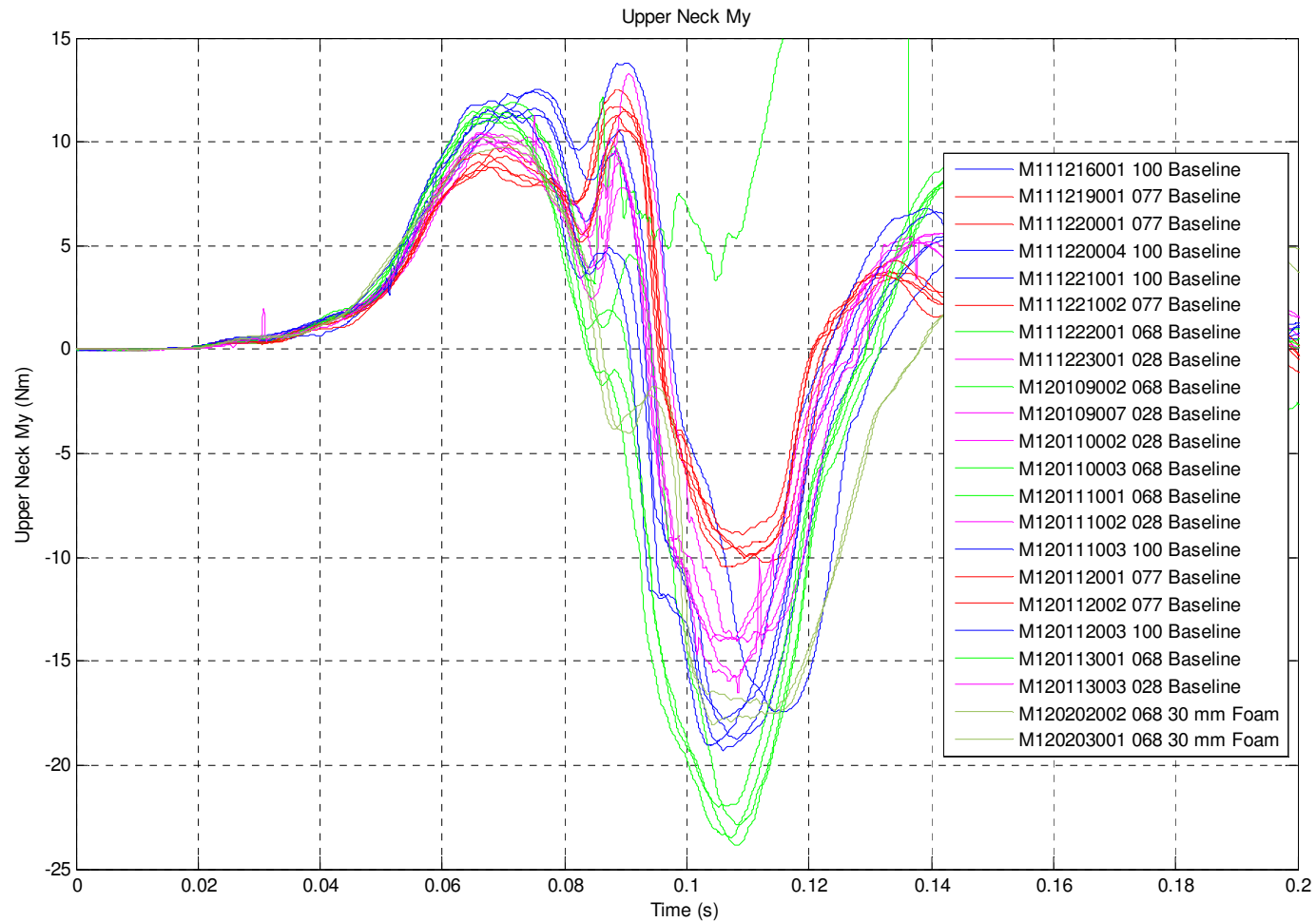
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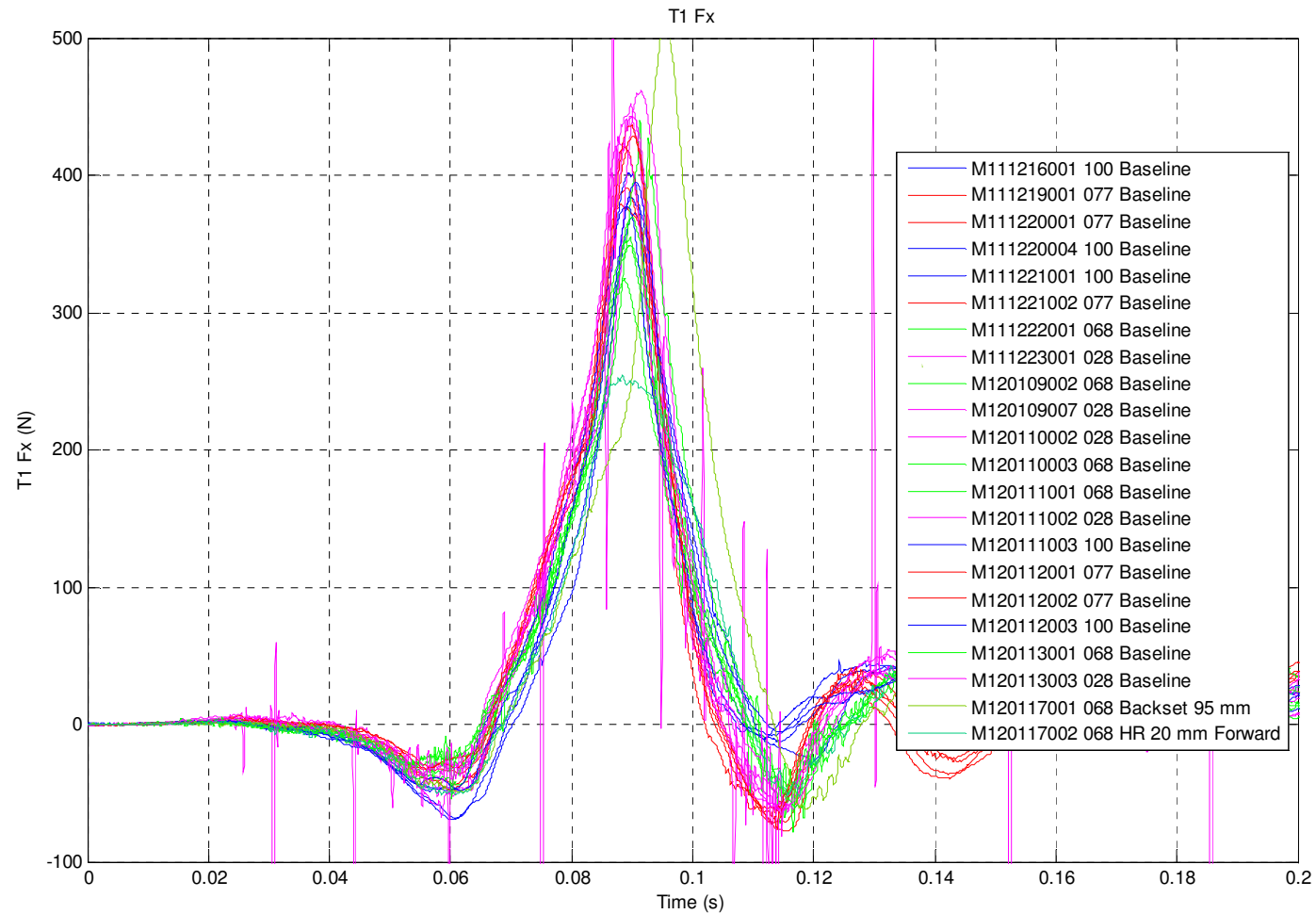
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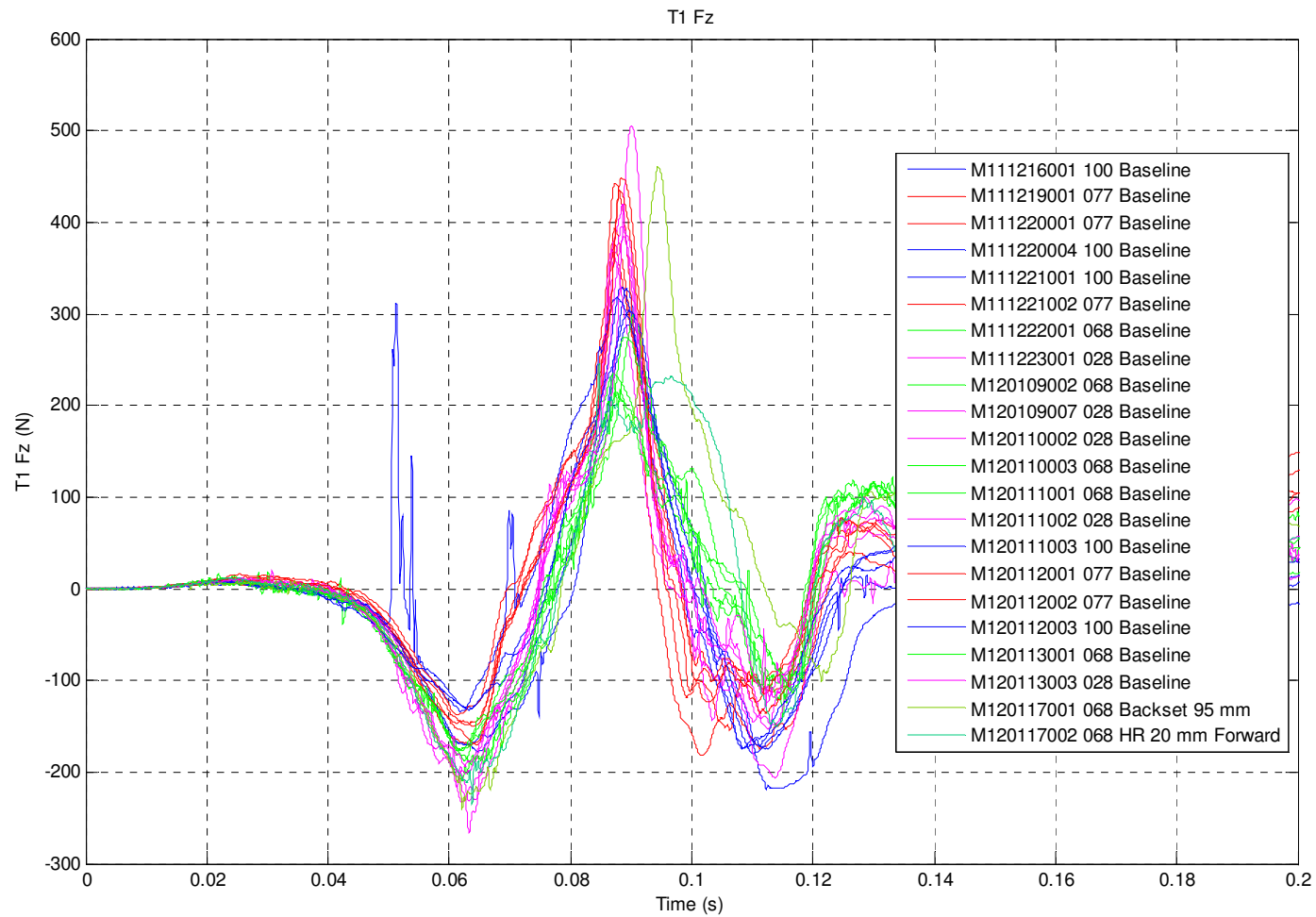
Seat Test Results

Baseline tests with + 068 different backset



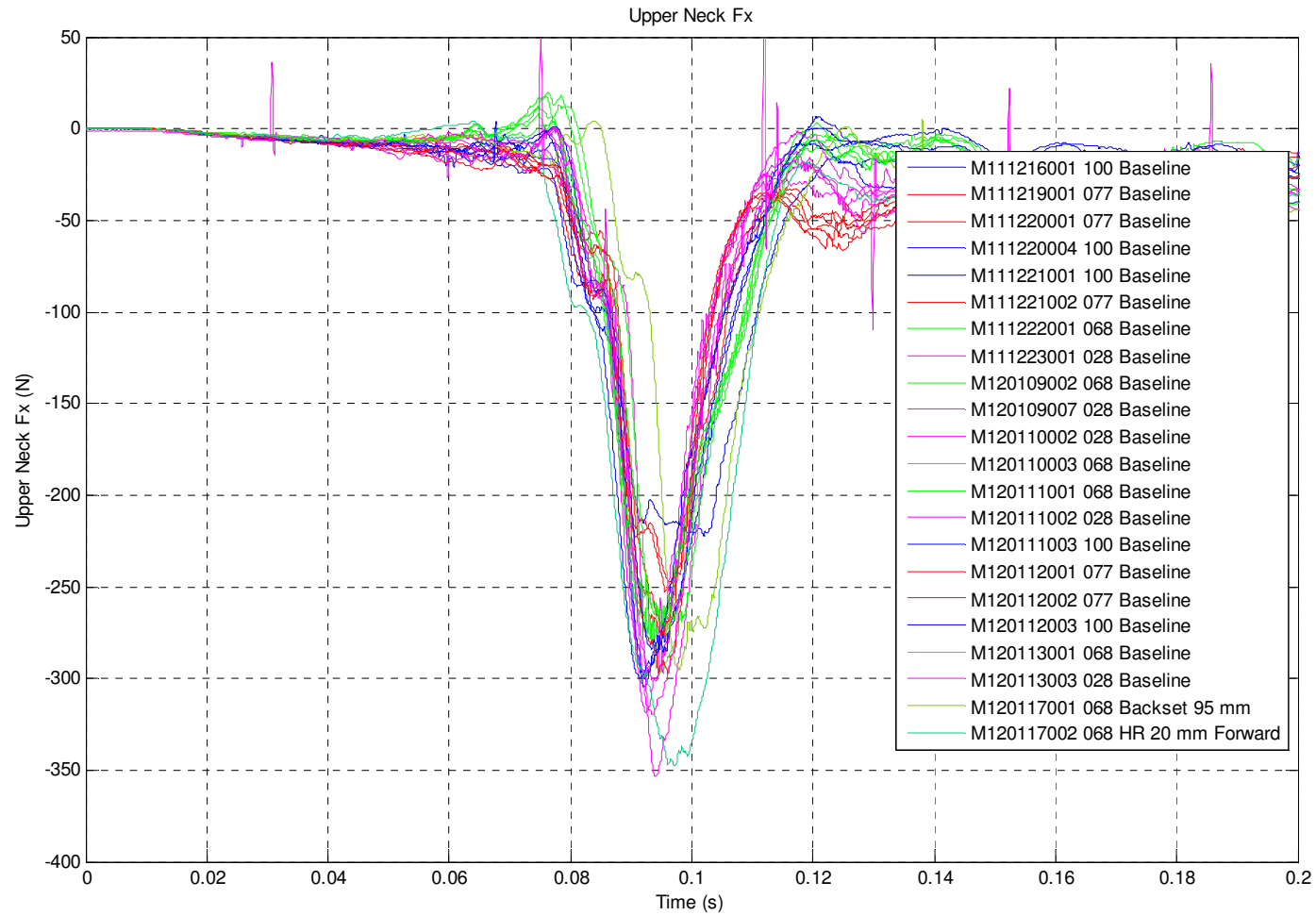
Seat Test Results

Baseline tests with + 068 different backset



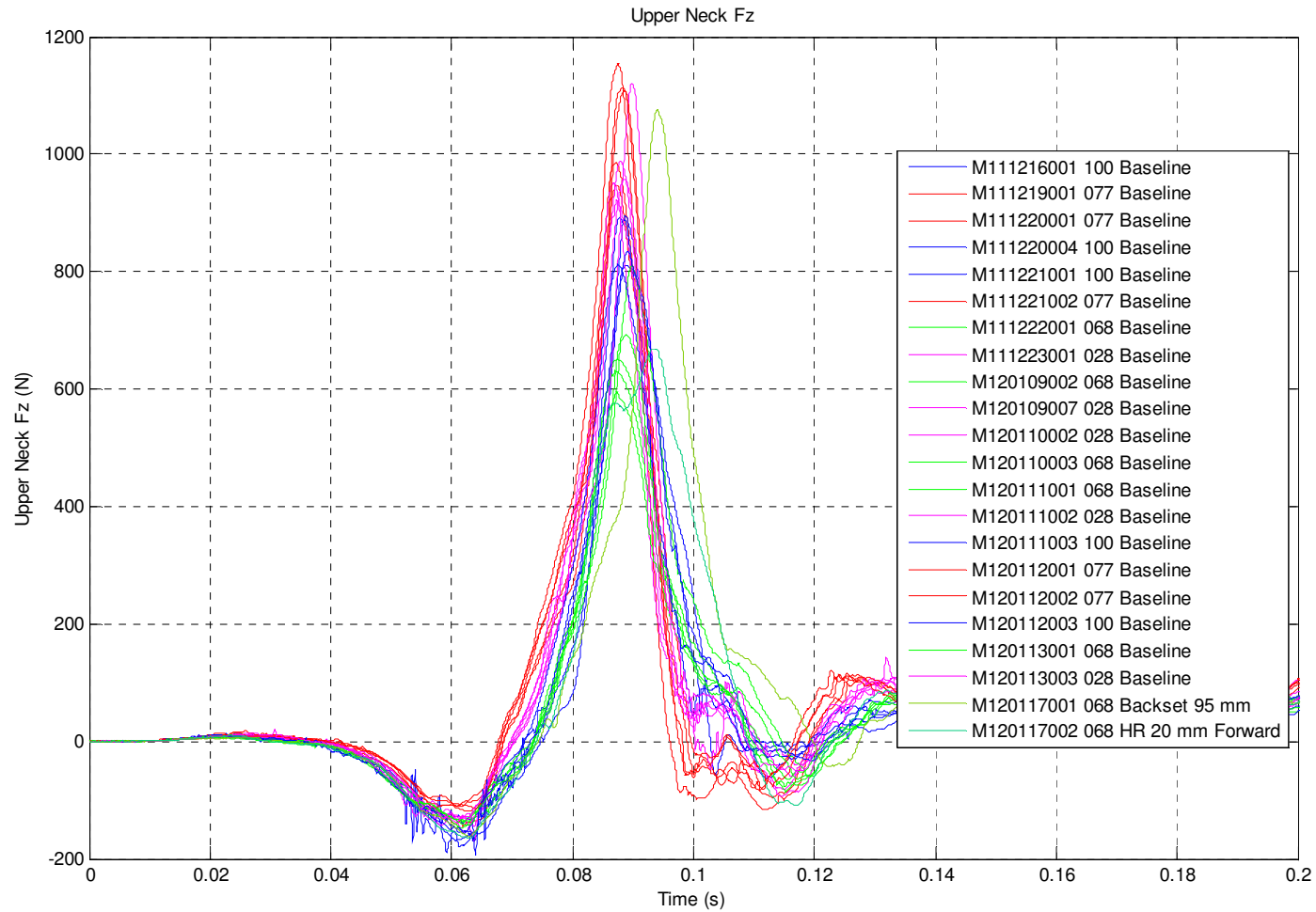
Seat Test Results

Baseline tests with + 068 different backset



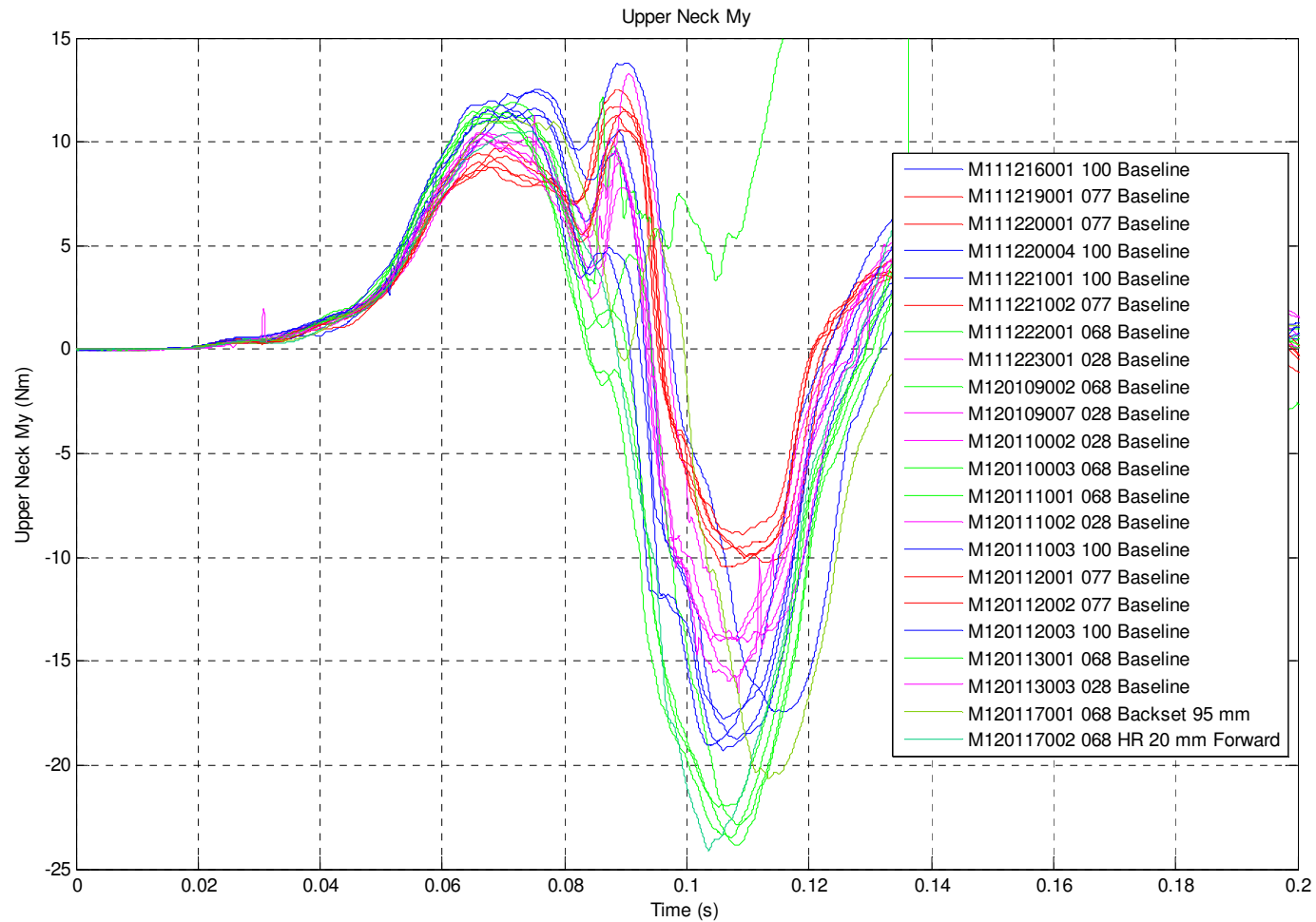
Seat Test Results

Baseline tests with + 068 different backset



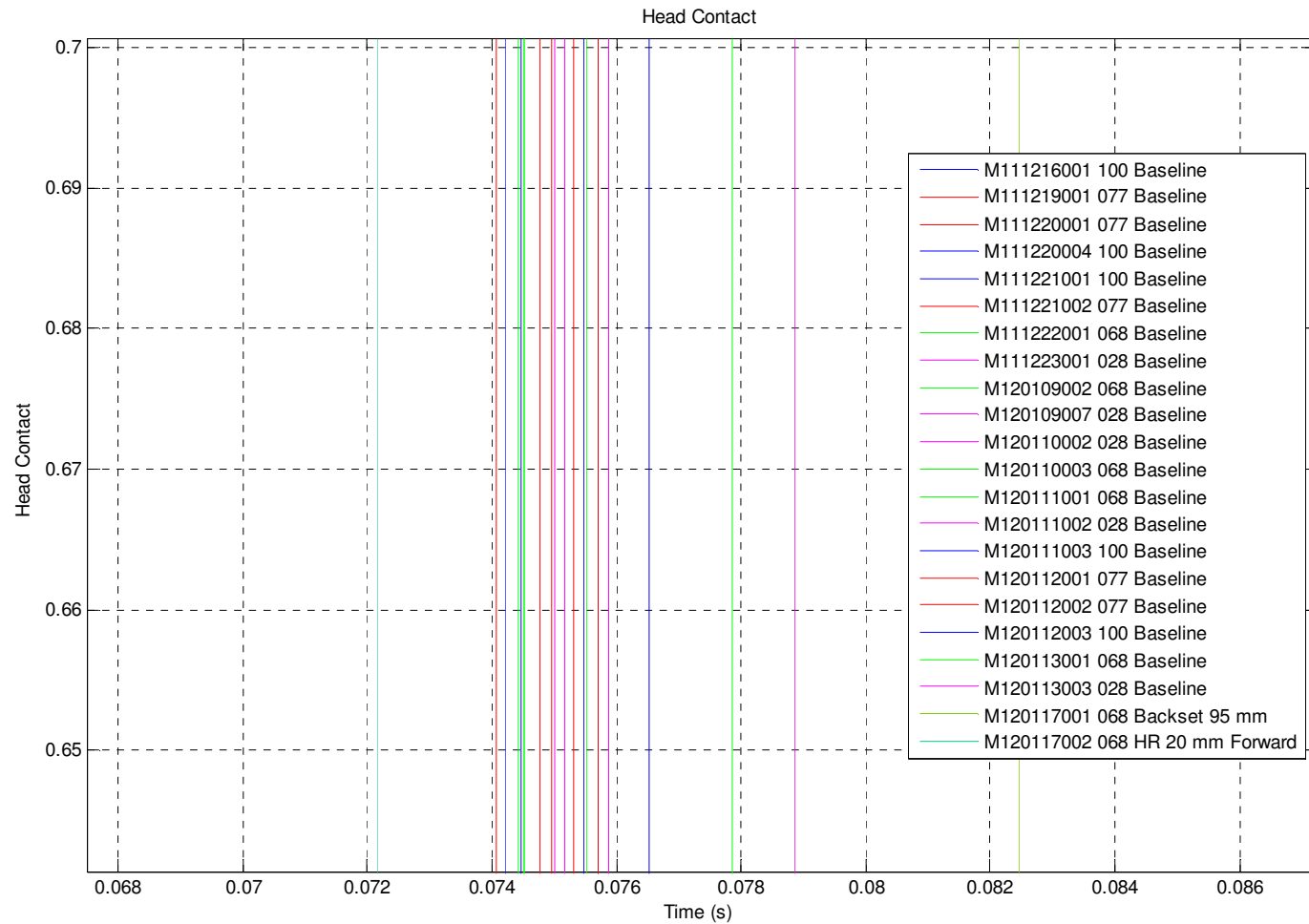
Seat Test Results

Baseline tests with + 068 different backset



Seat Test Results

Baseline tests with + 068 different backset

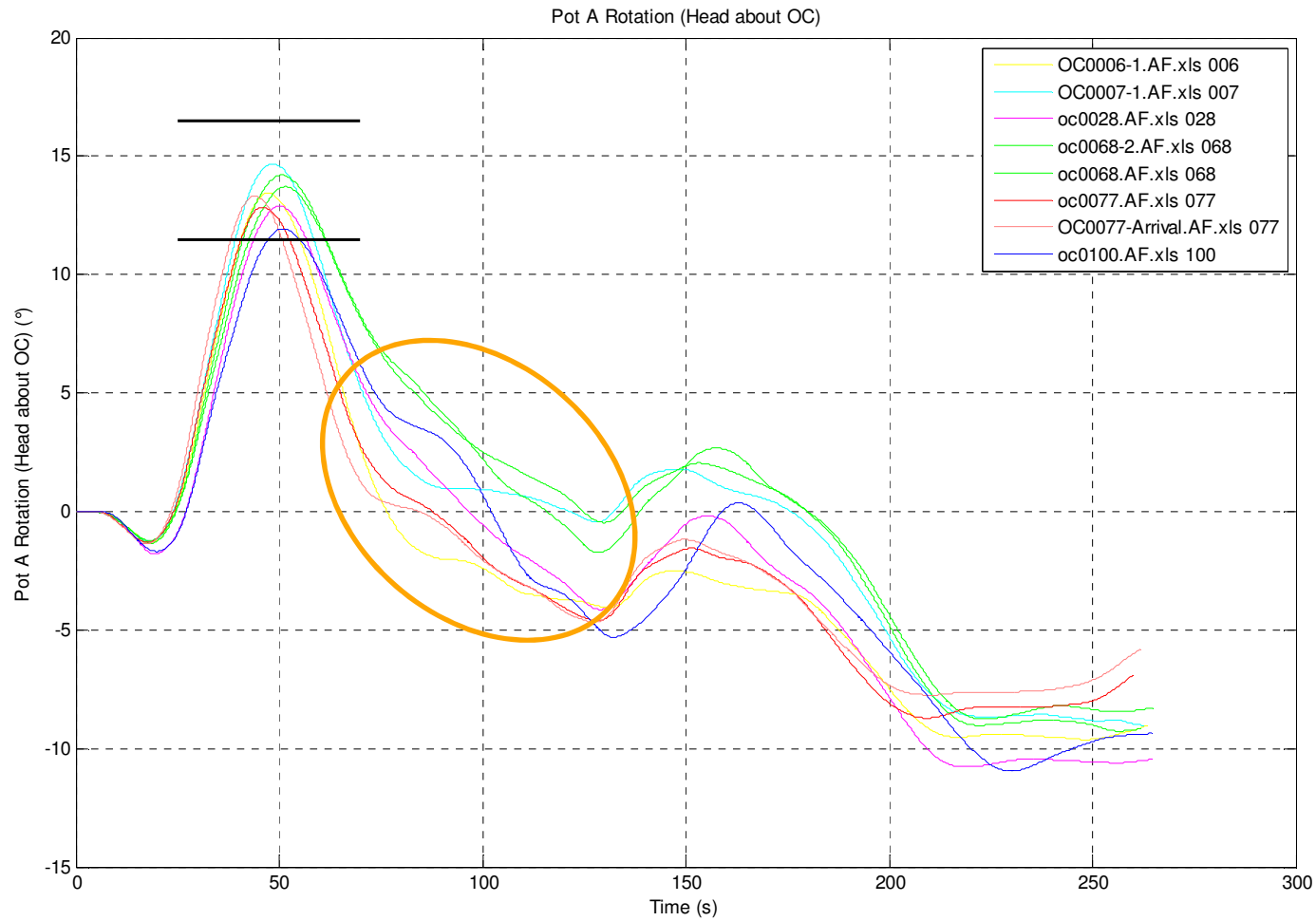


Take 45... Back at 13:50 CET



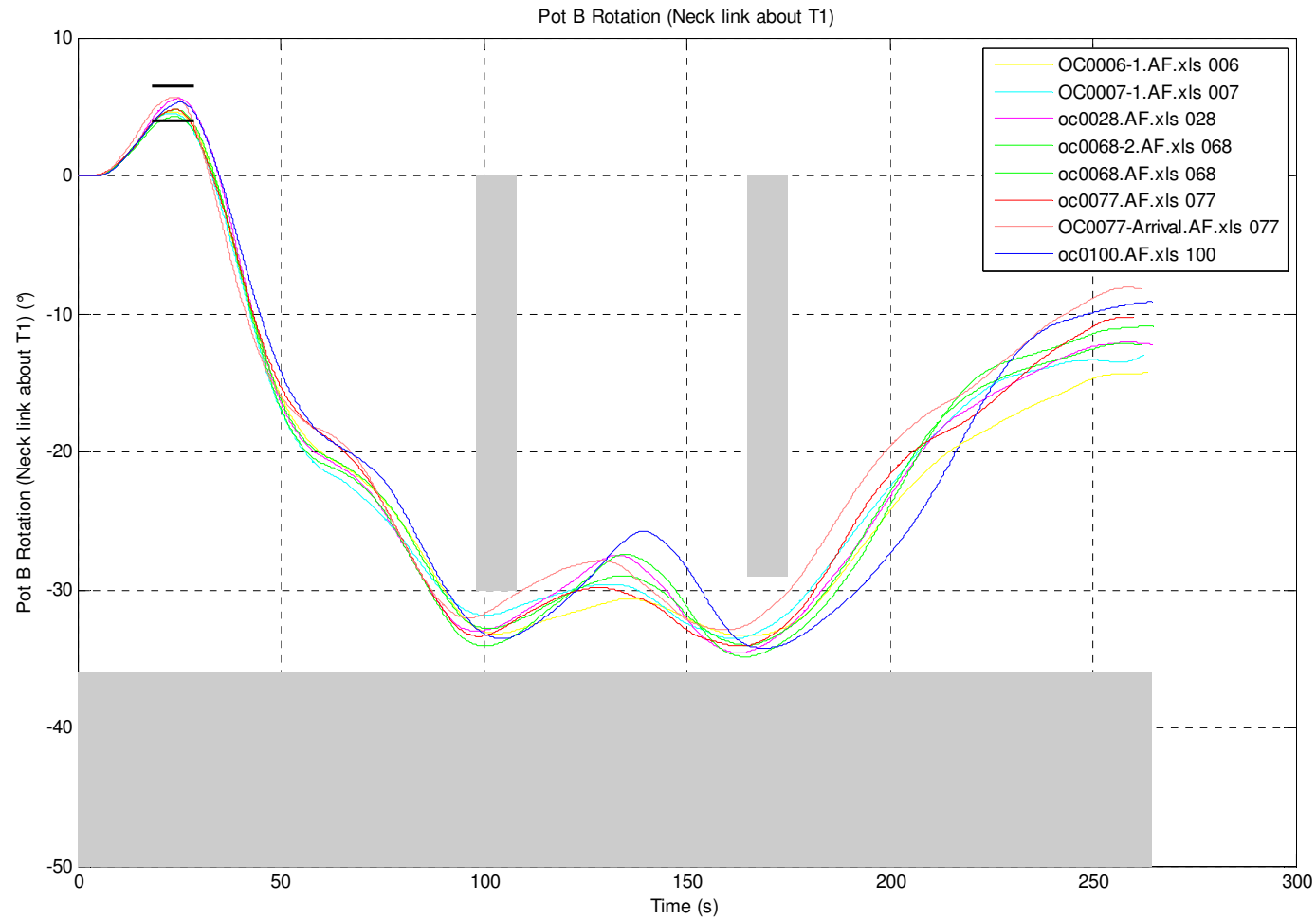
Certification Test Results

Without HR Cert



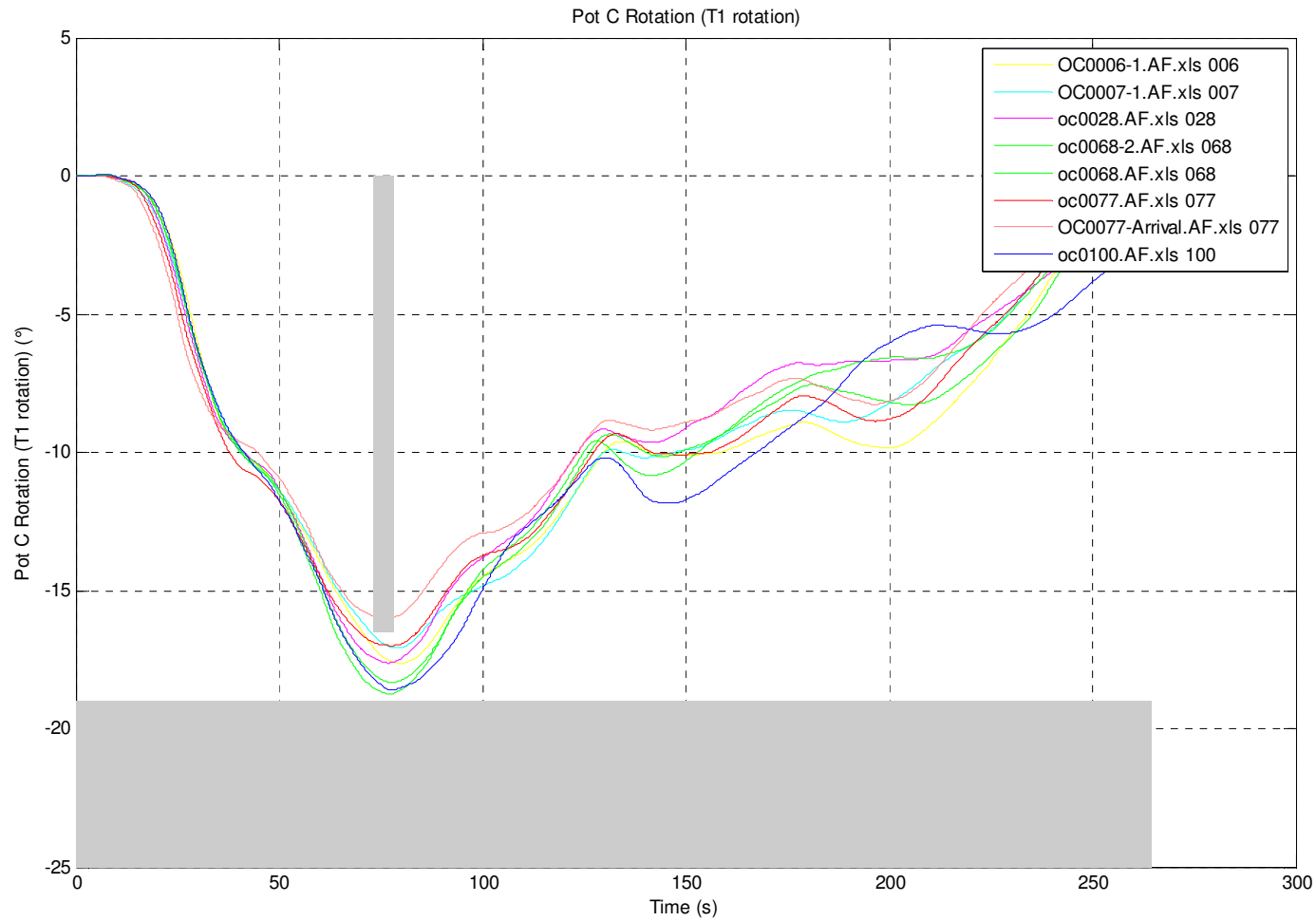
Certification Test Results

Without HR Cert



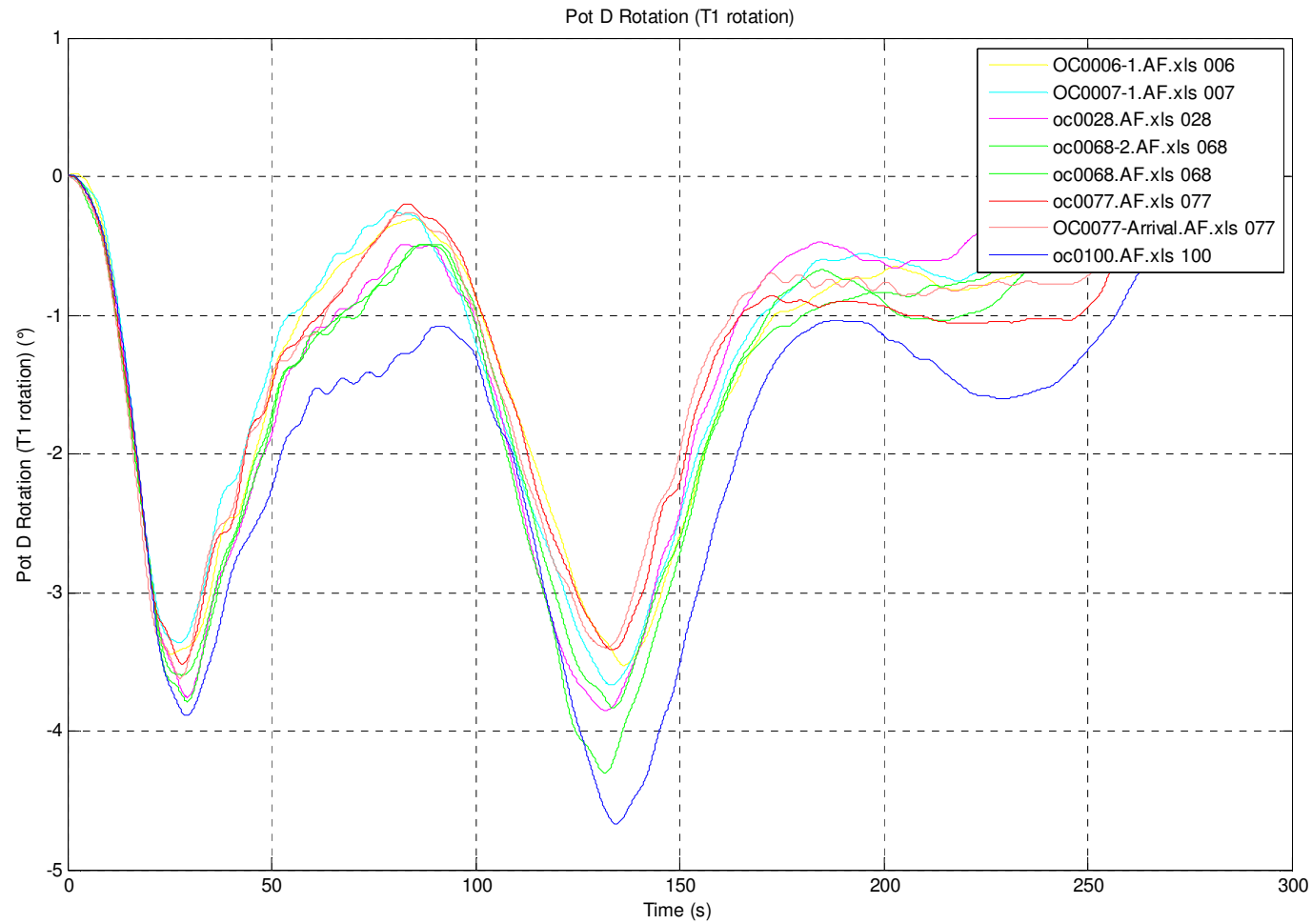
Certification Test Results

Without HR Cert



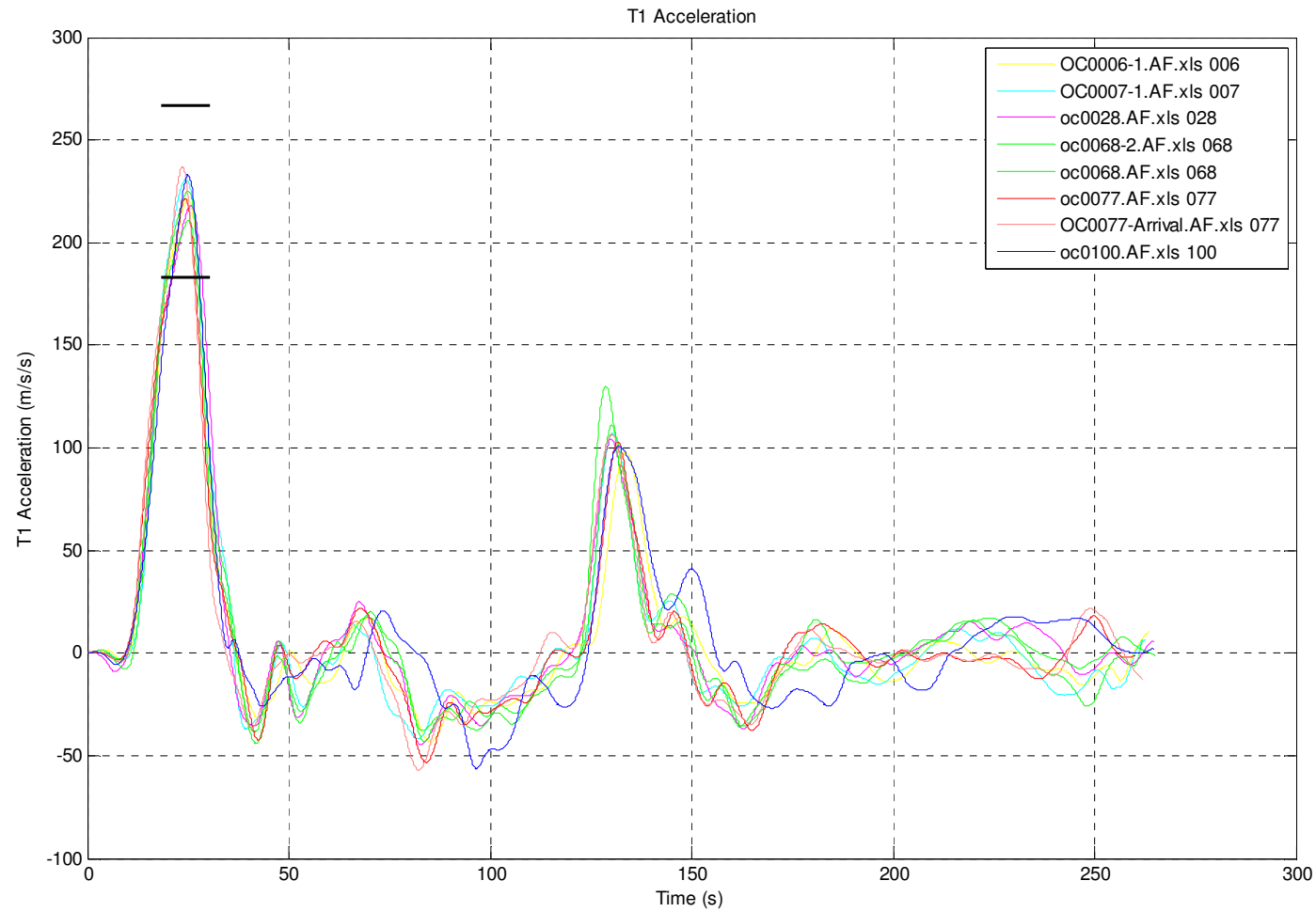
Certification Test Results

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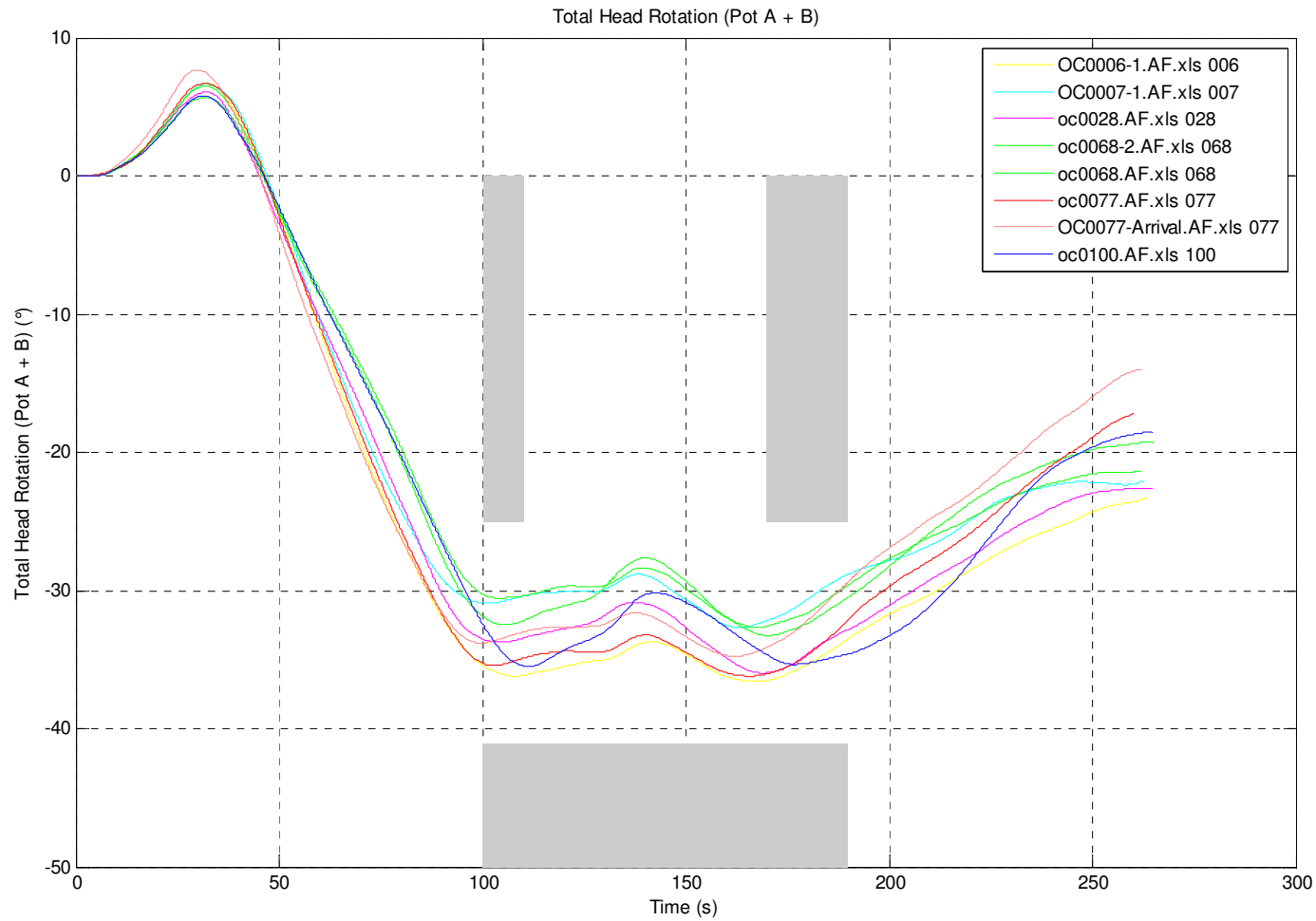
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Without HR Cert



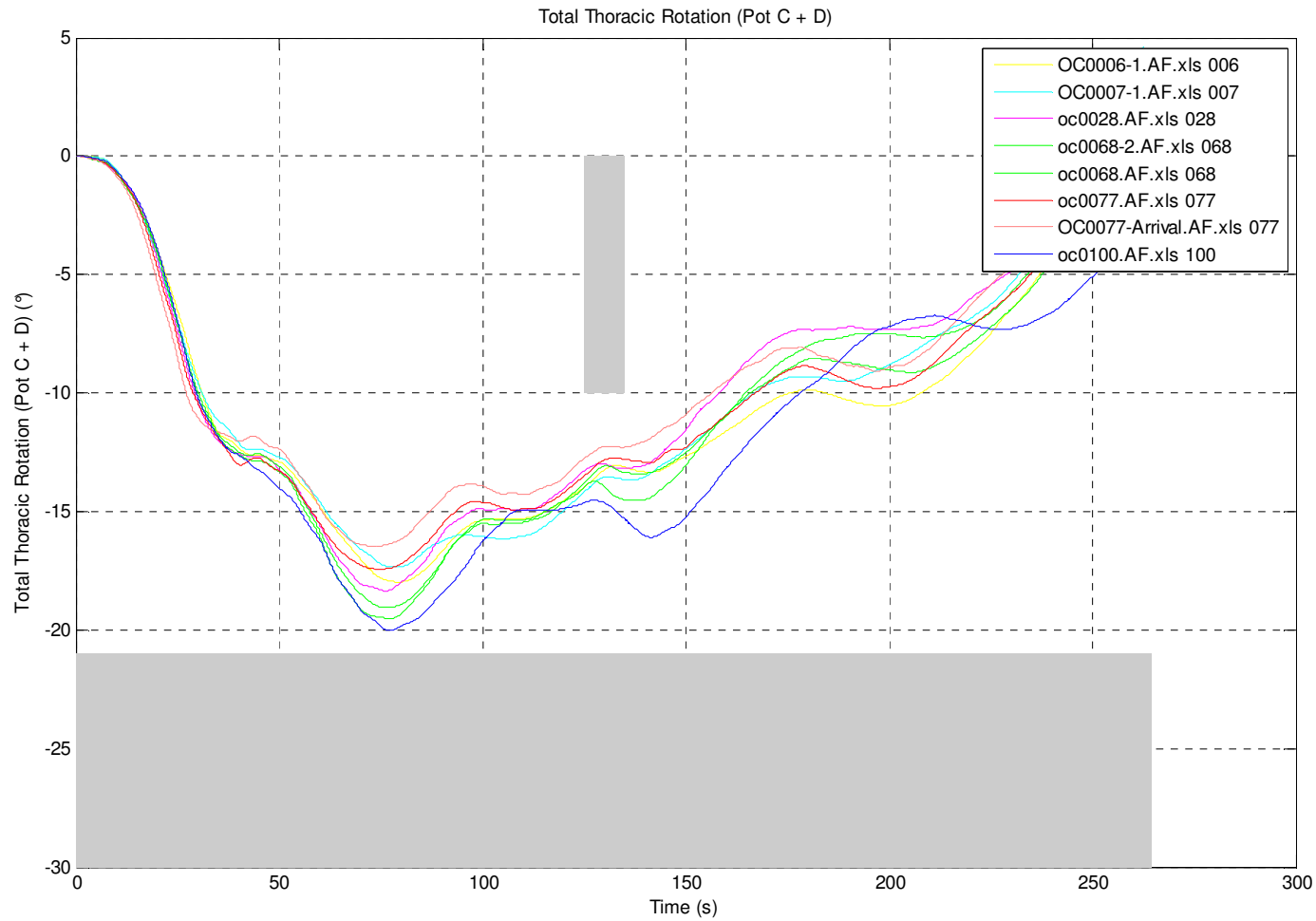
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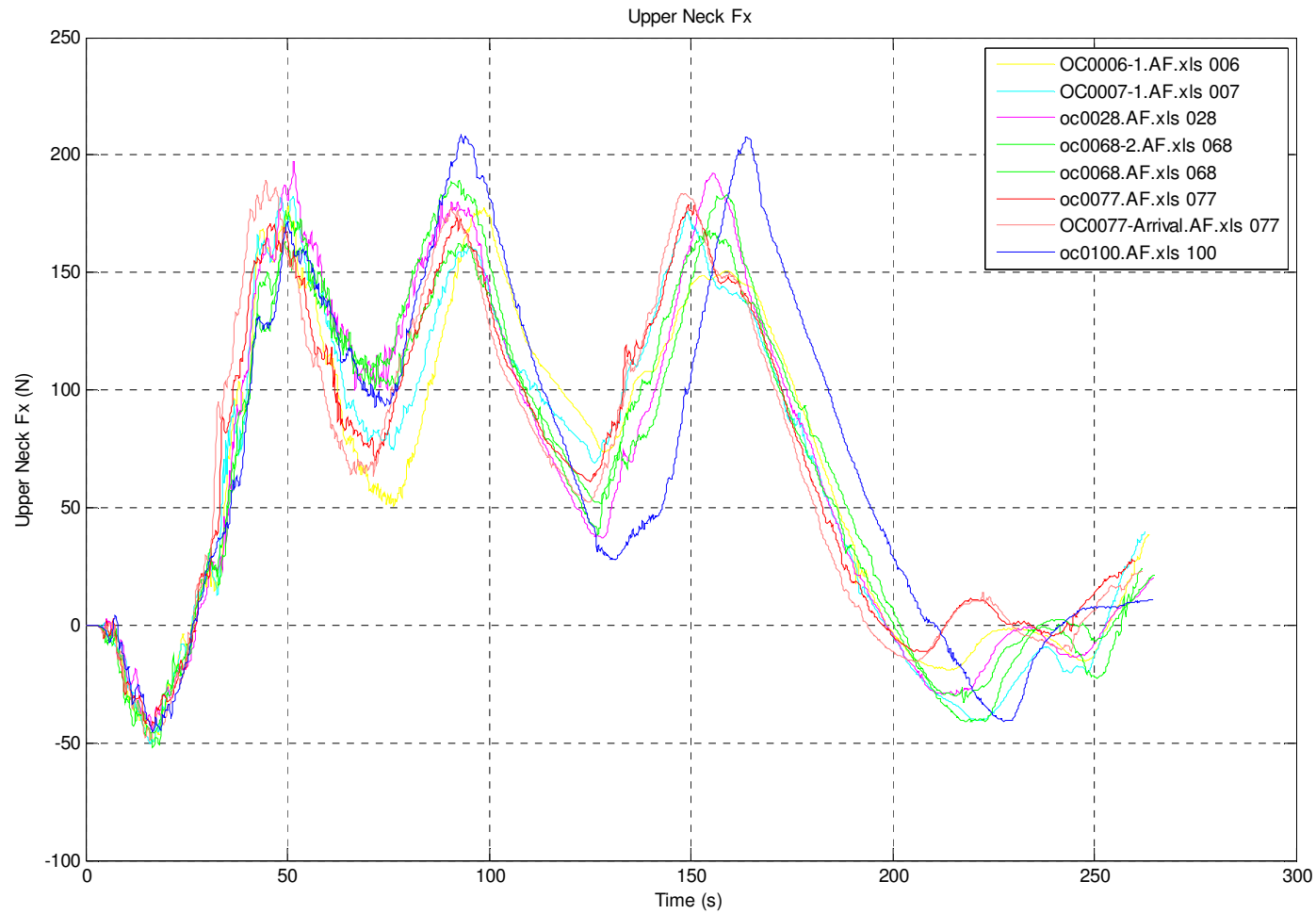
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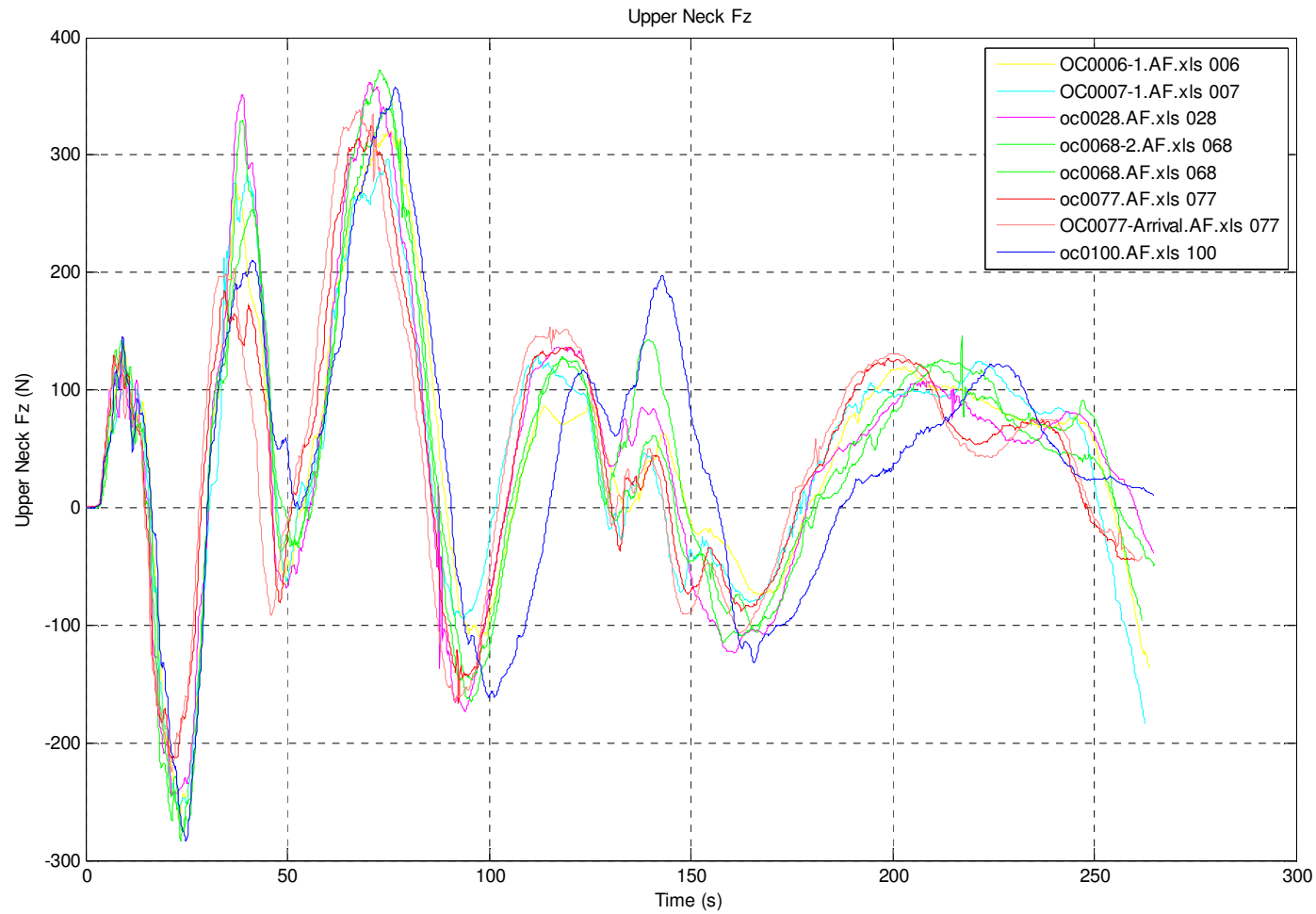
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Without HR Cert



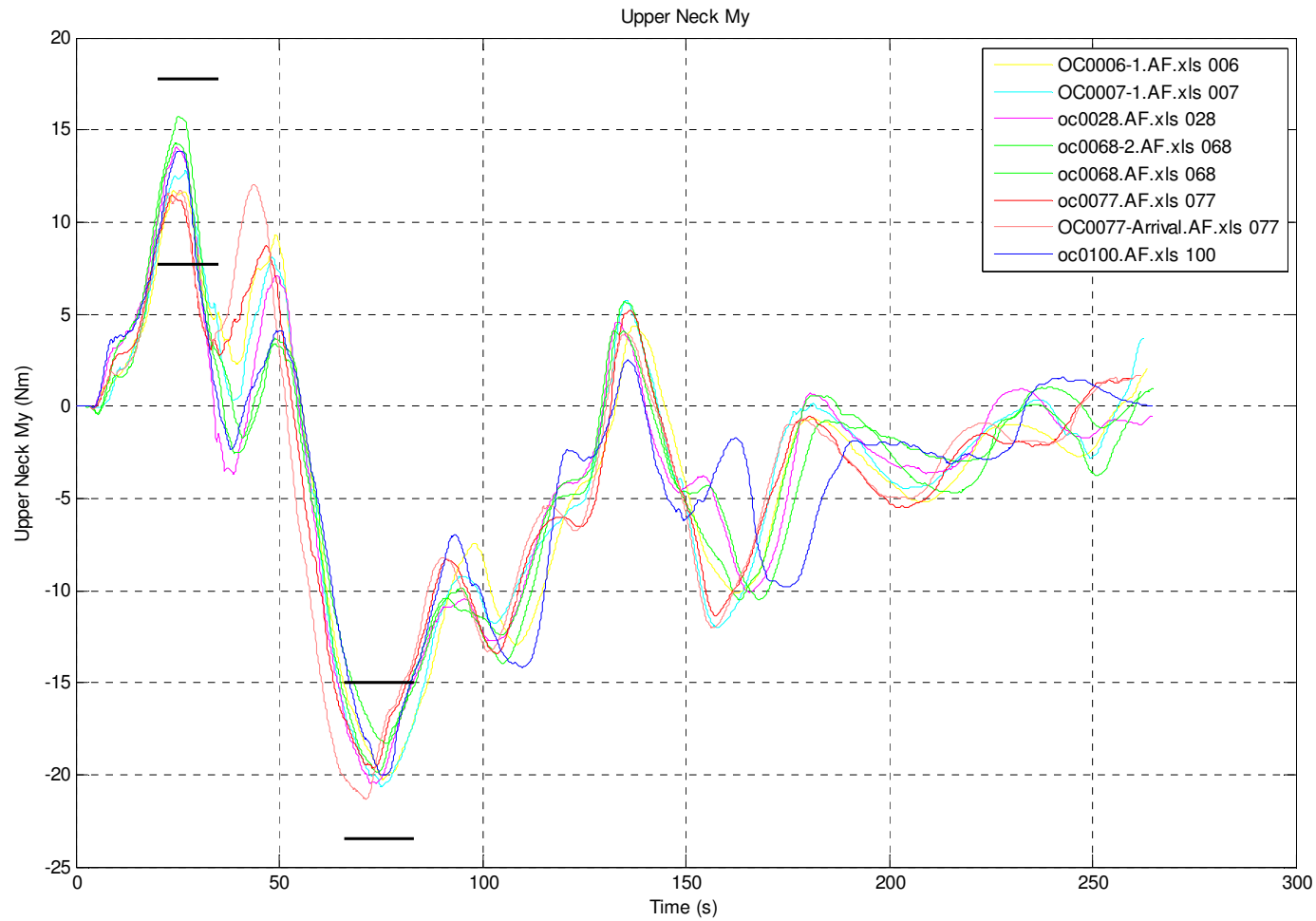
Certification Test Results

Without HR Cert



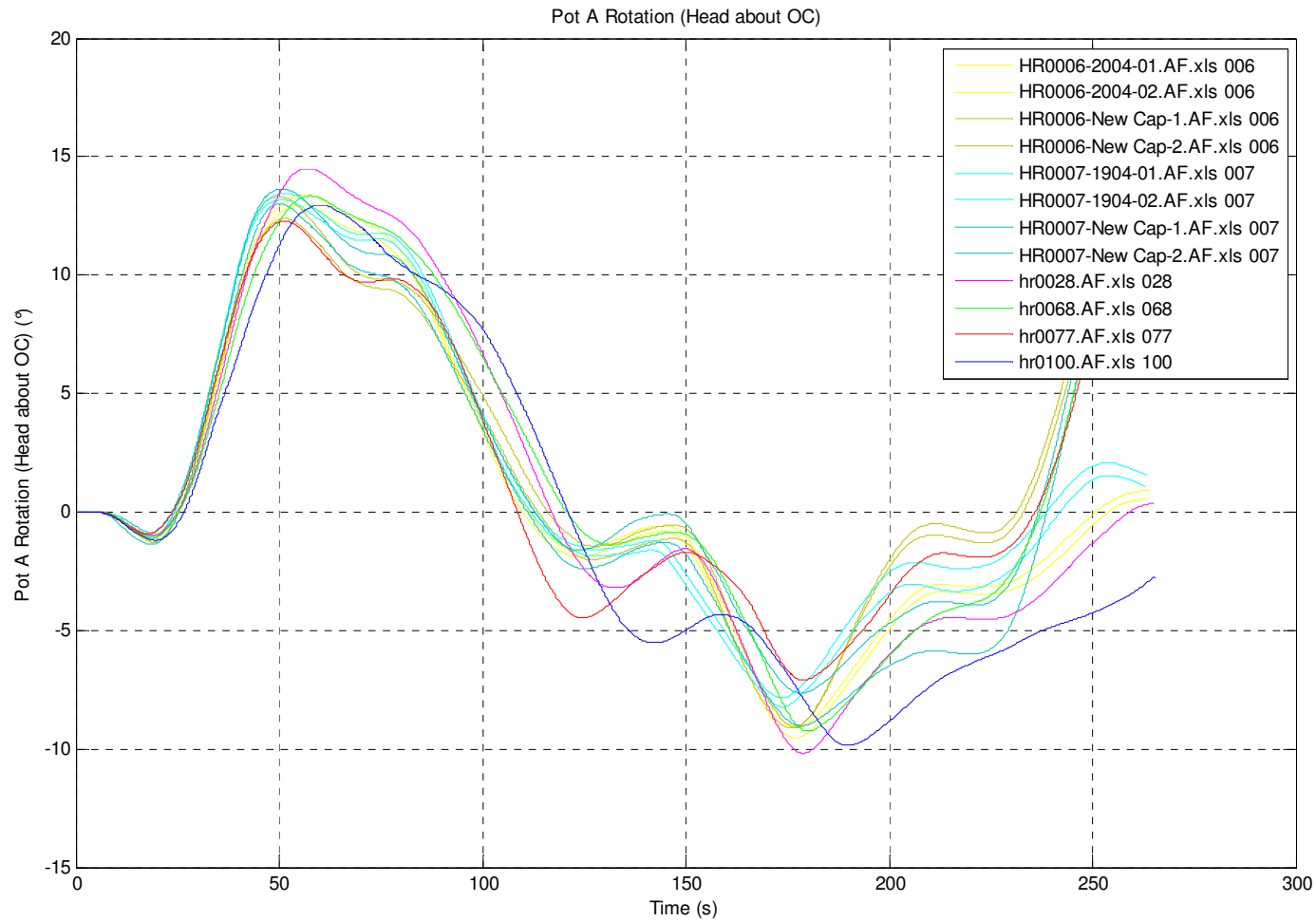
Certification Test Results

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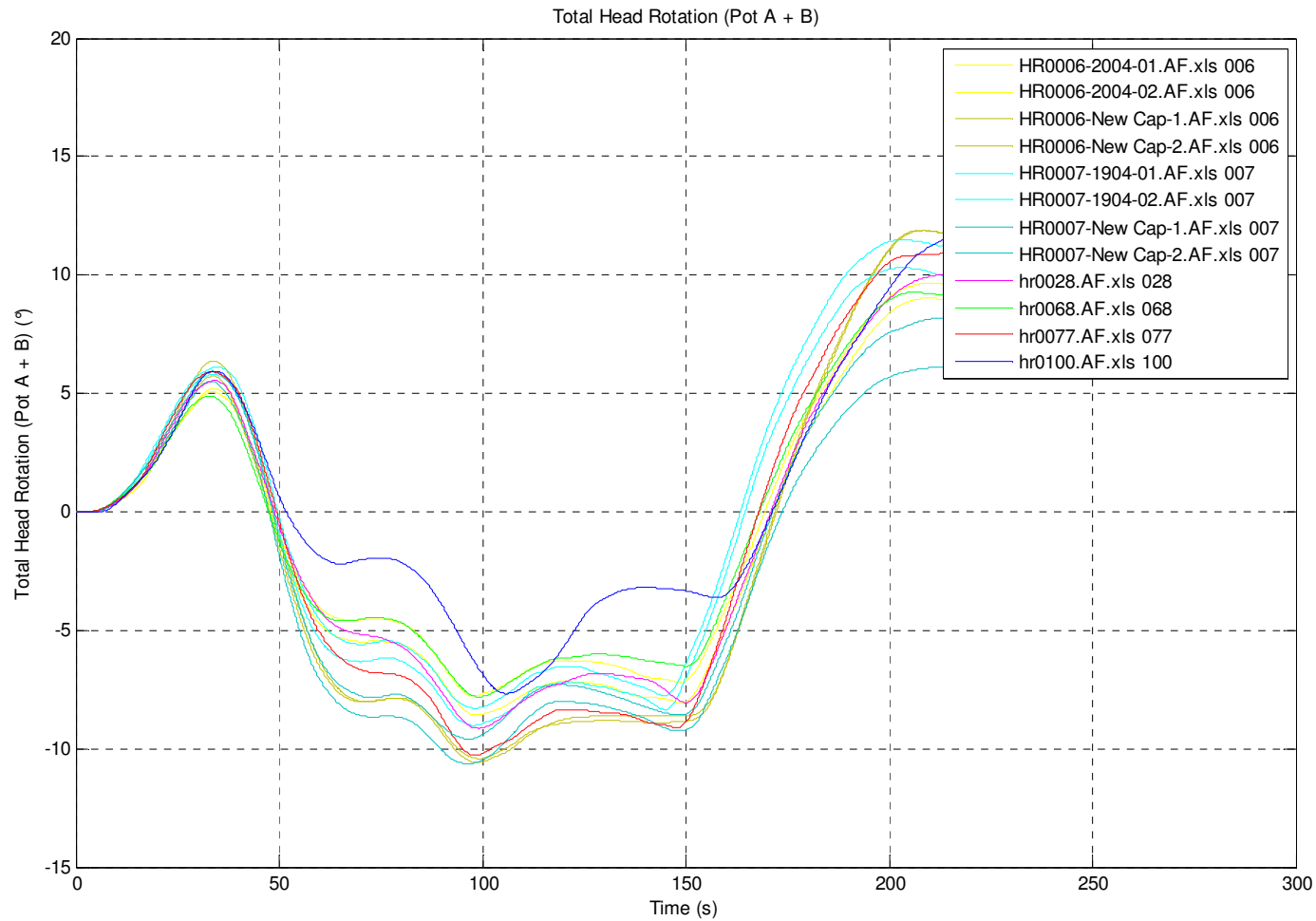
Introduction

With HR Cert



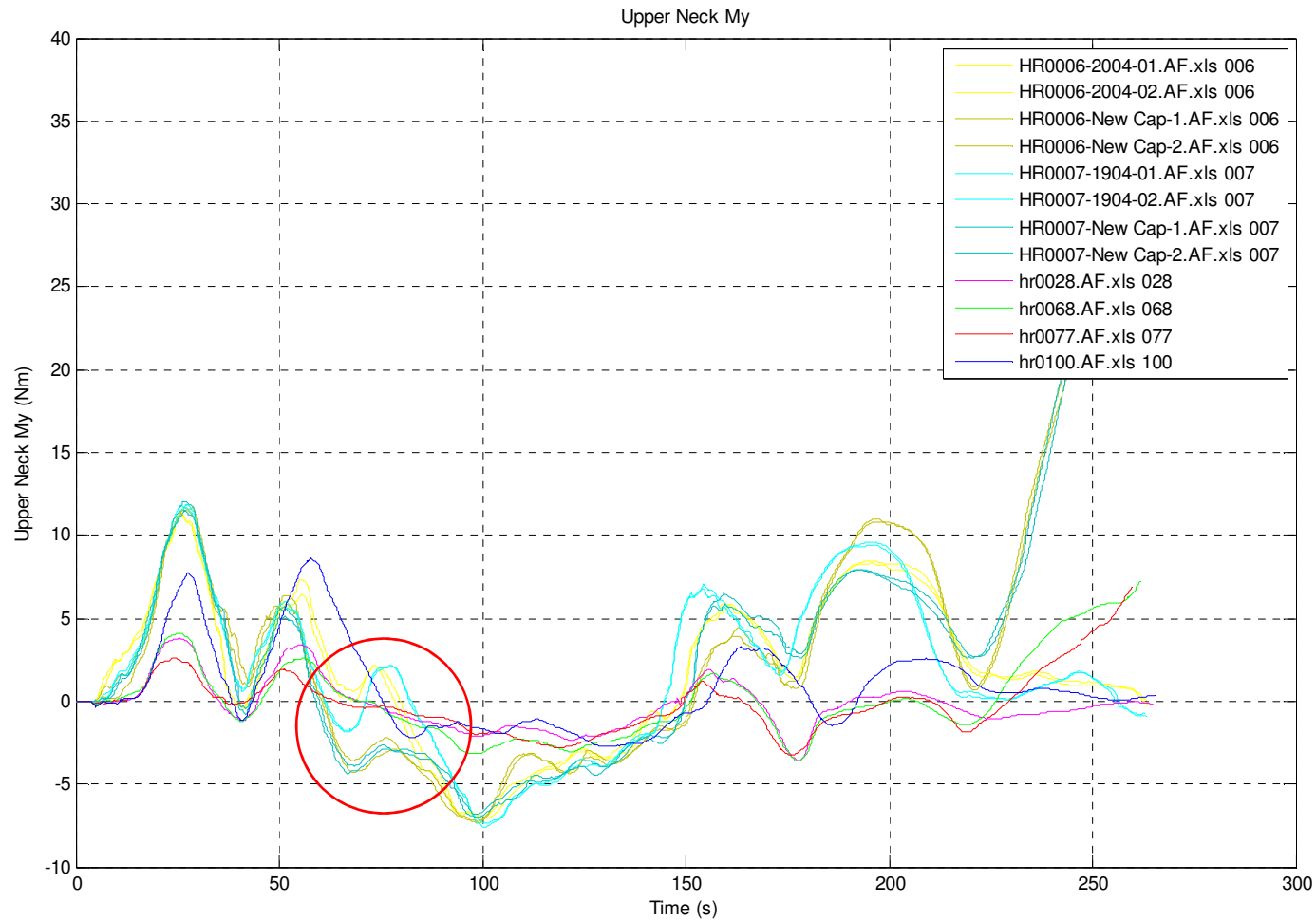
Introduction

With HR Cert



Certification Test Results

With HR Cert



Introduction

Outputs:

- Sled tests
 - T1 and upper neck Fx quite good
 - T1 My quite good
 - T1 and upper neck Fz very variable
 - Not related to small changes in seat / head restraint over time because no change in phase of responses (phase change seen with different backset)
 - Also big oscillations in Fz in certification test
 - Fz difference correlate in time with pelvis Az differences
 - Recommend improving pelvis flesh reproducibility
 - Upper neck My very variable
 - Correlates quite well with Pot A in no HR cert test and My in with HR cert test
 - Recommend much tighter control on Pot A response

Introduction

Outputs:

- Certification
 - Need pelvis flesh stiffness
 - Looking at quasi-static spine stiffness test
 - May need much tighter control of Pot A **after** initial peak which has the current corridor
 - Looking at source of oscillations in upper neck My in no-HR cert test (40 Hz)

- Design
 - Recommend smooth, biofidelic profile to rear of pelvis bone
 - Current profile OK provided any hard part in the seat not close to the step changes in profile
 - Would require alternative mounting for pelvis accels (if they are required)
 - Mount to base of spine?
 - (Currently modified Hybrid III part, so Hybrid III may have same issues in rear impact)

Introduction

What next?

- Try static spine stiffness tests before and after refurbishing spine
 - Aim to get these consistent between dummies
- Perform pelvis stiffness tests
 - Aim to get these consistent between dummies
 - May have to swap flesh between tests
- Re-test on TRL seat at BAST
 - Only 3-4 days testing available
- See Paul's presentation



Do You Have Any Questions?

Thank you

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