ALMA MATER STUDIORUM – UNIVERSITÀ DI BOLOGNA

SCUOLA DI INGEGNERIA E ARCHITETTURA

DICAM – Dipartimento di Ingegneria Civile, Ambientale e dei Materiali

Corso di Laurea Magistrale in Ingegneria Civile

TESI DI LAUREA MAGISTRALE

PROVE SU TAVOLA VIBRANTE DI UN SILO METALLICO A FONDO PIANO: ANALISI DELLA RISPOSTA SISMICA MEDIANTE MISURAZIONI OTTICHE

APPENDICE A – Parte 10

CANDITATO

Caterina Neri

RELATORE

Chiar.mo Prof. Ing. Stefano Silvestri

Anno Accademico 2018-2019

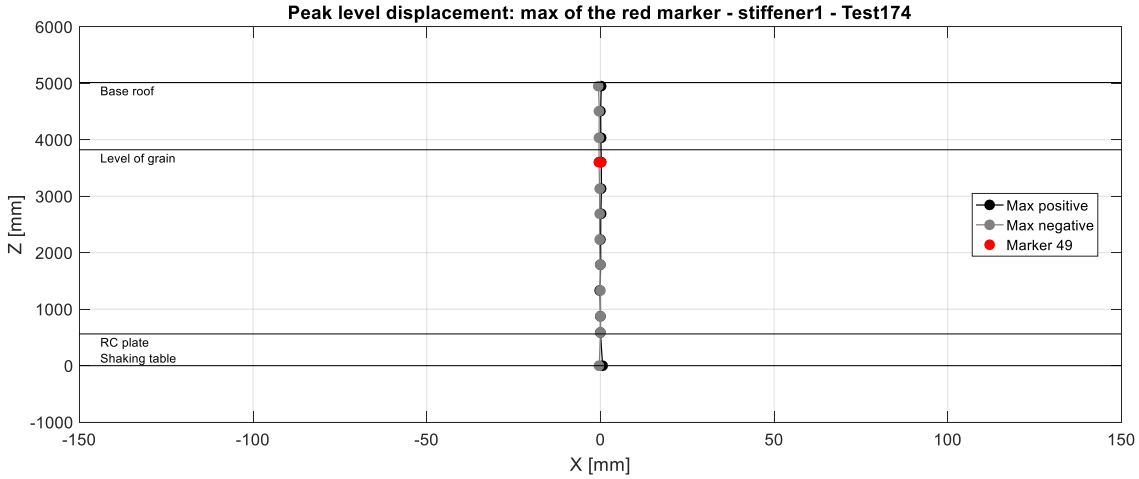
Sessione I

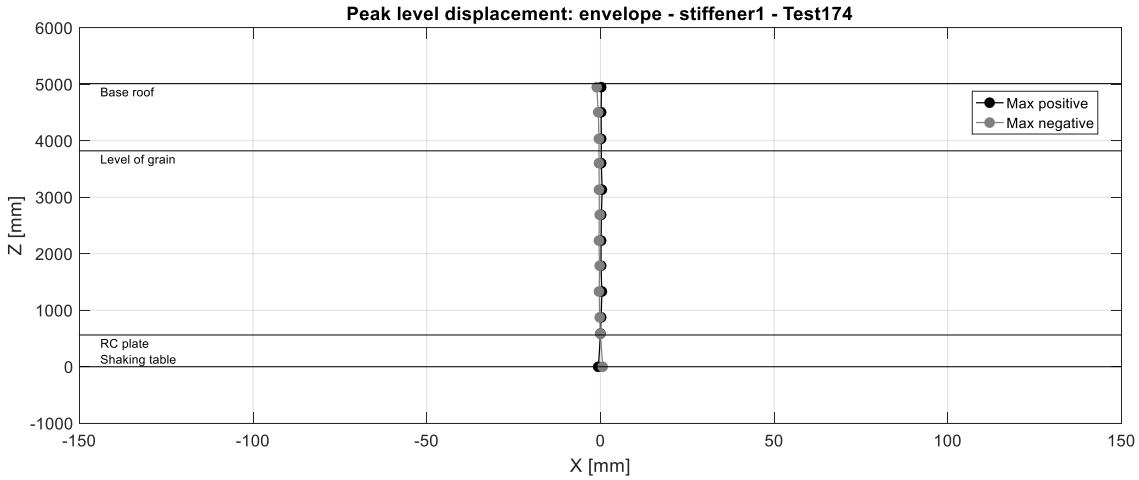
INDICE APPENDICE A

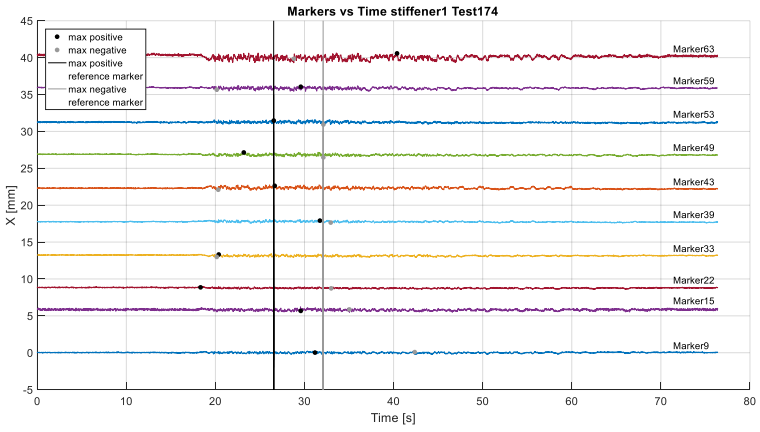
A. 6.6.1 Markers – Parte 1

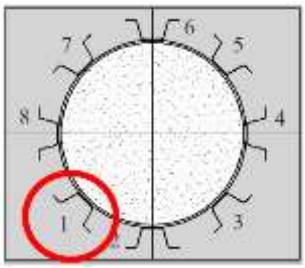
Earthquake input A1 0.1 g: Test 174

Montante 1

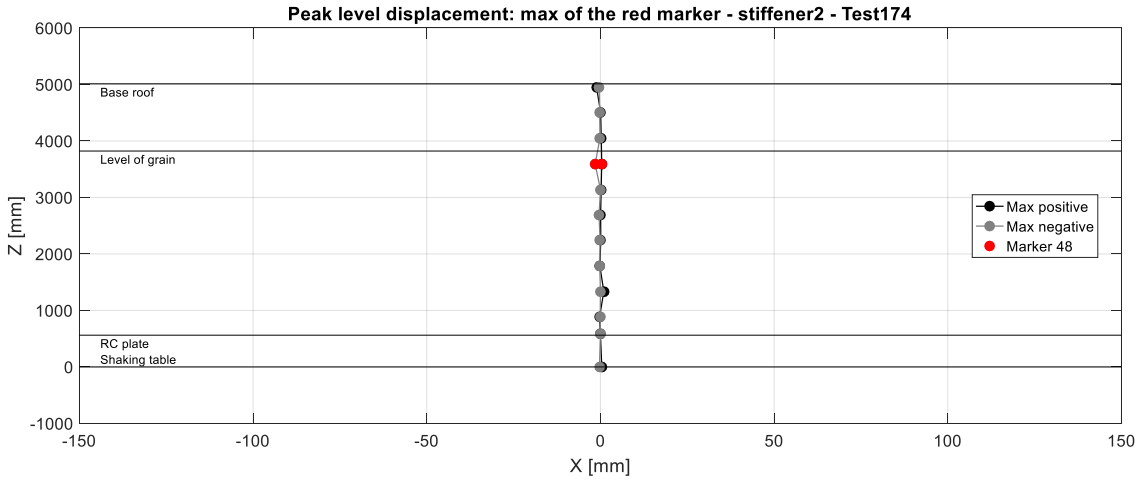


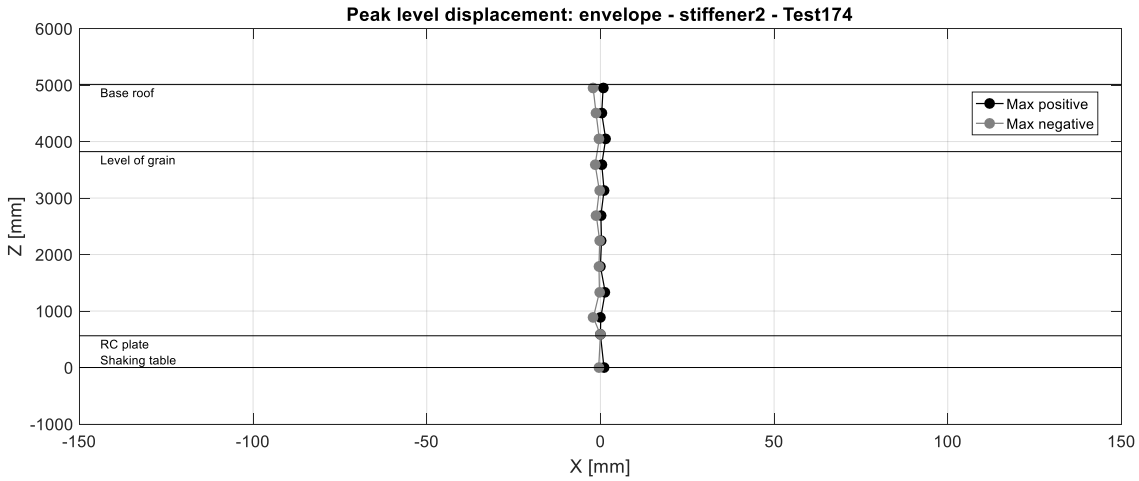


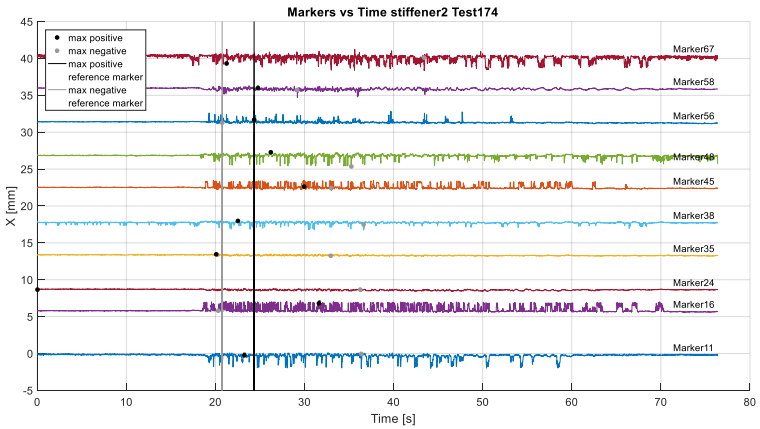


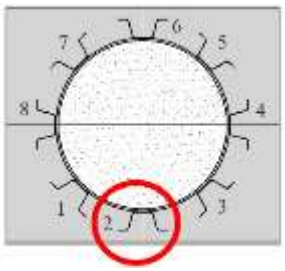


Montante 2

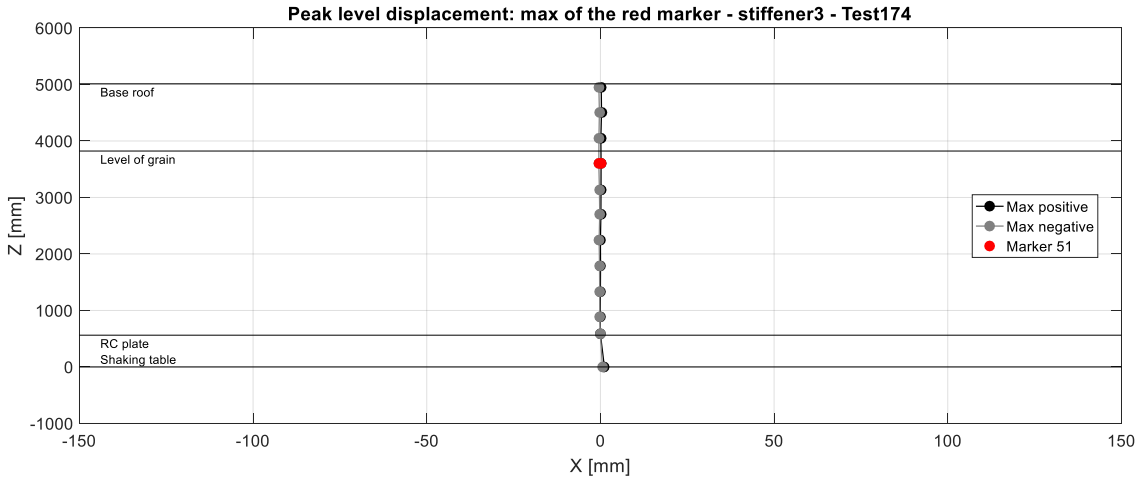

Peak level displacement: max of the red marker - stiffener2 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 48
Z [mm]
X [mm]

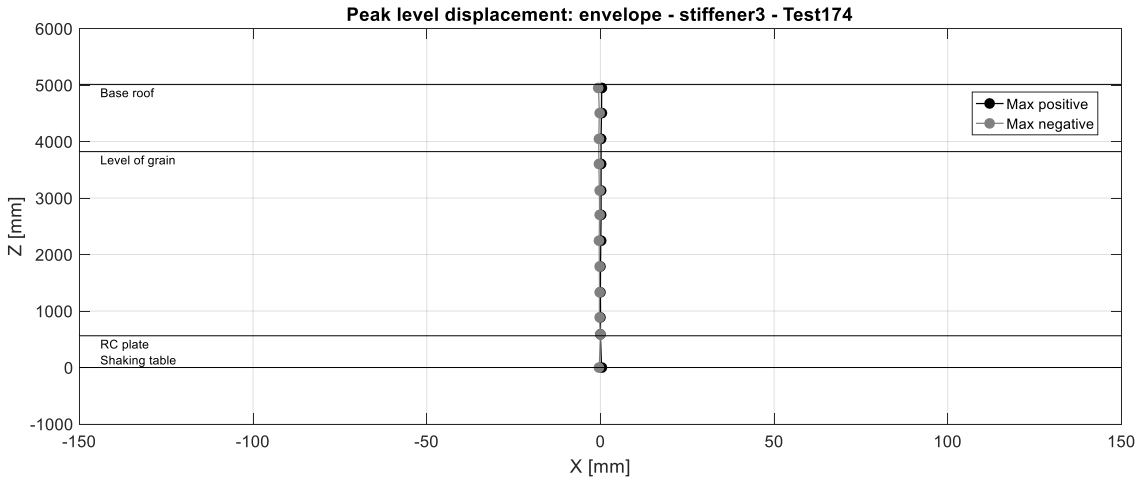

Peak level displacement: envelope - stiffener2 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]

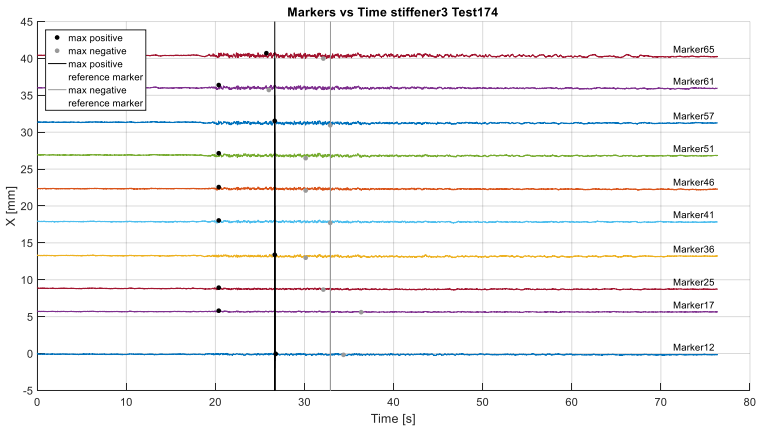

Markers vs Time stiffener2 Test174
max positive
max negative
max positive reference marker
max negative reference marker
Marker67
Marker58
Marker56
Marker48
Marker45
Marker38
Marker35
Marker24
Marker16
Marker11
X [mm]
Time [s]

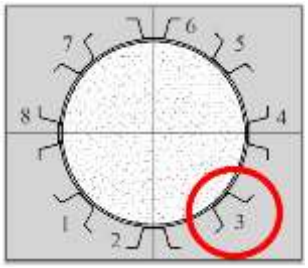

0
1
2
3
4
5
6
7
8

Montante 3


Peak level displacement: max of the red marker - stiffener3 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 51
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener3 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener3 Test174
max positive
max negative
max positive reference marker
max negative reference marker
Marker65
Marker61
Marker57
Marker51
Marker46
Marker41
Marker36
Marker25
Marker17
Marker12
X [mm]
Time [s]


1
2
3
4
5
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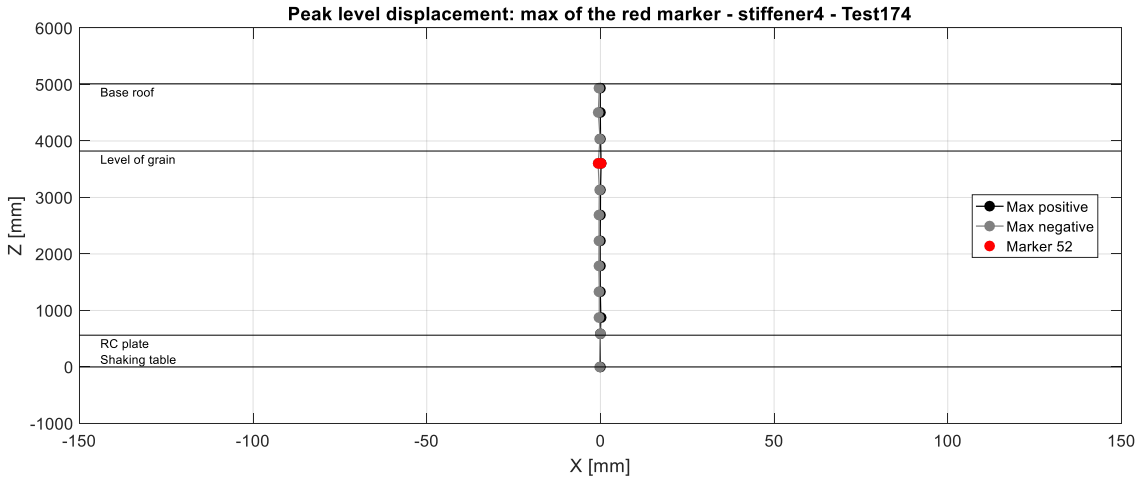
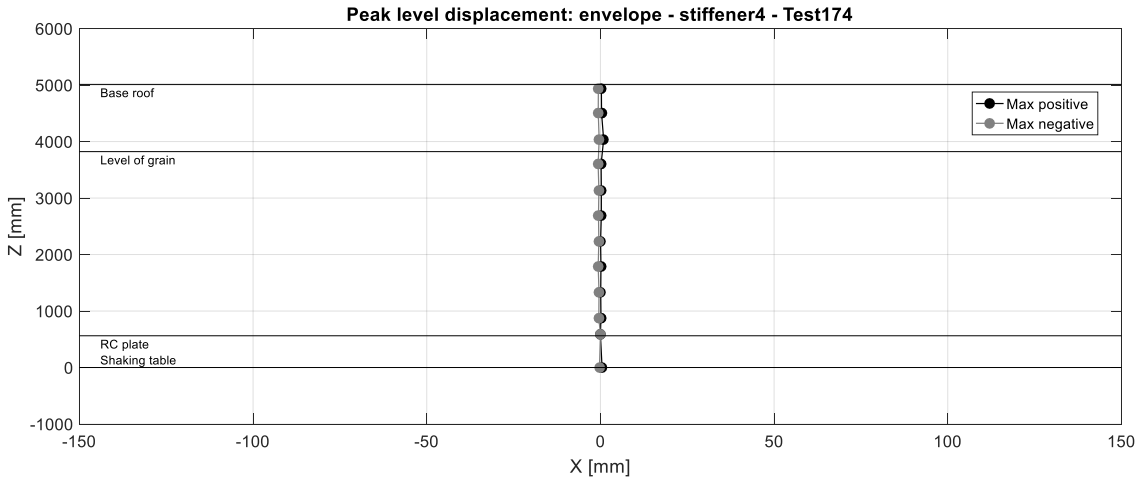
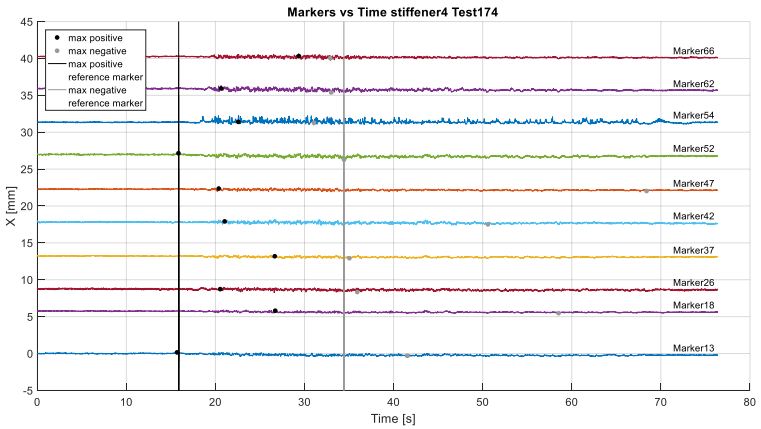
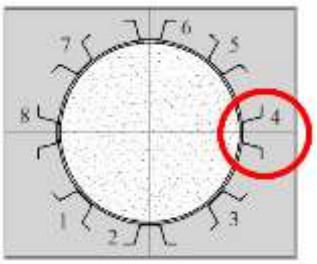
Montante 4

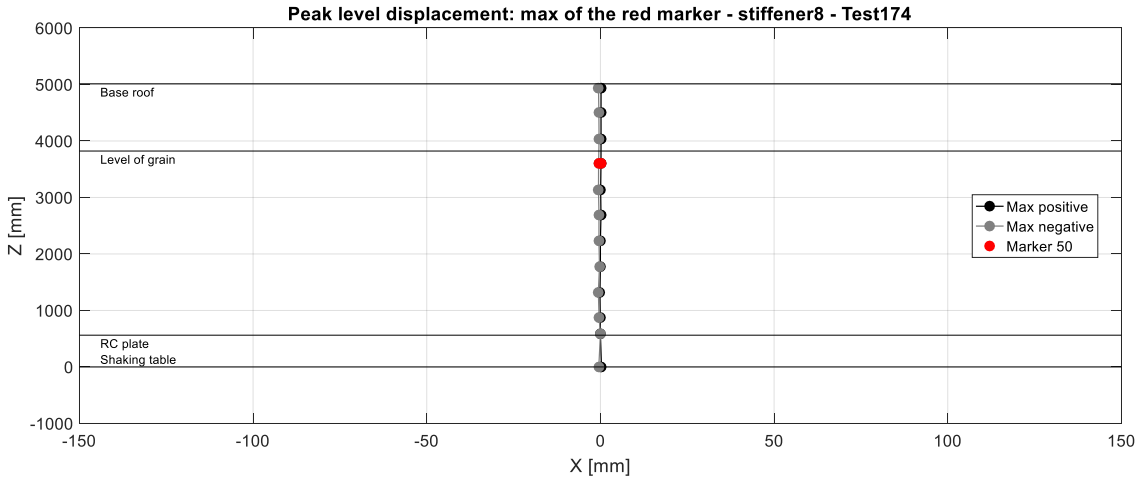

Peak level displacement: max of the red marker - stiffener4 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 52
Z [mm]
X [mm]

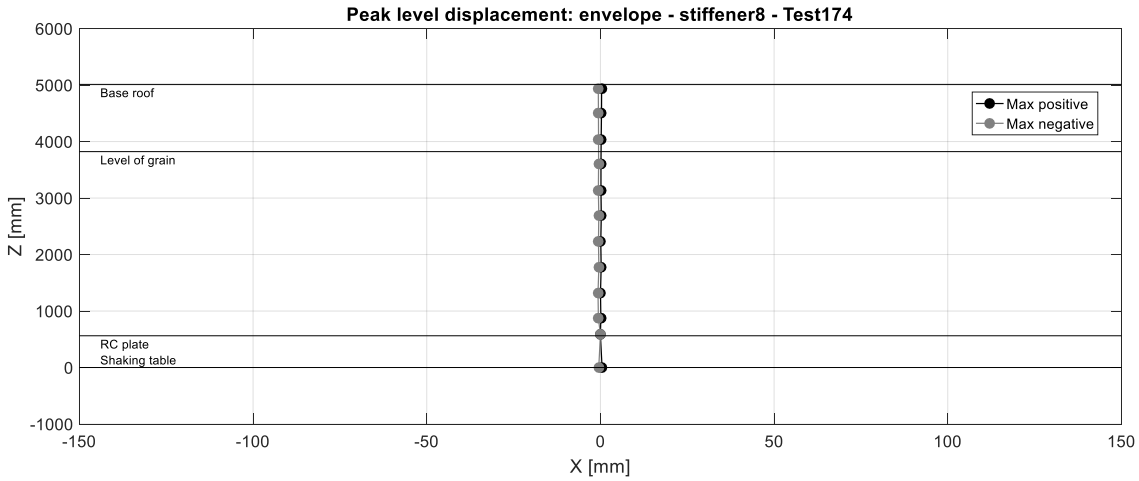

Peak level displacement: envelope - stiffener4 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]

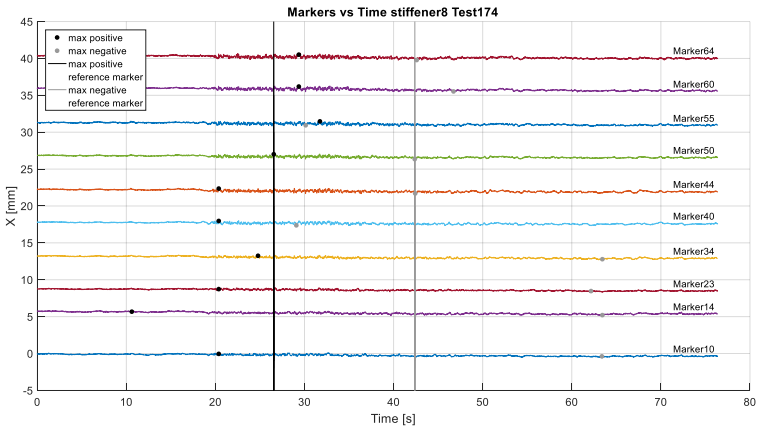

Markers vs Time stiffener4 Test174
max positive
max negative
max positive reference marker
max negative reference marker
Marker66
Marker62
Marker54
Marker52
Marker47
Marker42
Marker37
Marker26
Marker18
Marker13
X [mm]
Time [s]

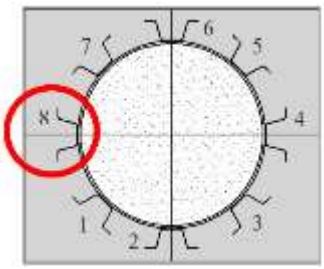


Montante 8


Peak level displacement: max of the red marker - stiffener8 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 50
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener8 - Test174
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener8 Test174
max positive
max negative
max positive reference marker
max negative reference marker
Marker64
Marker60
Marker55
Marker50
Marker44
Marker40
Marker34
Marker23
Marker14
Marker10
X [mm]
Time [s]


1
2
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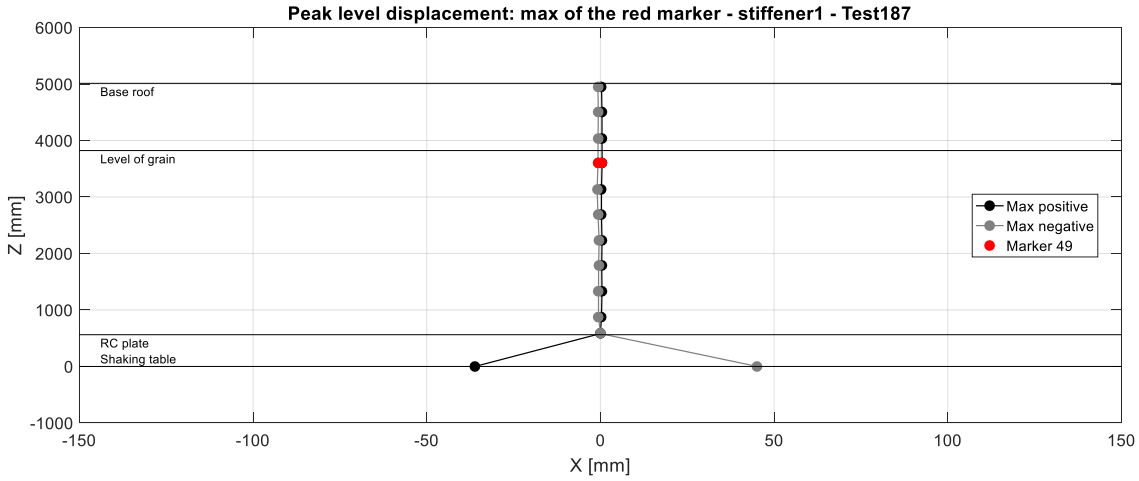
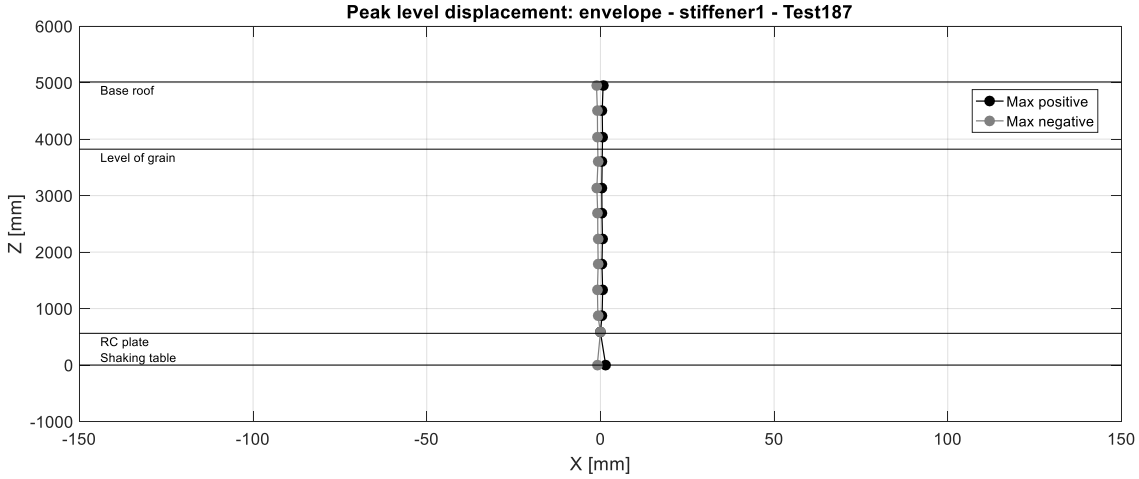
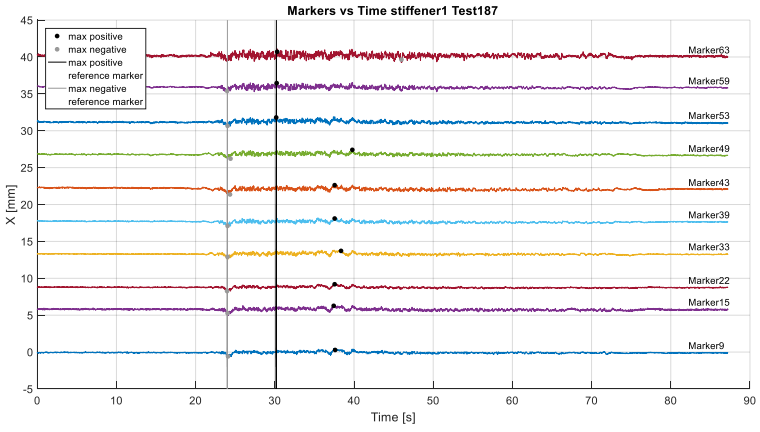
7
8

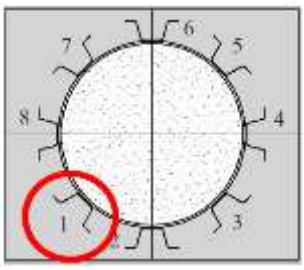
Earthquake input A1 0.3 g: Test 187

Montante 1

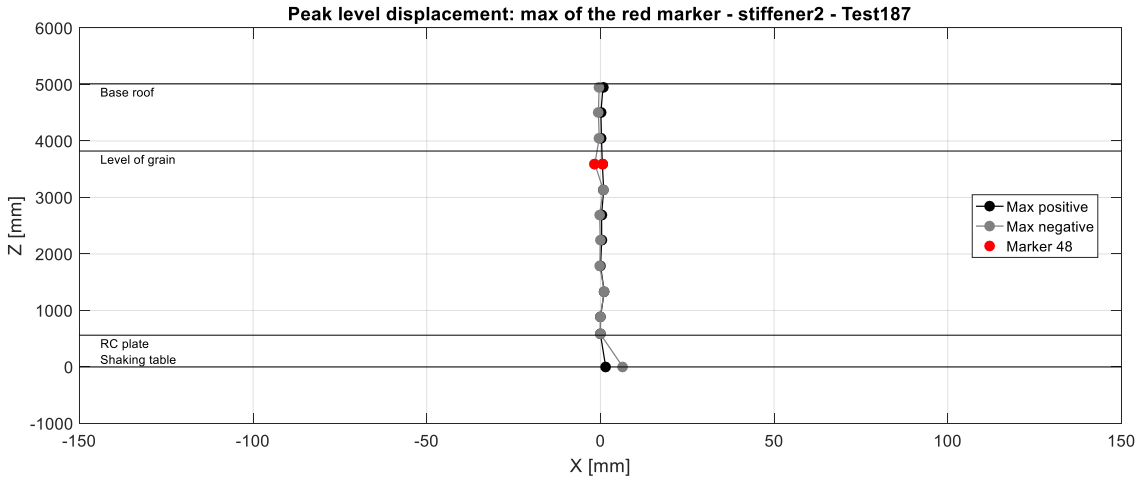


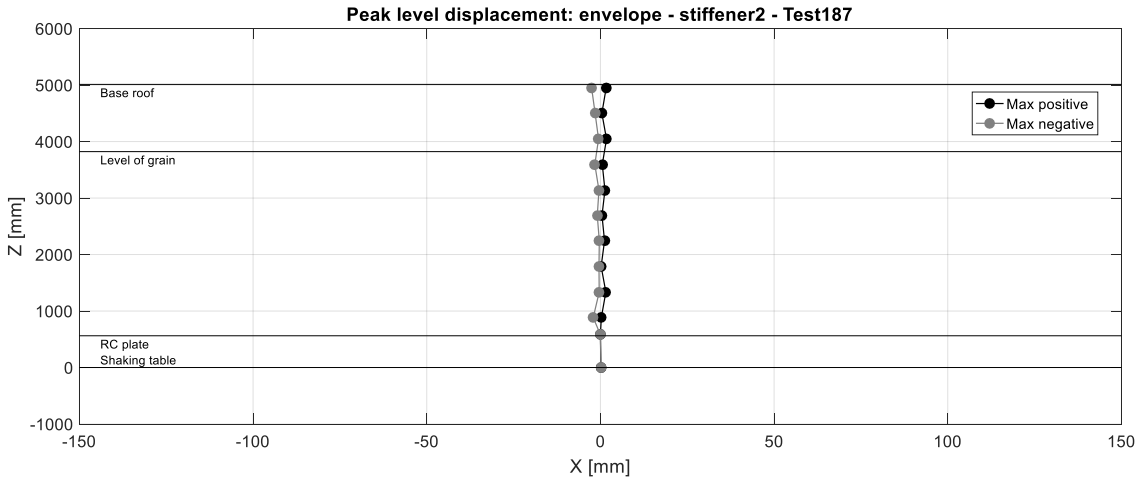


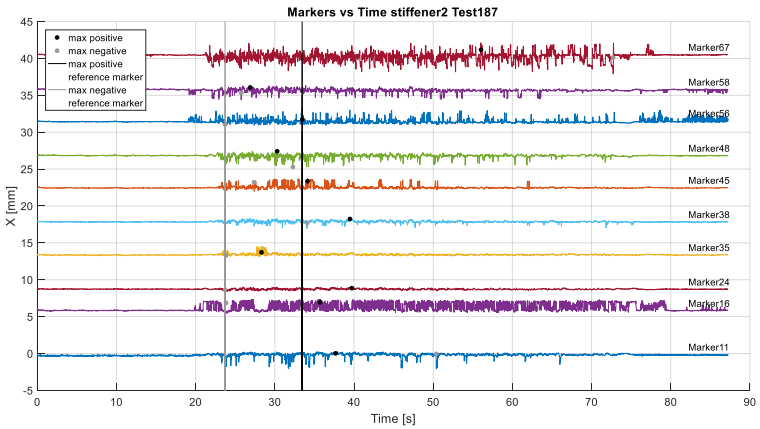


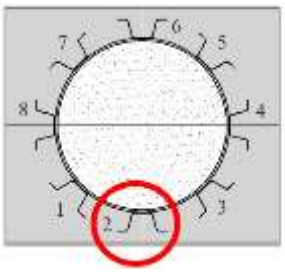


Montante 2


Peak level displacement: max of the red marker - stiffener2 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 48
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener2 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener2 Test187
max positive
max negative
max positive reference marker
max negative reference marker
Marker67
Marker58
Marker56
Marker48
Marker45
Marker38
Marker35
Marker24
Marker18
Marker11
X [mm]
Time [s]


1
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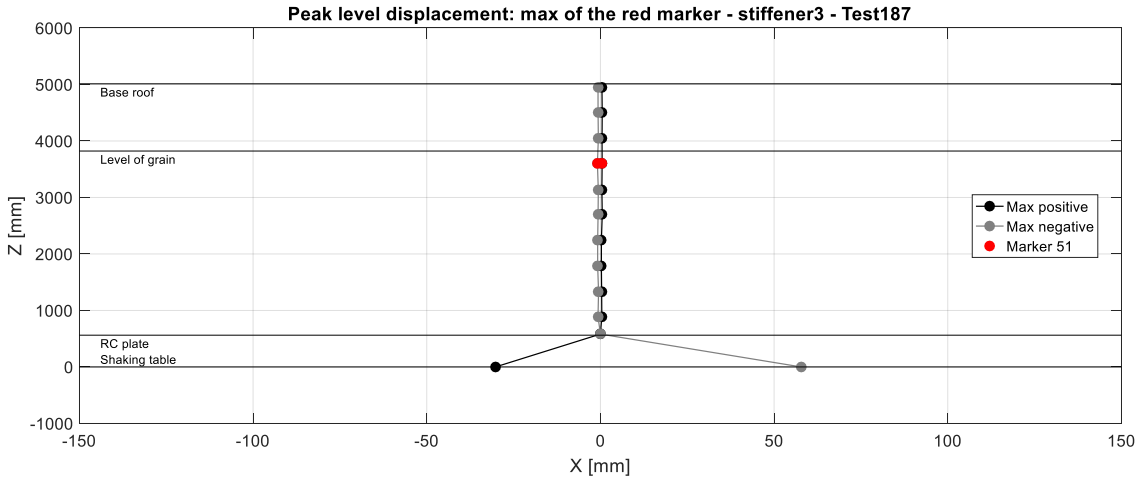
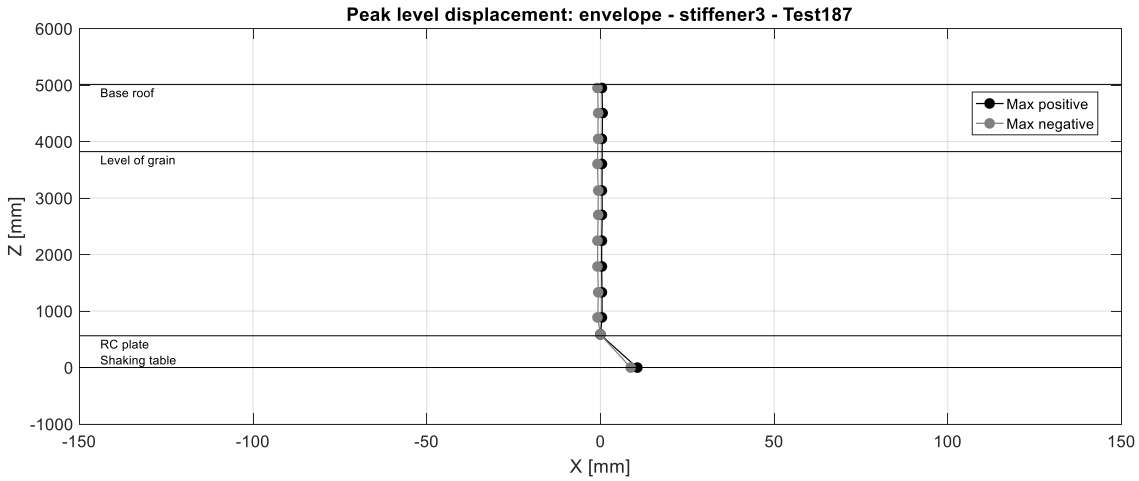
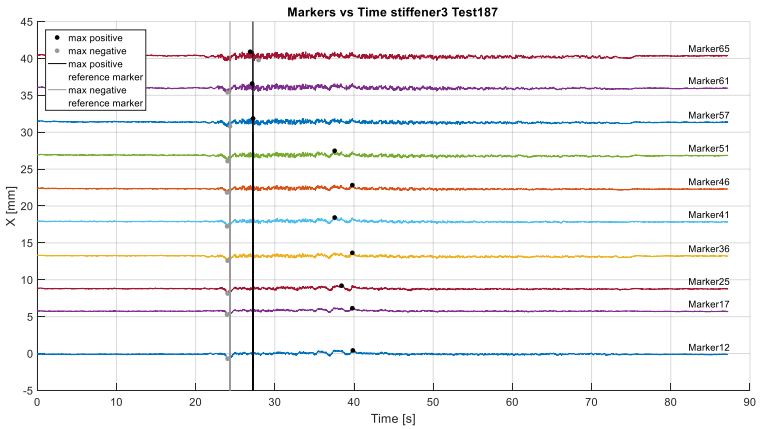
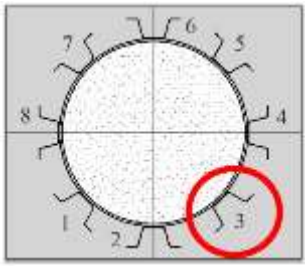
Montante 3


Peak level displacement: max of the red marker - stiffener3 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 51
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener3 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener3 Test187
max positive
max negative
max positive reference marker
max negative reference marker
Marker65
Marker61
Marker57
Marker51
Marker46
Marker41
Marker36
Marker25
Marker17
Marker12
X [mm]
Time [s]


1
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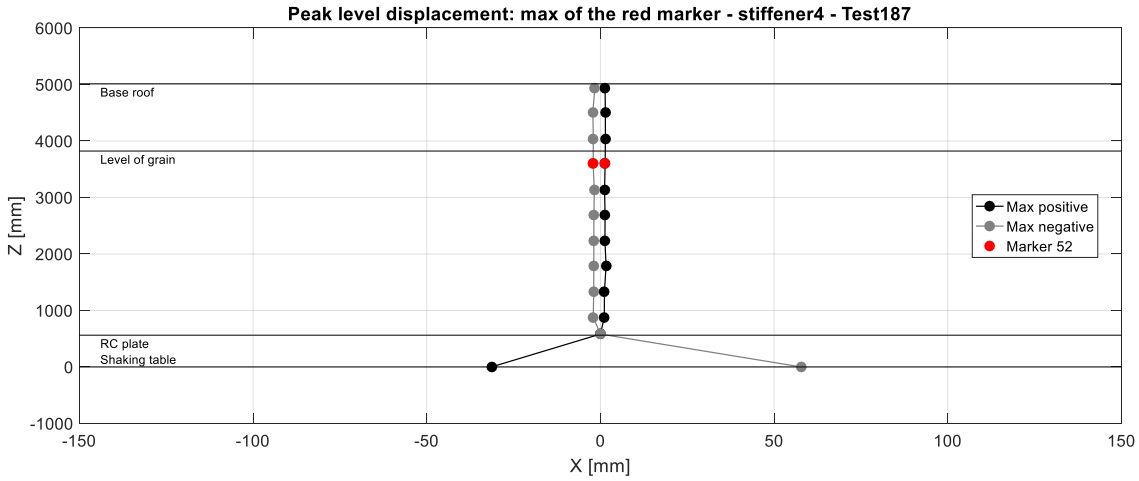
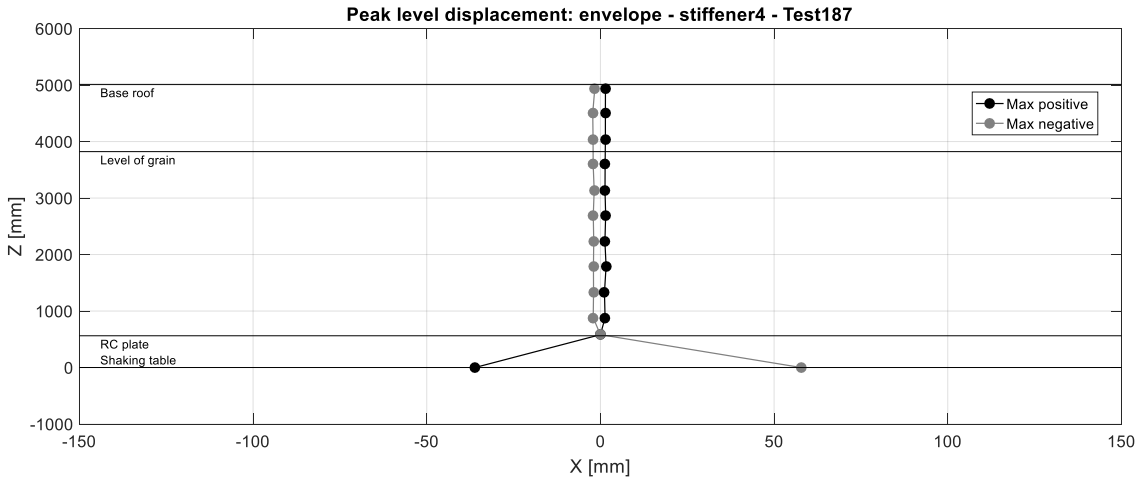
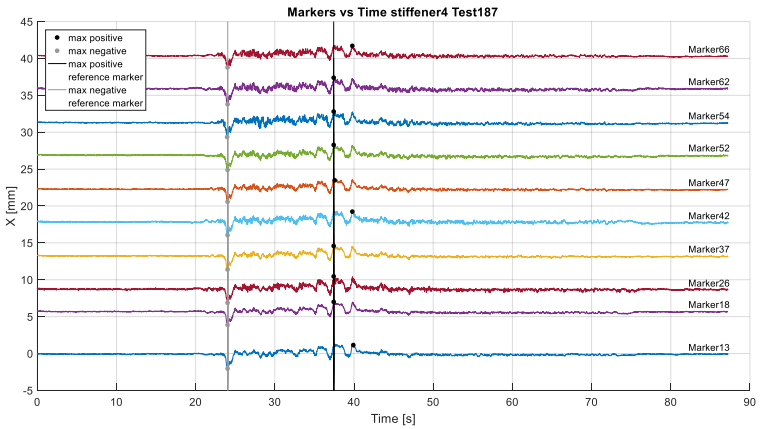
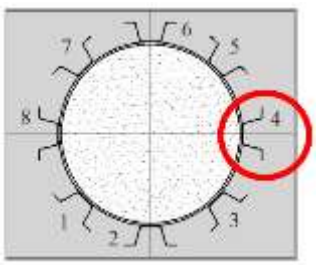
Montante 4


Peak level displacement: max of the red marker - stiffener4 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 52
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener4 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener4 Test187
max positive
max negative
max positive reference marker
max negative reference marker
Marker66
Marker62
Marker54
Marker52
Marker47
Marker42
Marker37
Marker26
Marker18
Marker13
X [mm]
Time [s]


1
2
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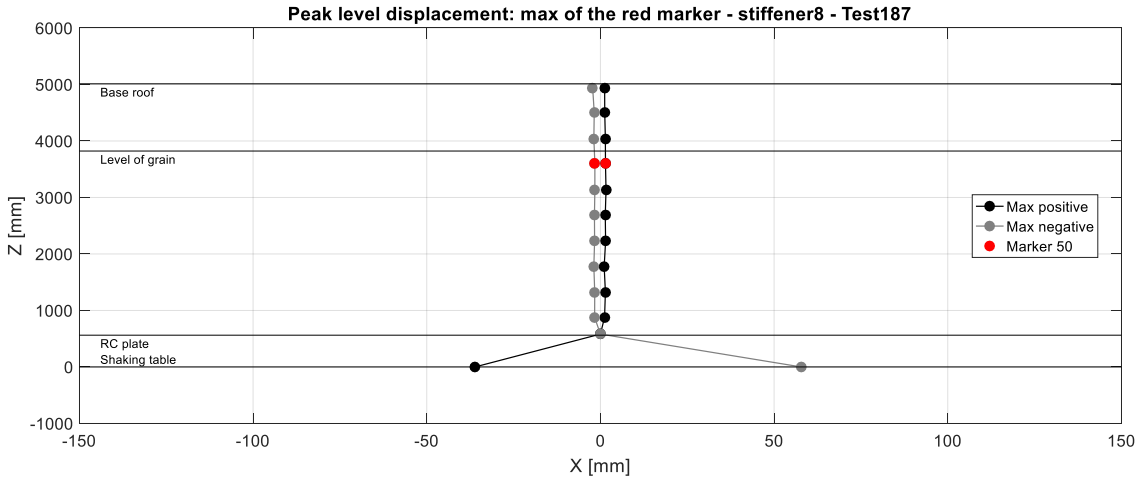
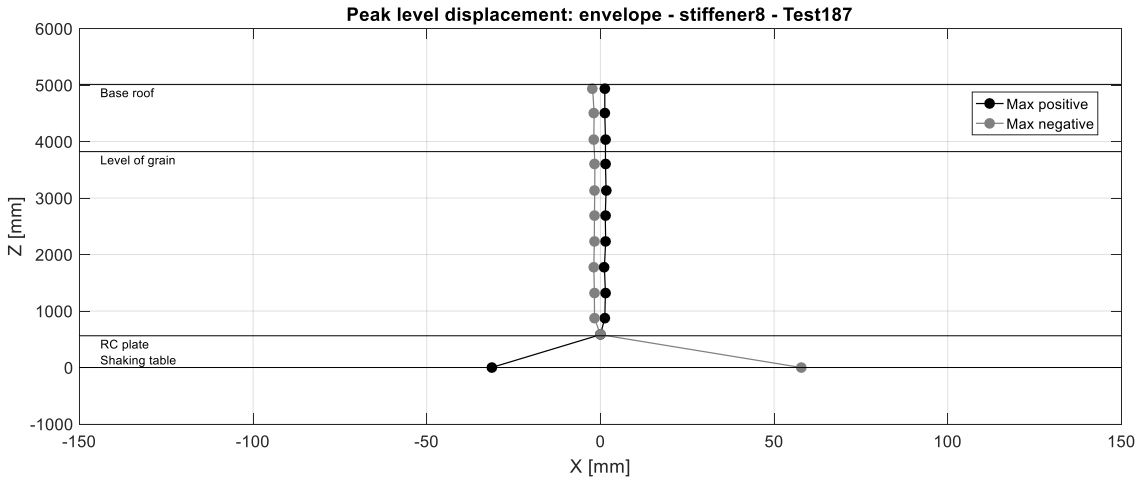
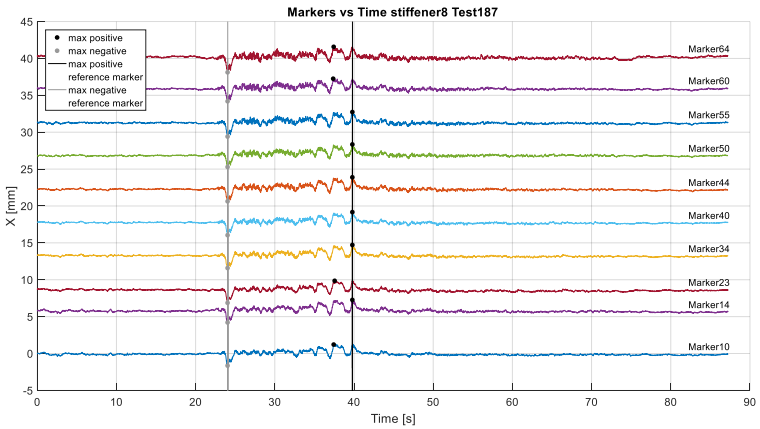
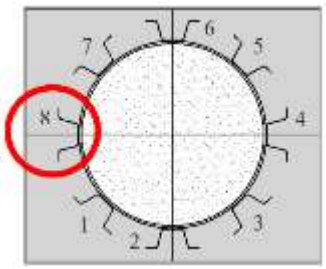
Montante 8


Peak level displacement: max of the red marker - stiffener8 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 50
Z [mm]
X [mm]

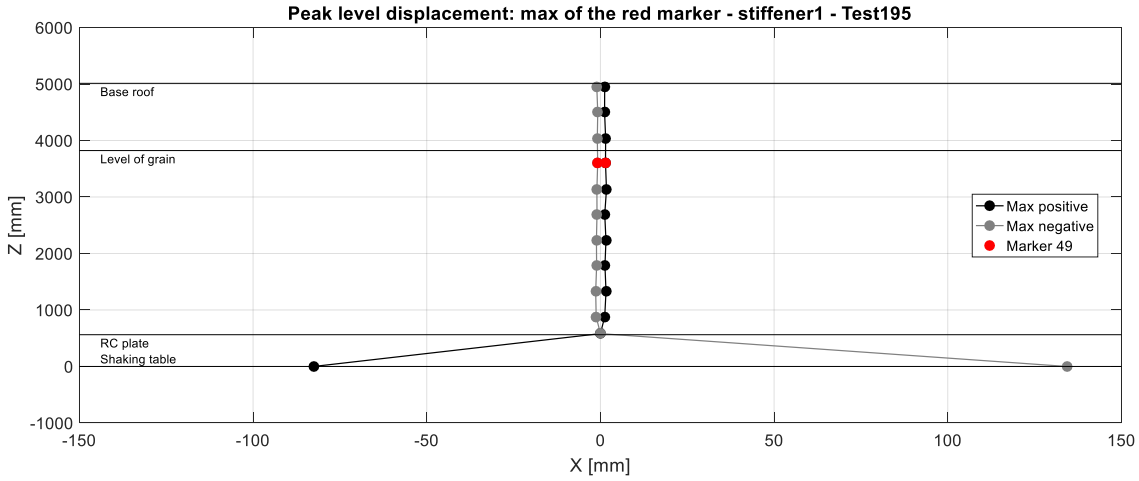

Peak level displacement: envelope - stiffener8 - Test187
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]

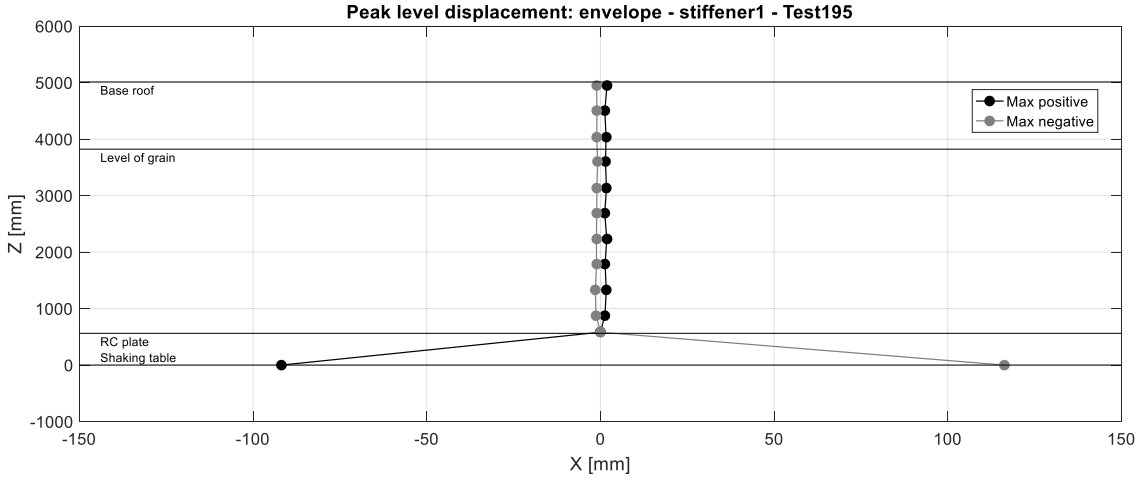

Markers vs Time stiffener8 Test187
max positive
max negative
max positive reference marker
max negative reference marker
Marker64
Marker60
Marker55
Marker50
Marker44
Marker40
Marker34
Marker23
Marker14
Marker10
X [mm]
Time [s]

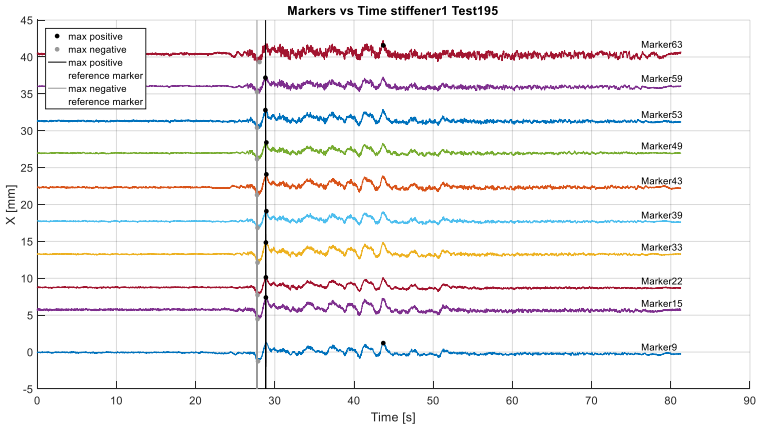

1
2
3
4
5
6
7
8

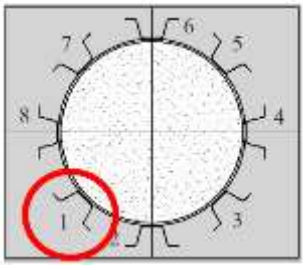
Earthquake input A1 0.5 g: Test 195

Montante 1

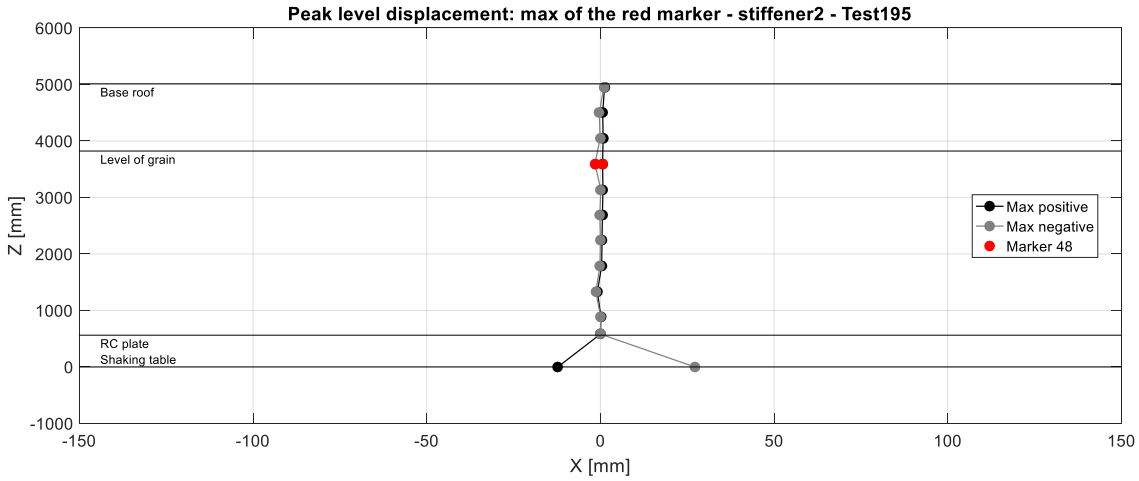


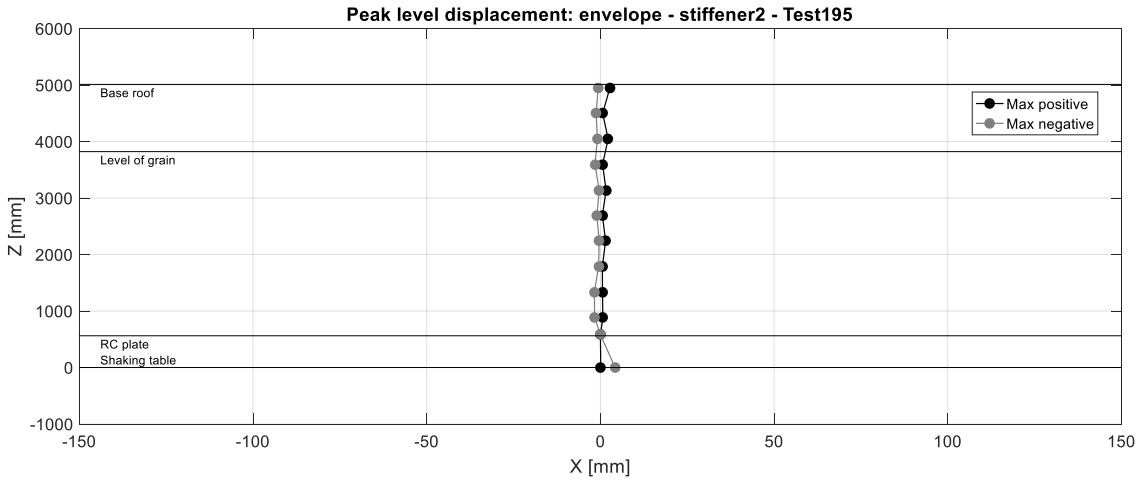


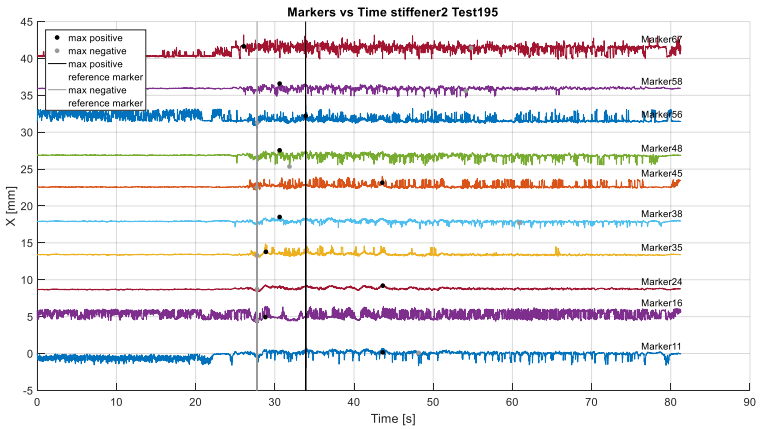


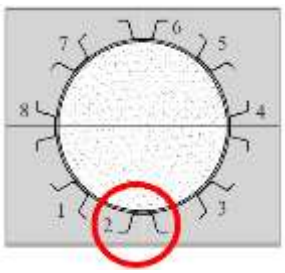


Montante 2


Peak level displacement: max of the red marker - stiffener2 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 48
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener2 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener2 Test195
max positive
max negative
max positive reference marker
max negative reference marker
Marker58
Marker48
Marker45
Marker38
Marker35
Marker24
Marker16
Marker11
X [mm]
Time [s]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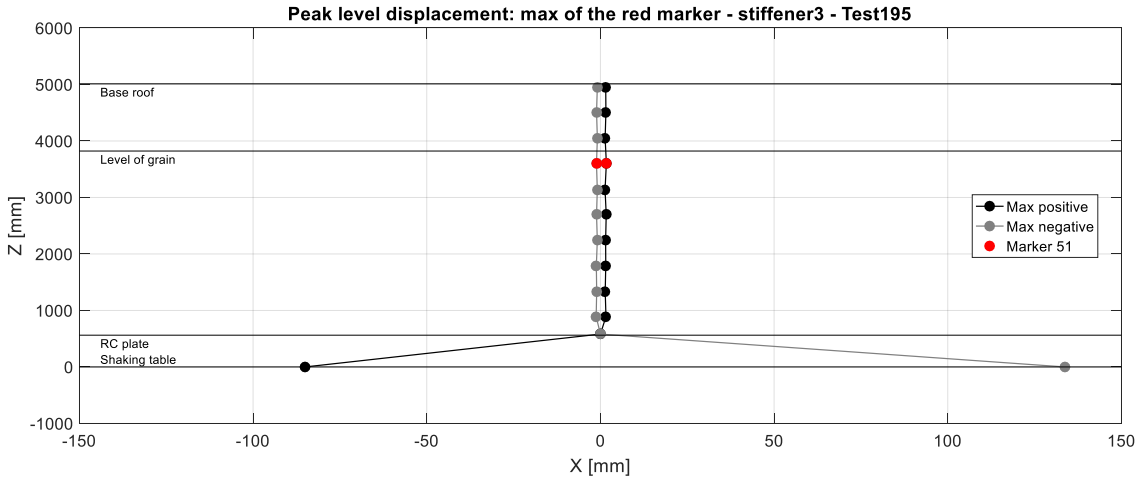
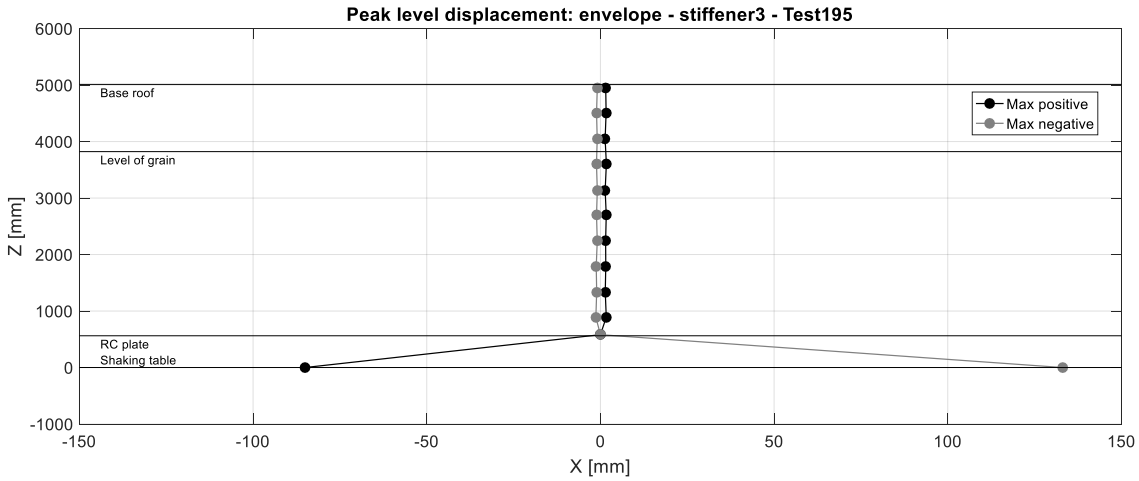
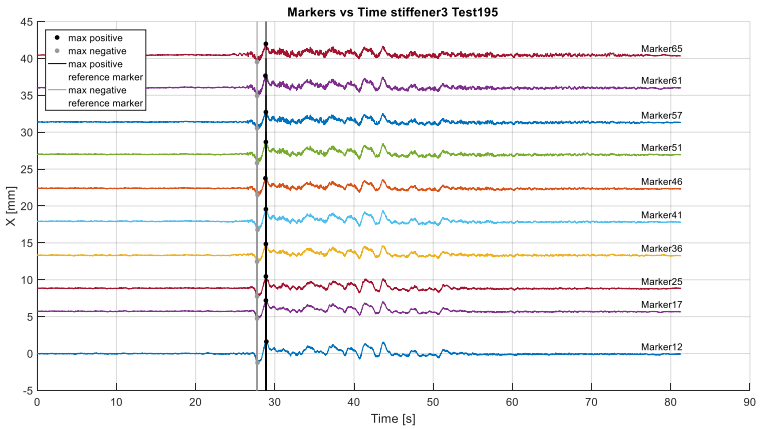
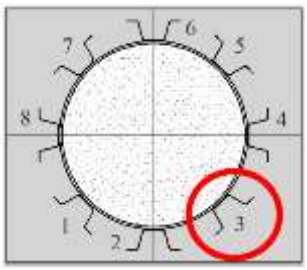
Montante 3


Peak level displacement: max of the red marker - stiffener3 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 51
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener3 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener3 Test195
max positive
max negative
max positive reference marker
max negative reference marker
Marker65
Marker61
Marker57
Marker51
Marker46
Marker41
Marker36
Marker25
Marker17
Marker12
X [mm]
Time [s]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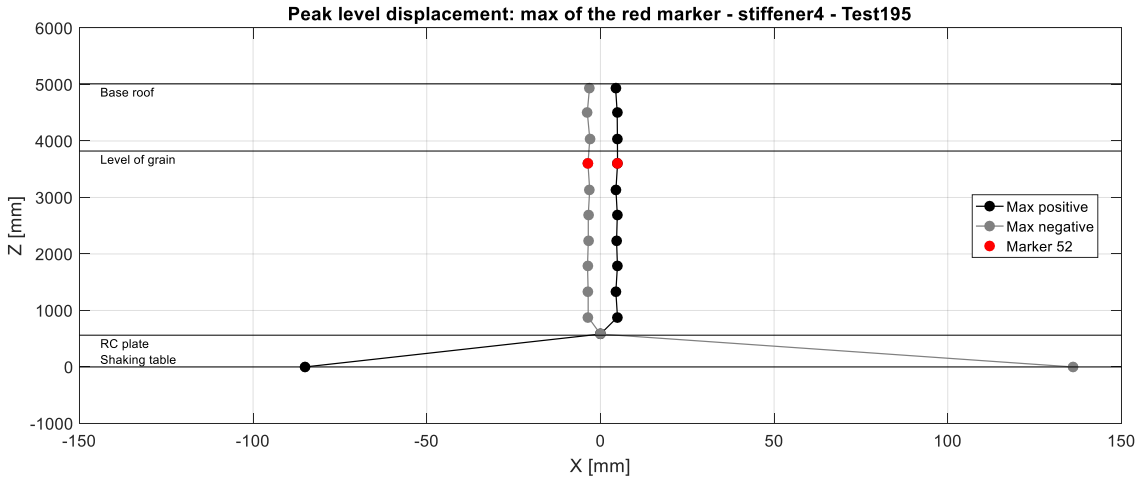
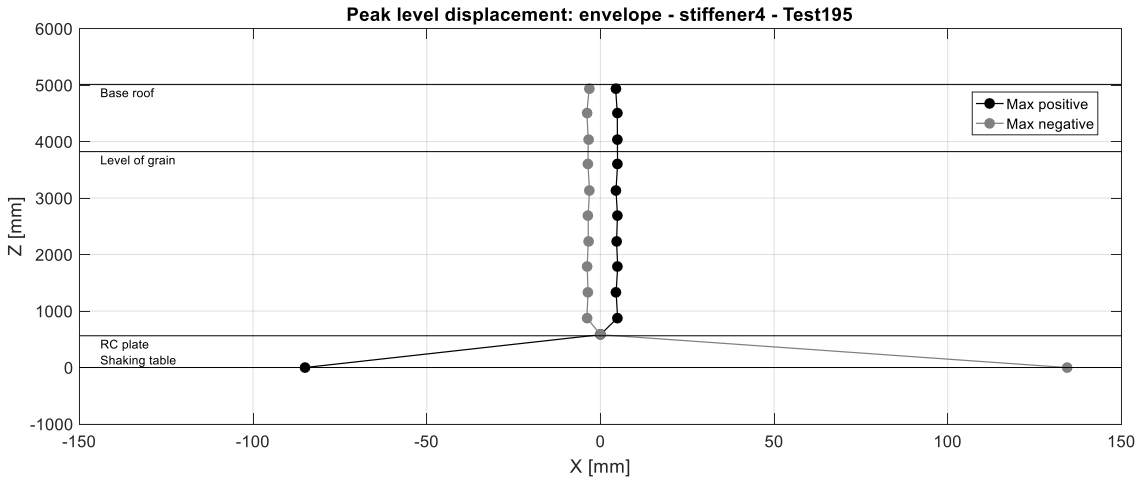
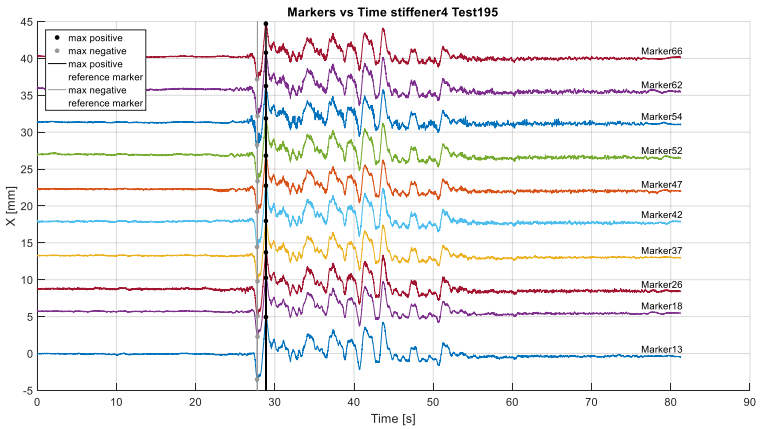
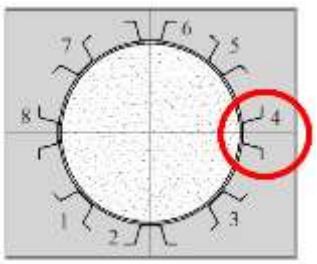
Montante 4


Peak level displacement: max of the red marker - stiffener4 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 52
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener4 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener4 Test195
max positive
max negative
max positive reference marker
max negative reference marker
Marker66
Marker62
Marker54
Marker52
Marker47
Marker42
Marker37
Marker26
Marker18
Marker13
X [mm]
Time [s]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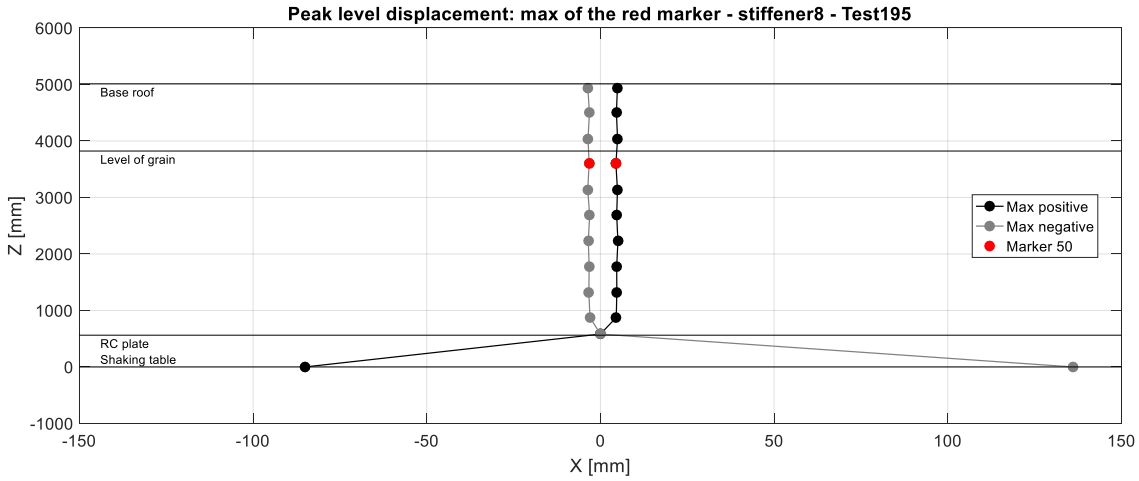
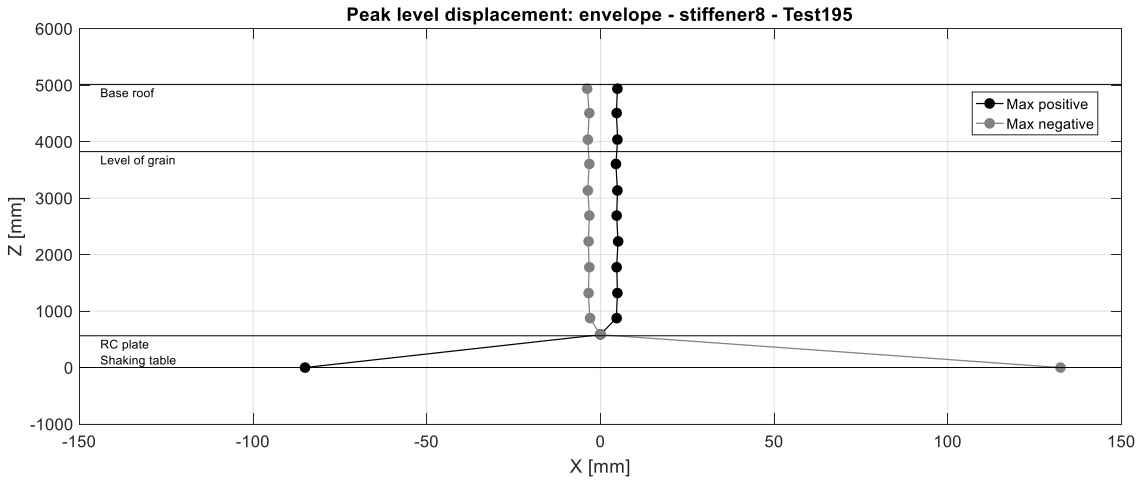
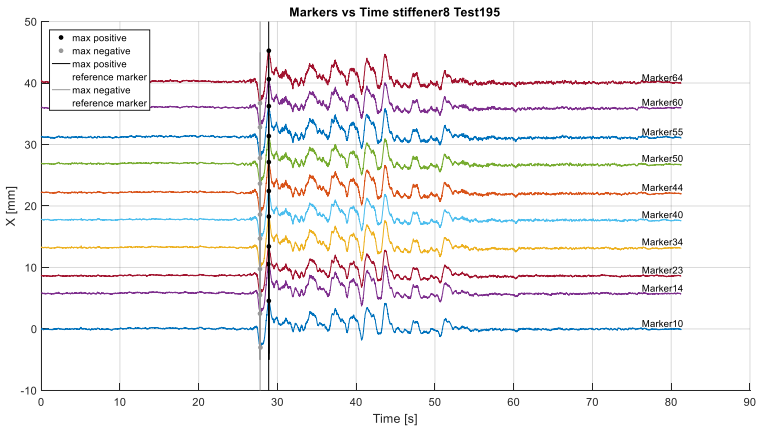
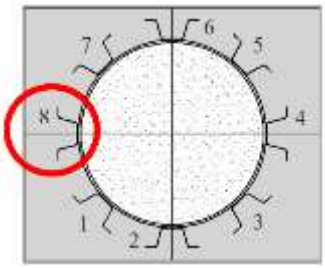
Montante 8


Peak level displacement: max of the red marker - stiffener8 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 50
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener8 - Test195
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener8 Test195
max positive
max negative
max positive reference marker
max negative reference marker
Marker64
Marker60
Marker55
Marker50
Marker44
Marker40
Marker34
Marker23
Marker14
Marker10
X [mm]
Time [s]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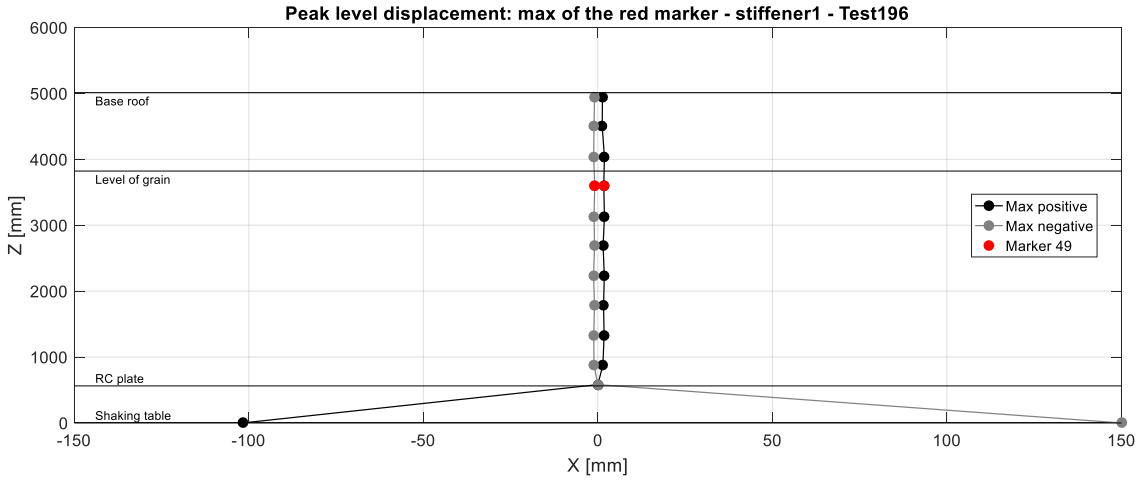
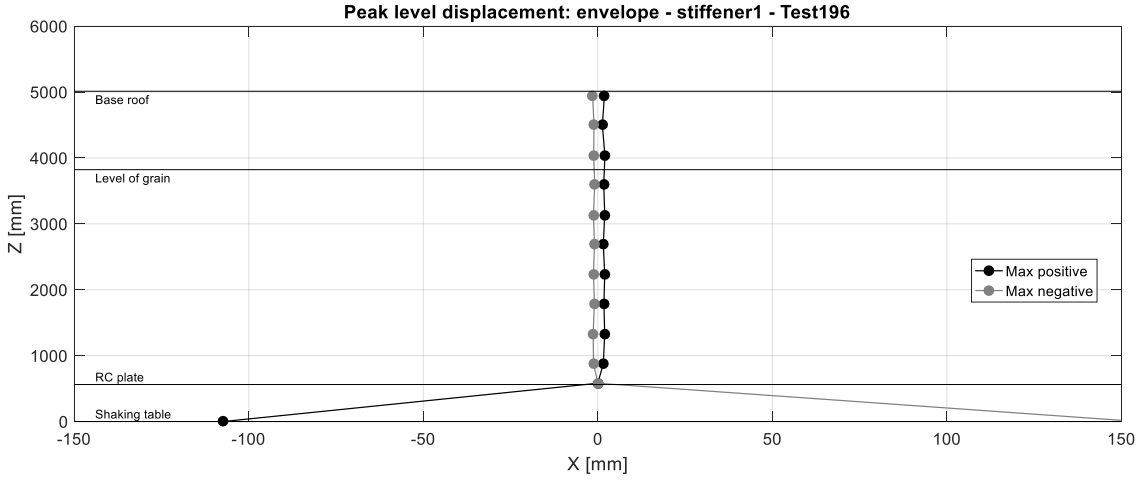
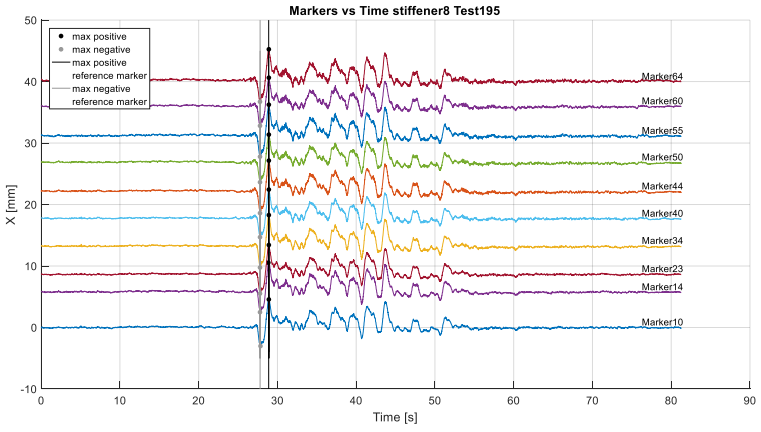
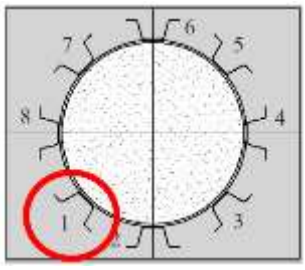
Earthquake input A1 0.55 g: Test 196

Montante 1

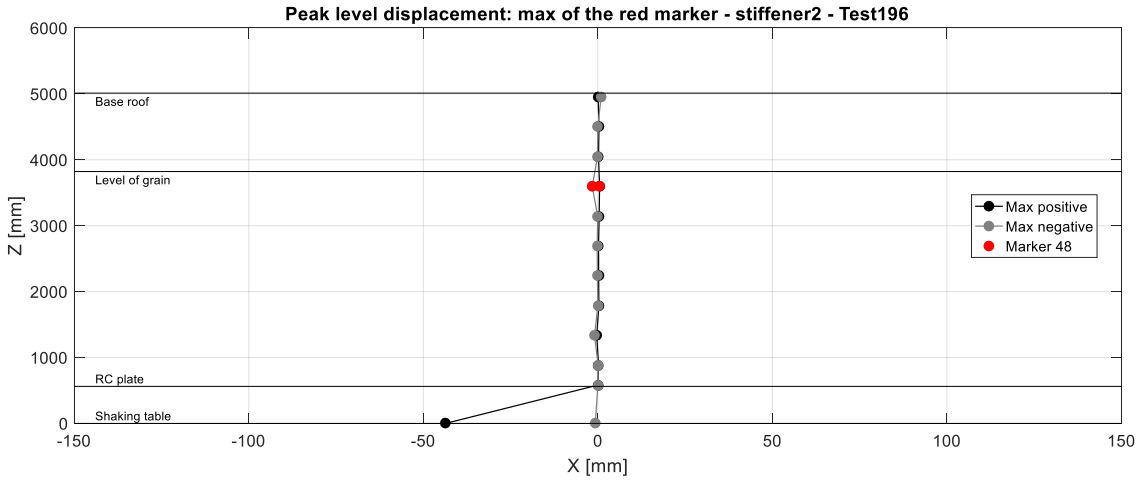


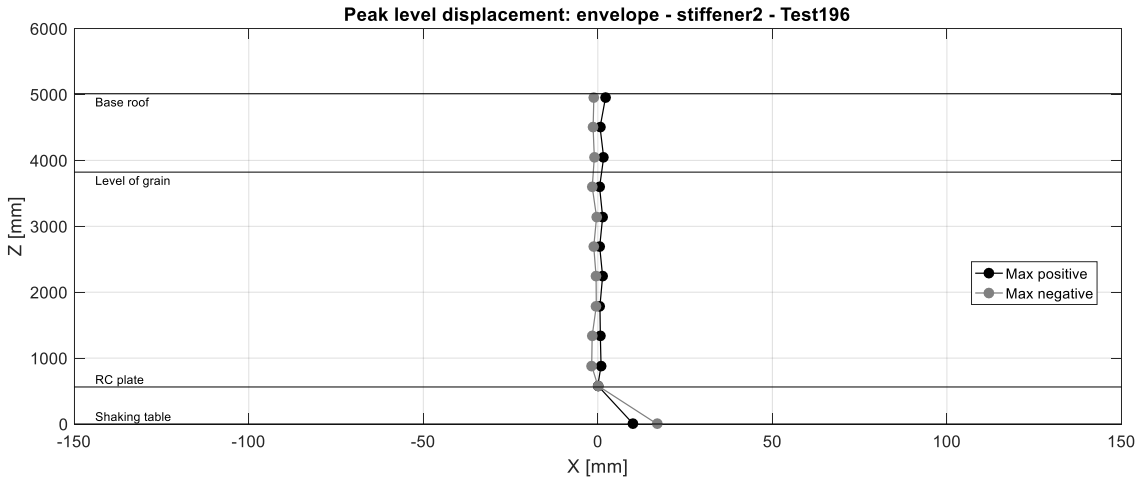


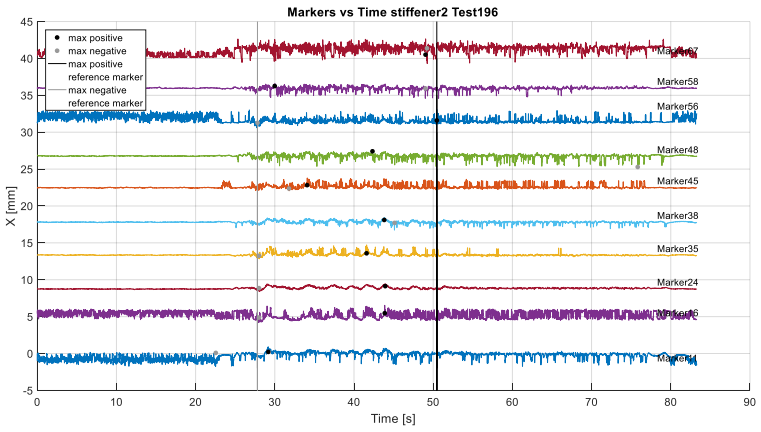


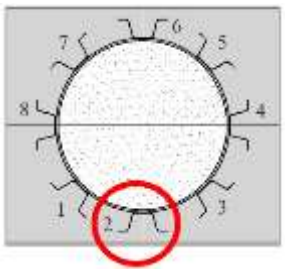


Montante 2


Peak level displacement: max of the red marker - stiffener2 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 48
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener2 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener2 Test196
max positive
max negative
max positive reference marker
max negative reference marker
Marker58
Marker56
Marker48
Marker45
Marker38
Marker35
Marker24
X [mm]
Time [s]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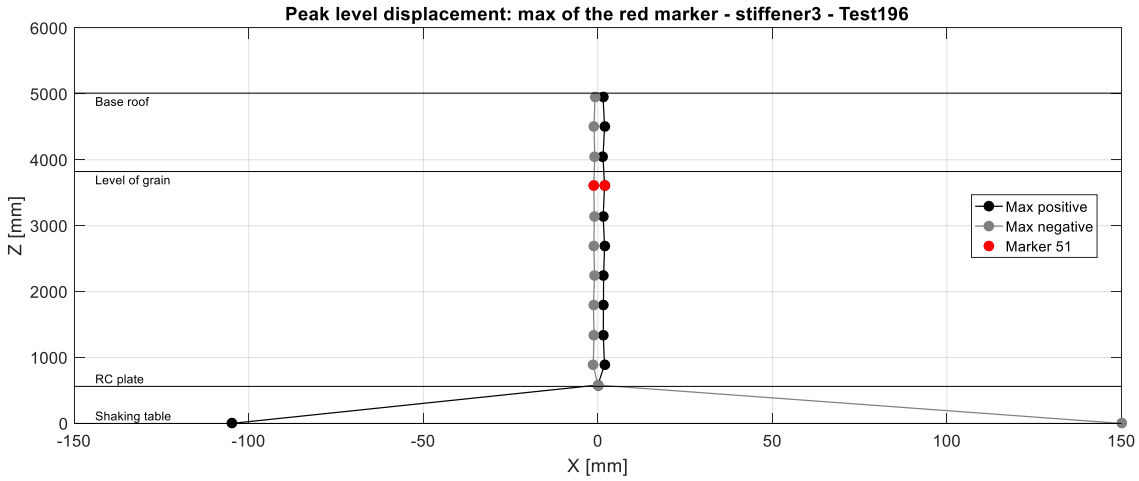
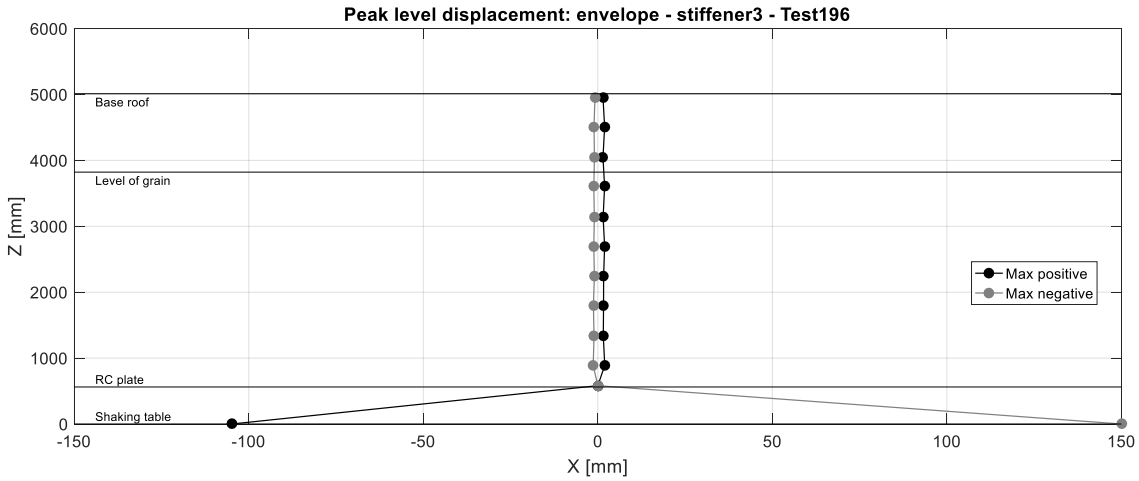
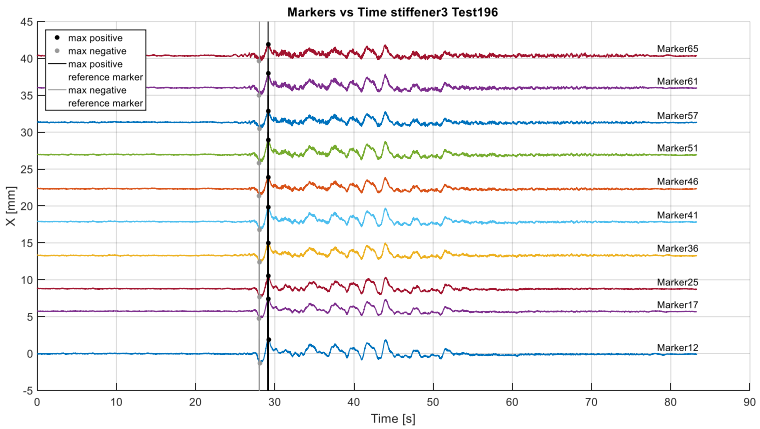
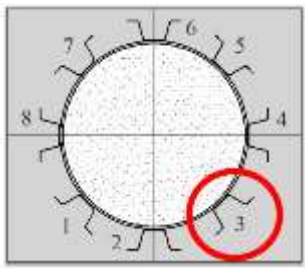
Montante 3


Peak level displacement: max of the red marker - stiffener3 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 51
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener3 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener3 Test196
max positive
max negative
max positive reference marker
max negative reference marker
Marker65
Marker61
Marker57
Marker51
Marker46
Marker41
Marker36
Marker25
Marker17
Marker12
X [mm]
Time [s]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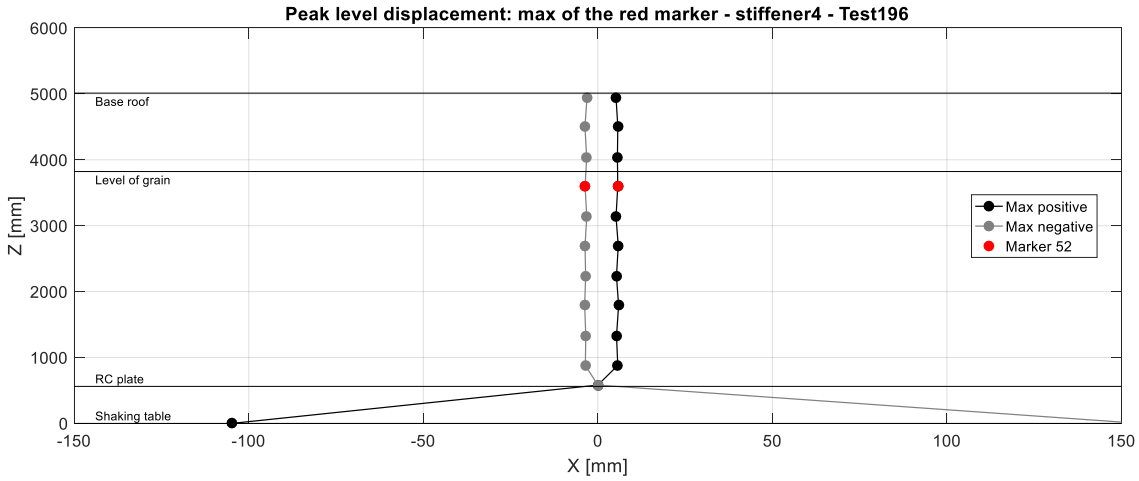
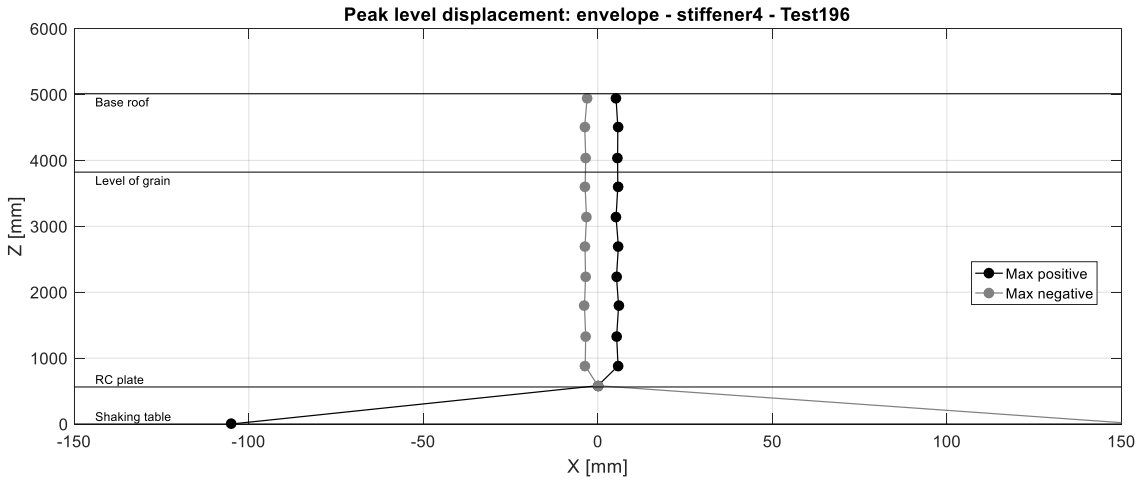
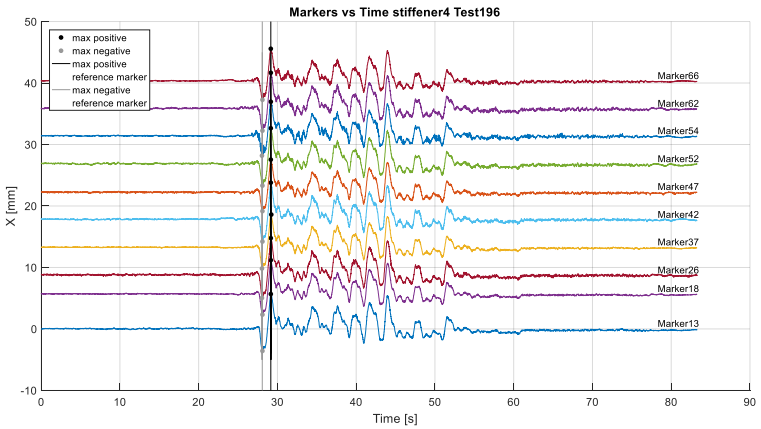
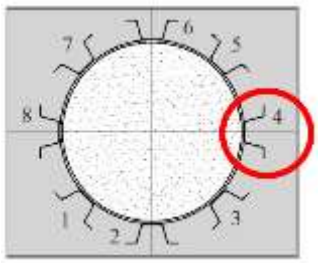
Montante 4


Peak level displacement: max of the red marker - stiffener4 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 52
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener4 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener4 Test196
max positive
max negative
max positive reference marker
max negative reference marker
Marker66
Marker62
Marker54
Marker52
Marker47
Marker42
Marker37
Marker26
Marker18
Marker13
X [mm]
Time [s]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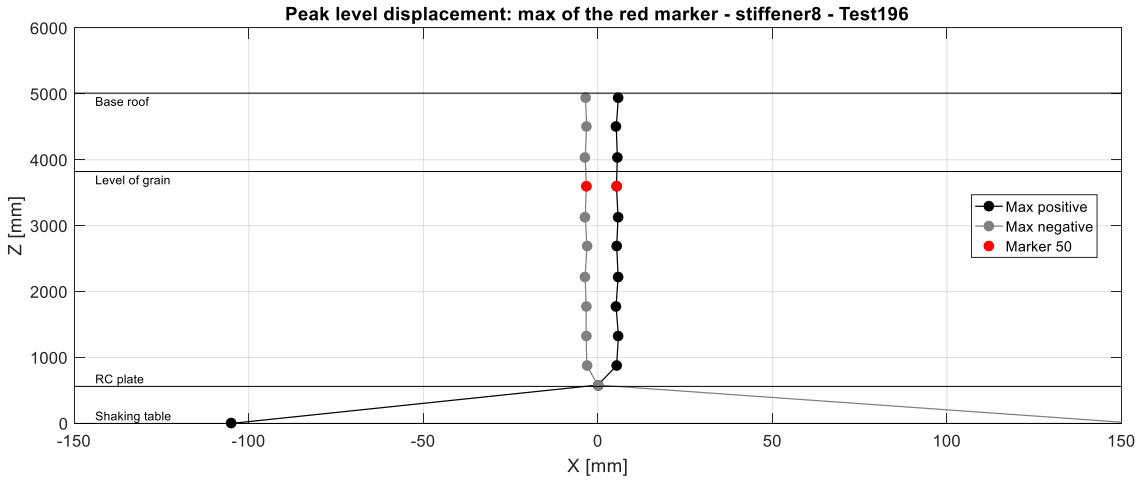
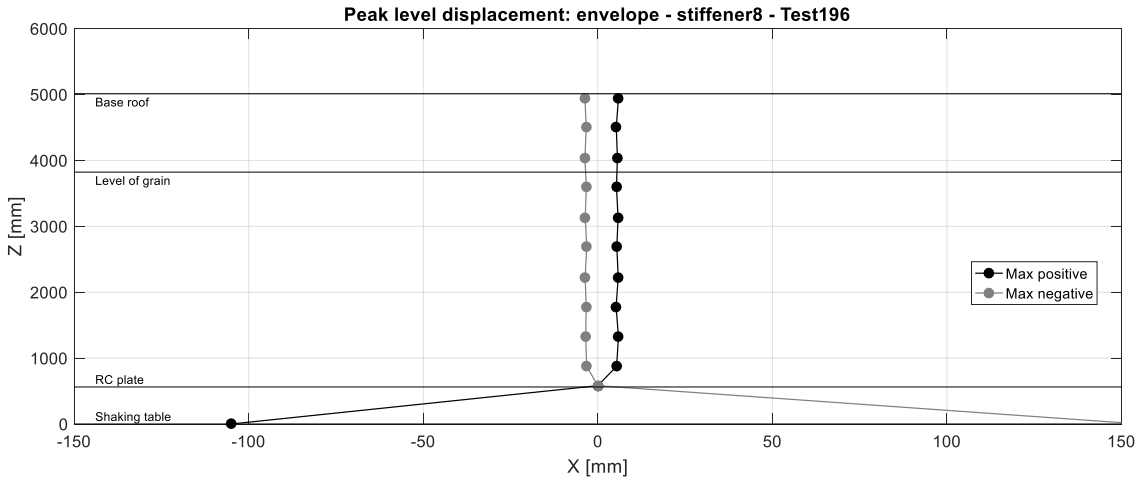
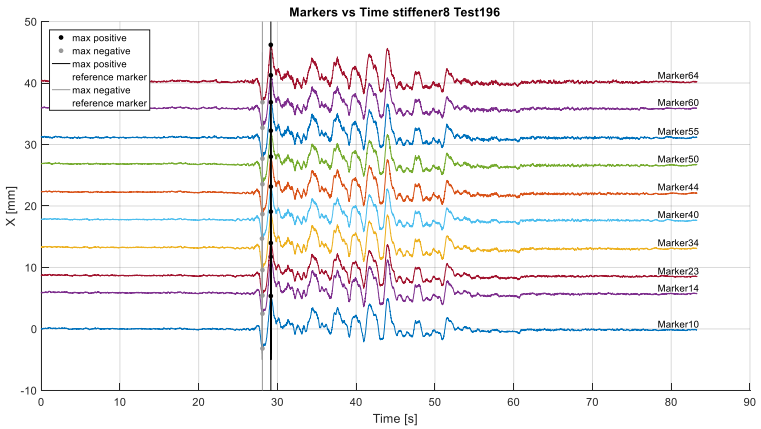
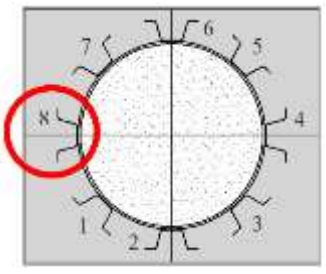
Montante 8


Peak level displacement: max of the red marker - stiffener8 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 50
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener8 - Test196
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener8 Test196
max positive
max negative
max positive reference marker
max negative reference marker
Marker64
Marker60
Marker55
Marker50
Marker44
Marker40
Marker34
Marker23
Marker14
Marker10
X [mm]
Time [s]


1
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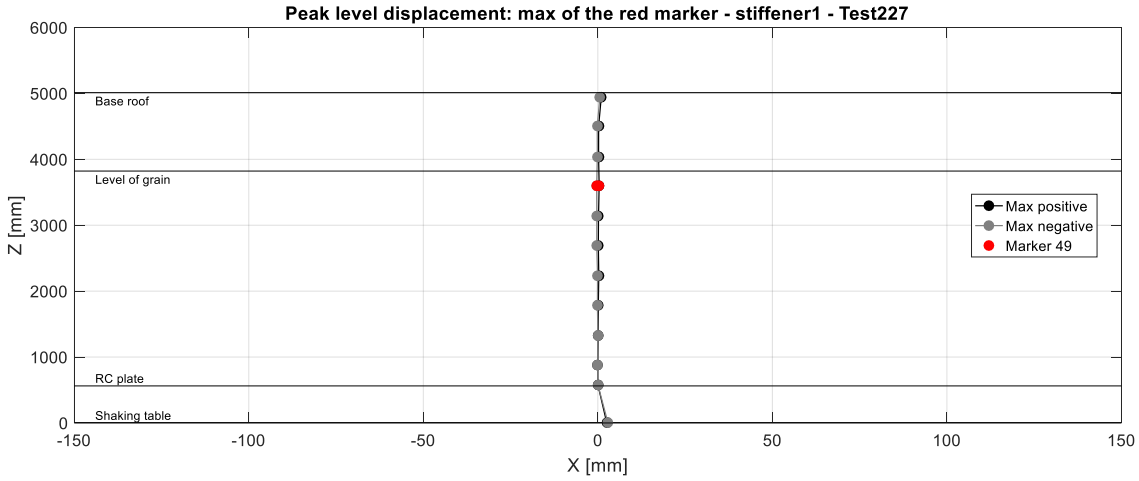
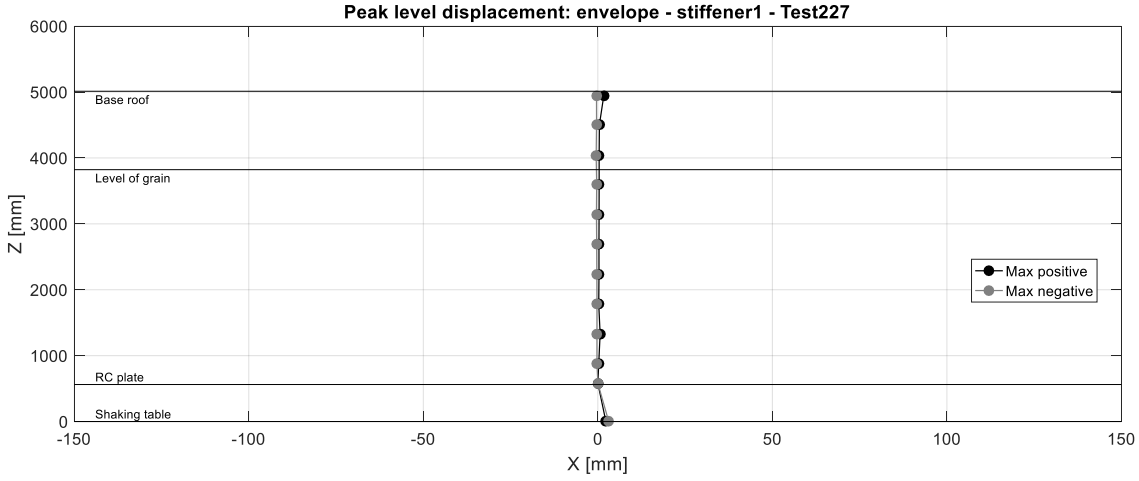
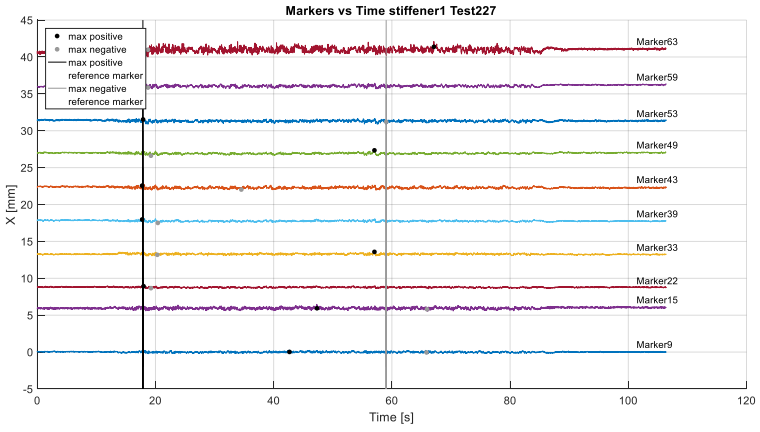
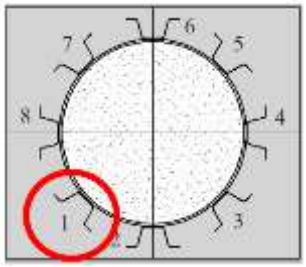
Earthquake input RS1 0.1 g: Test 227

Montante 1

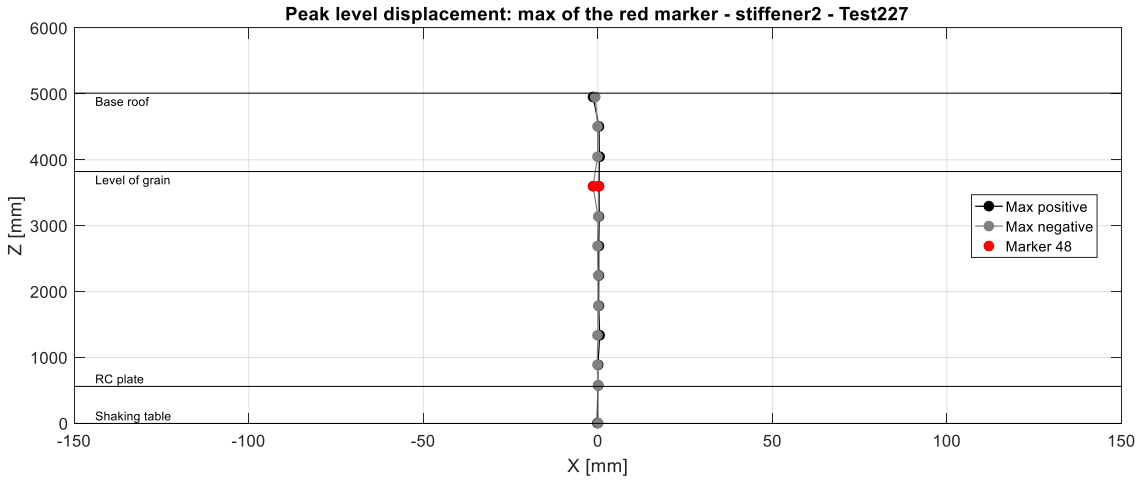


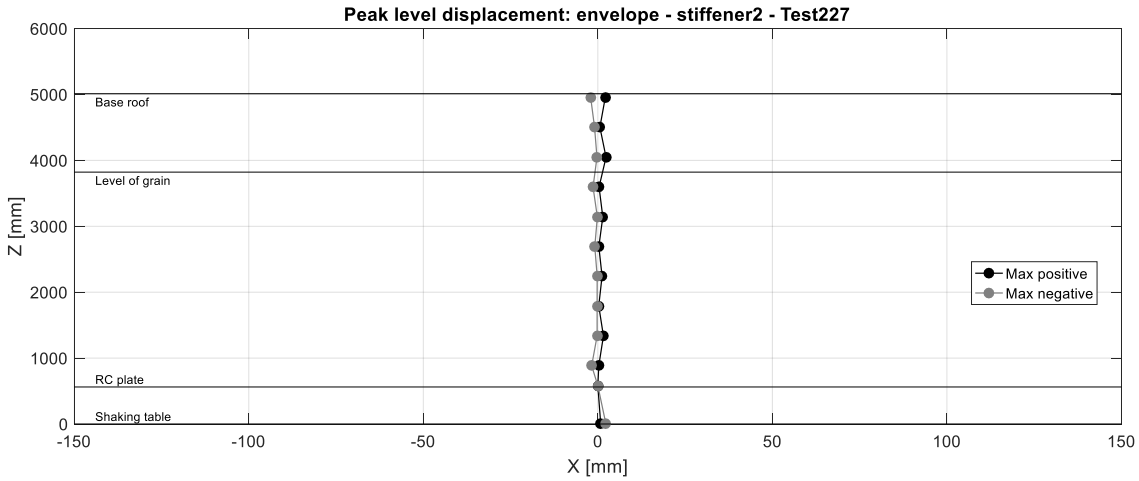


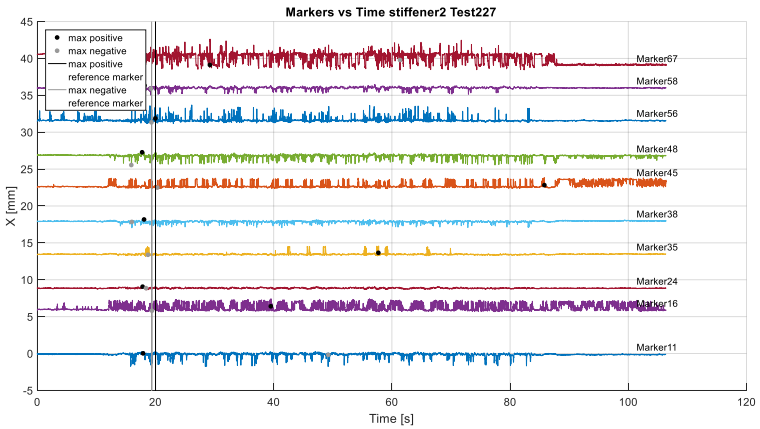


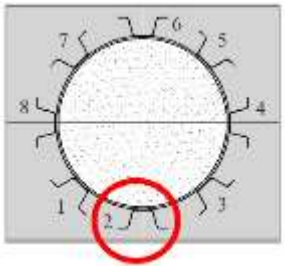


Montante 2

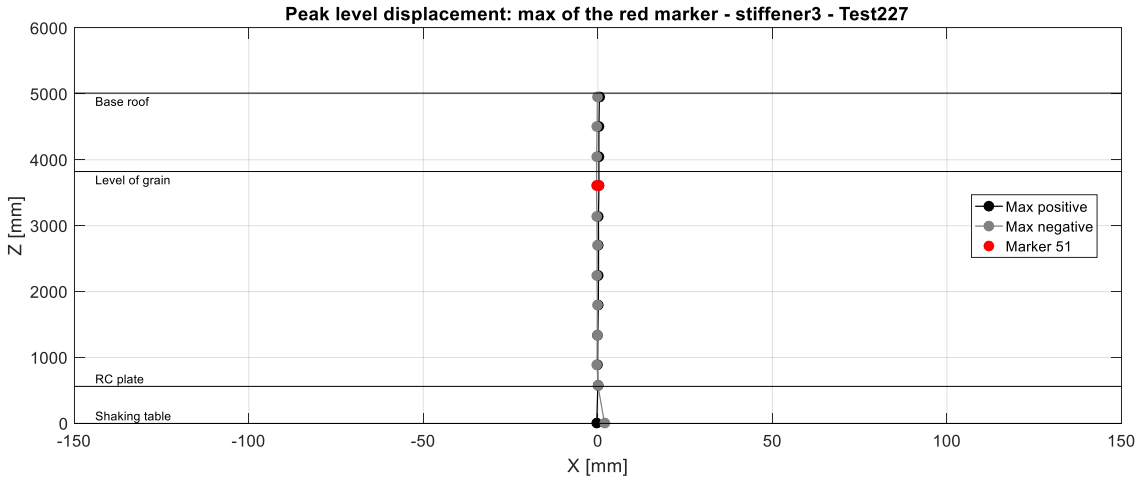

Peak level displacement: max of the red marker - stiffener2 - Test227
Base roof
Level of grain
RC plate
Shaking table
Z [mm]
X [mm]
Max positive
Max negative
Marker 48

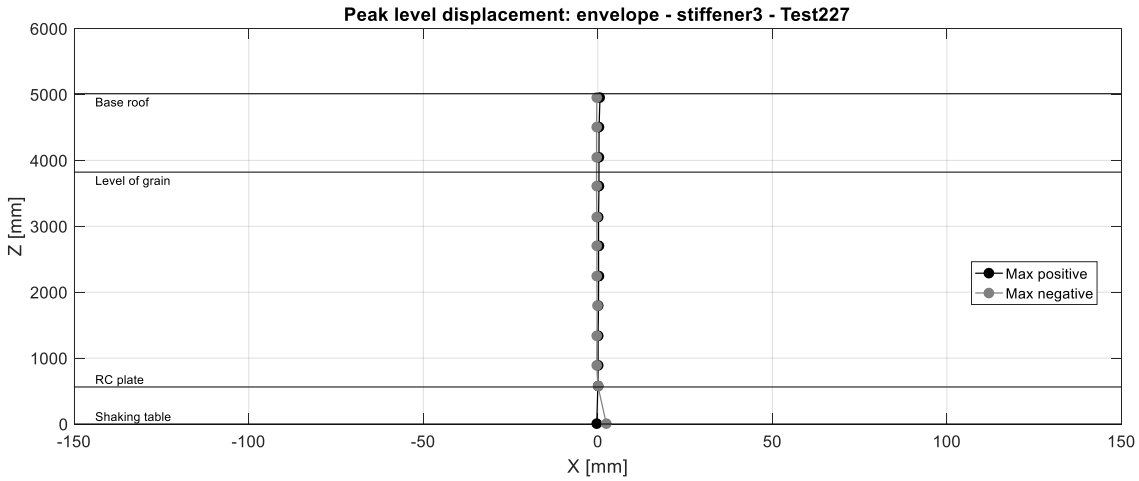

Peak level displacement: envelope - stiffener2 - Test227
Base roof
Level of grain
RC plate
Shaking table
Z [mm]
X [mm]
Max positive
Max negative

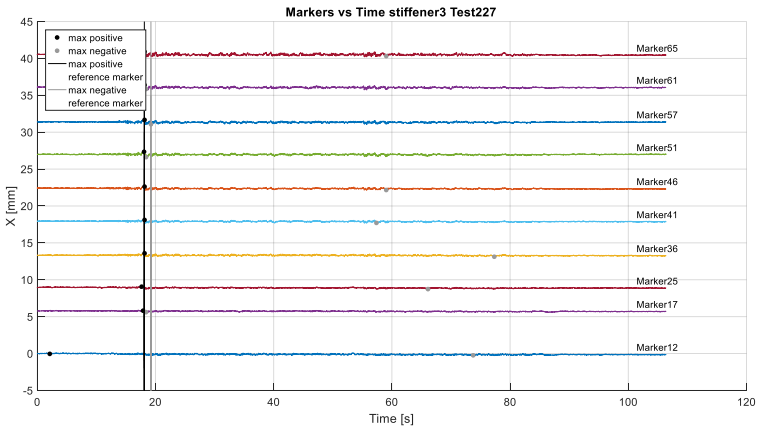

Markers vs Time stiffener2 Test227
max positive
max negative
max positive reference marker
max negative reference marker
Marker67
Marker58
Marker56
Marker48
Marker45
Marker38
Marker35
Marker24
Marker16
Marker11
X [mm]
Time [s]

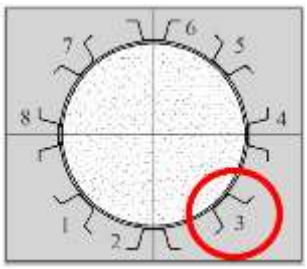


Montante 3


Peak level displacement: max of the red marker - stiffener3 - Test227
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 51
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener3 - Test227
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener3 Test227
max positive
max negative
max positive reference marker
max negative reference marker
Marker65
Marker61
Marker57
Marker51
Marker46
Marker41
Marker36
Marker25
Marker17
Marker12
X [mm]
Time [s]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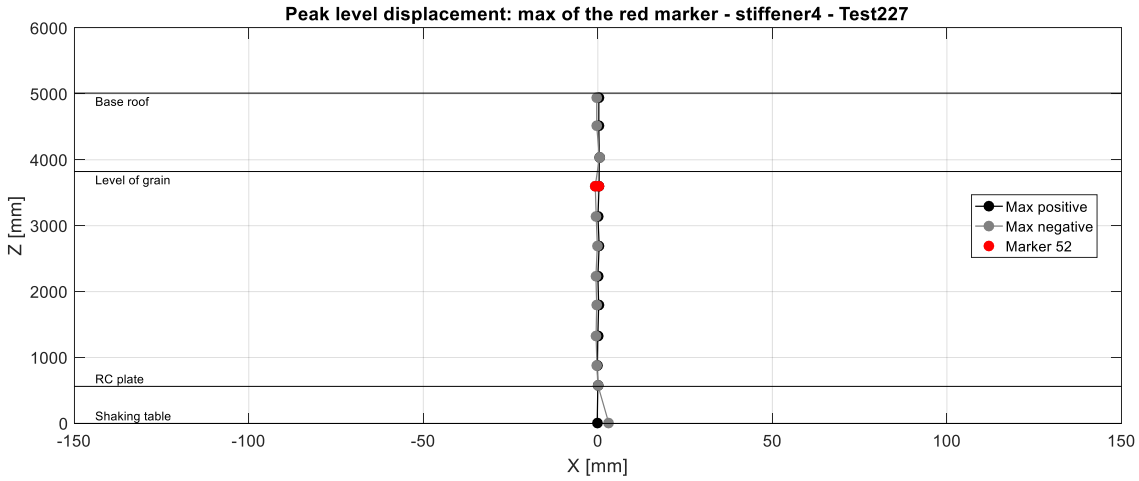
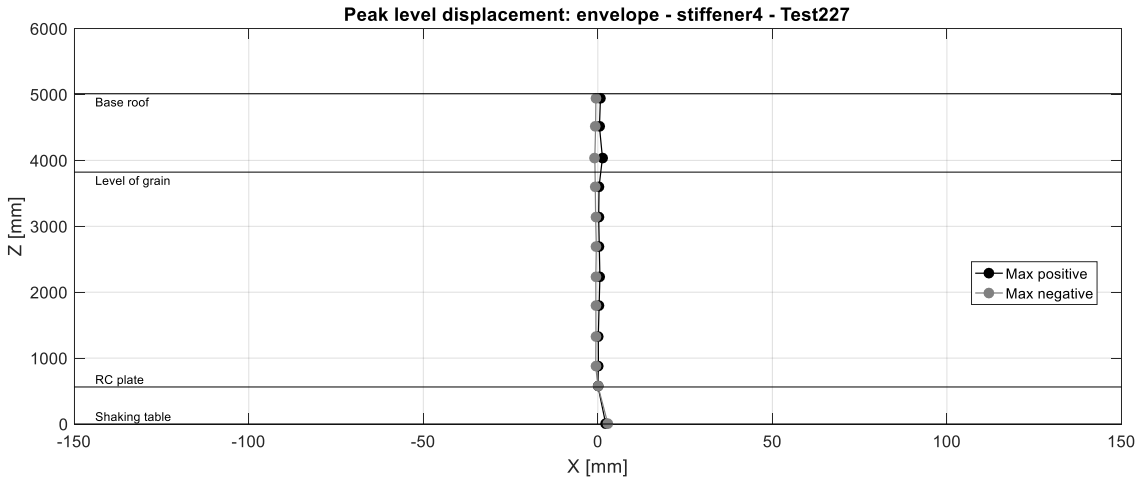
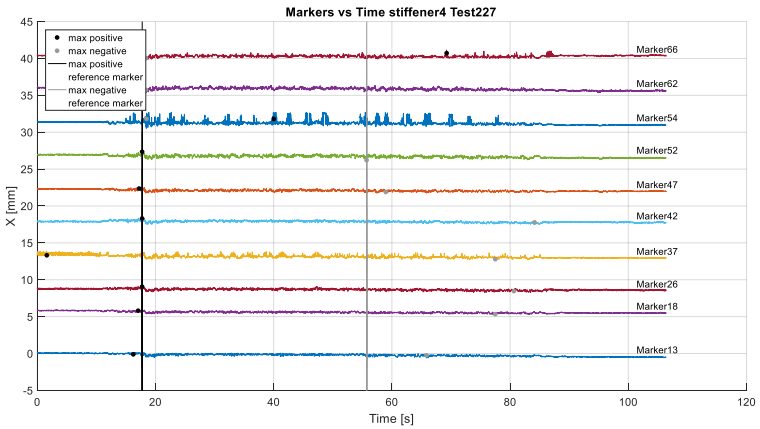
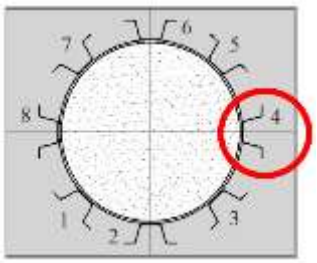
Montante 4


Peak level displacement: max of the red marker - stiffener4 - Test227
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 52
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener4 - Test227
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener4 Test227
max positive
max negative
max positive reference marker
max negative reference marker
Marker66
Marker62
Marker54
Marker52
Marker47
Marker42
Marker37
Marker26
Marker18
Marker13
X [mm]
Time [s]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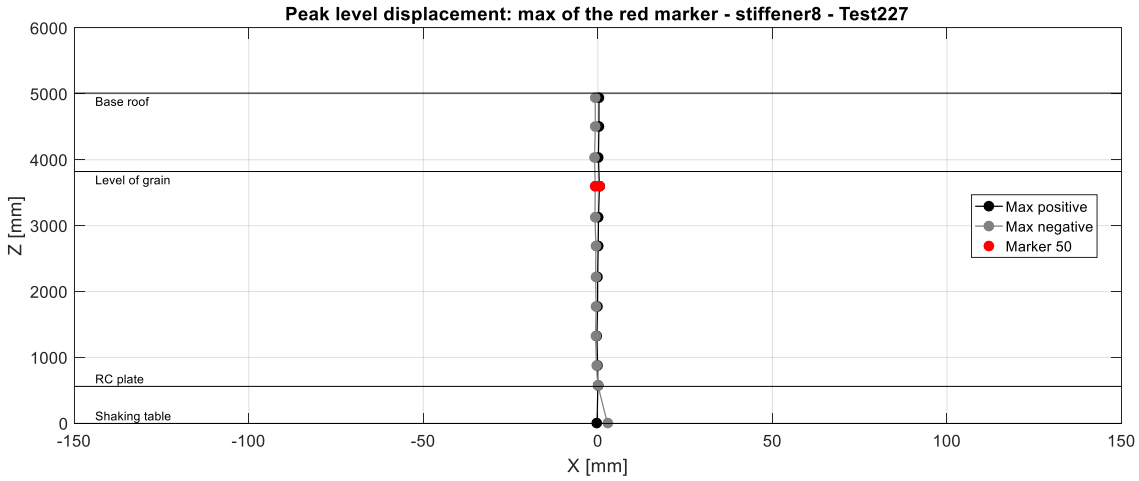
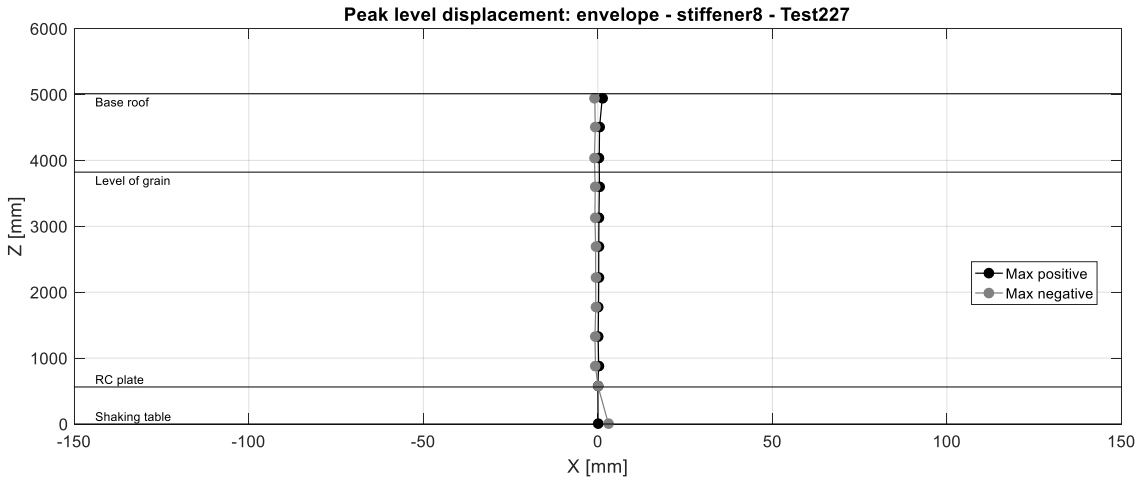
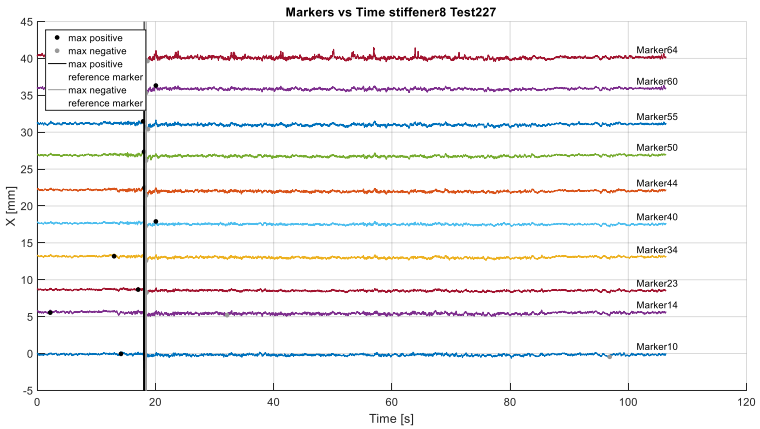
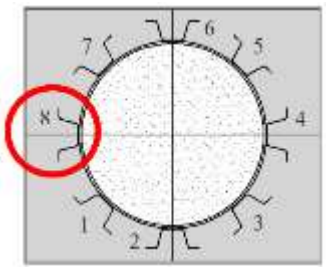
Montante 8


Peak level displacement: max of the red marker - stiffener8 - Test227
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 50
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener8 - Test227
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener8 Test227
max positive
max negative
max positive reference marker
max negative reference marker
Marker64
Marker60
Marker55
Marker50
Marker44
Marker40
Marker34
Marker23
Marker14
Marker10
X [mm]
Time [s]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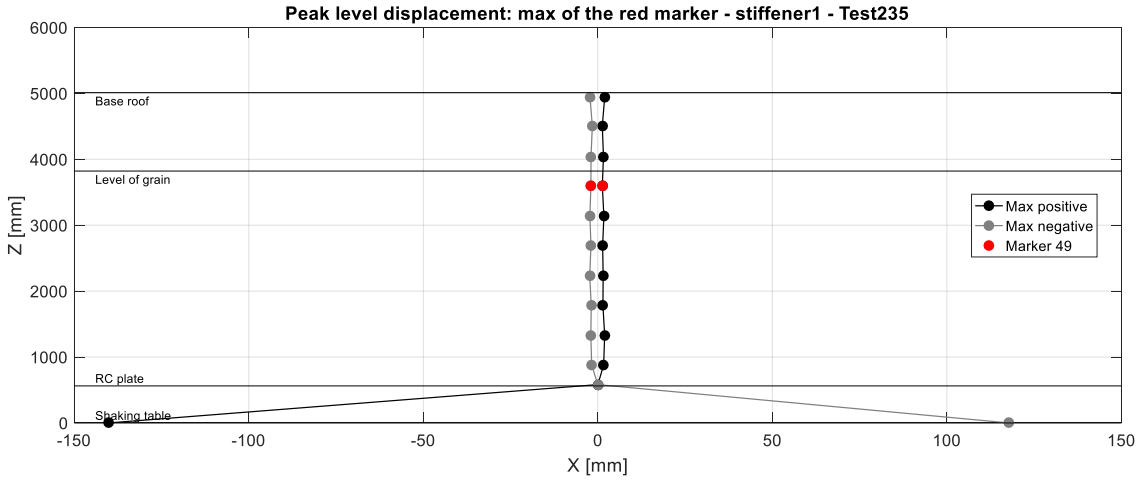
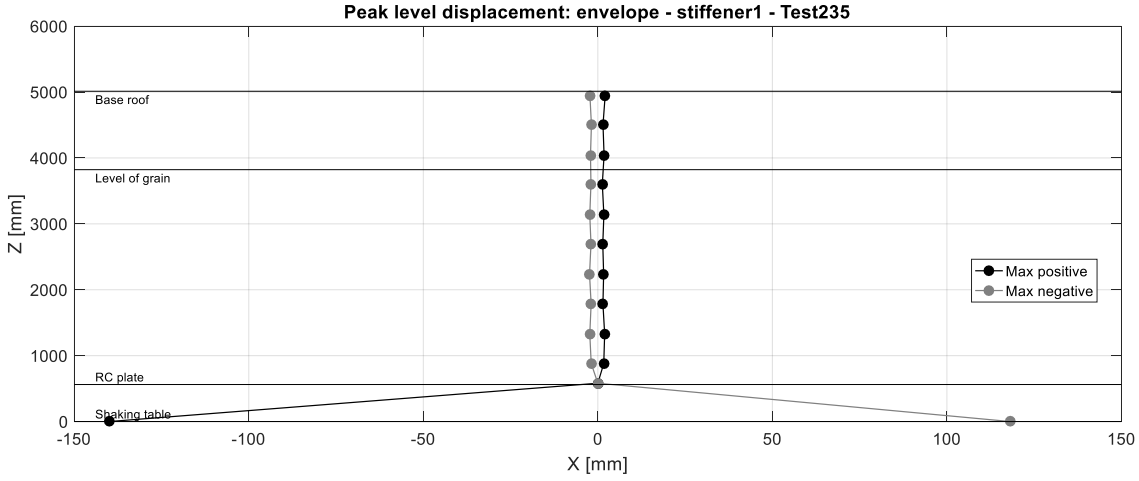
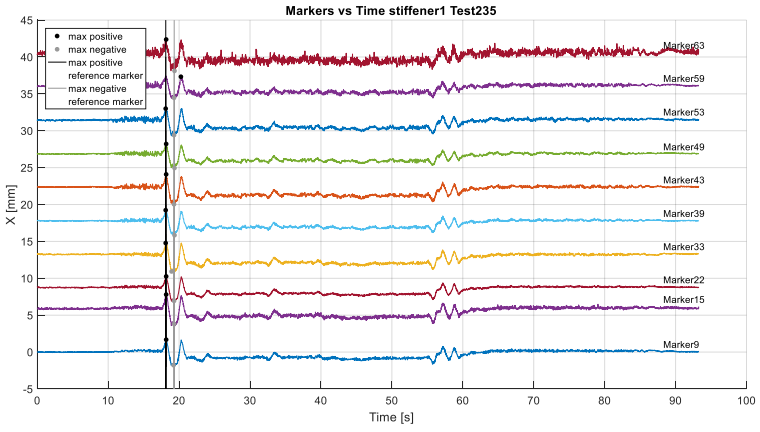
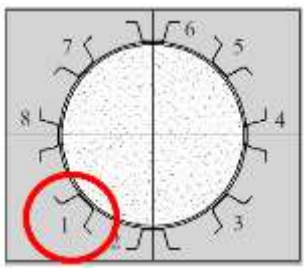
Earthquake input RS1 0.3 g: Test 235

Montante 1

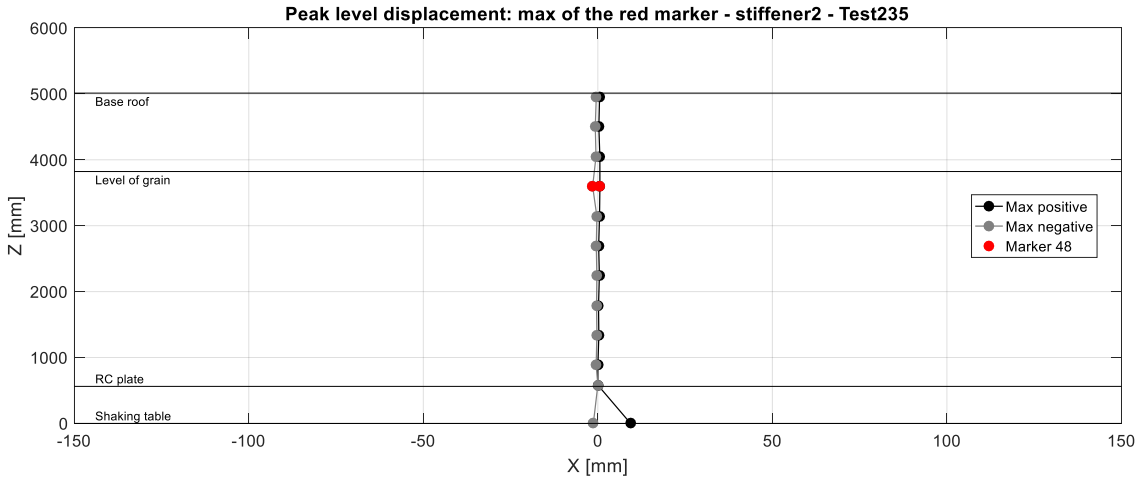


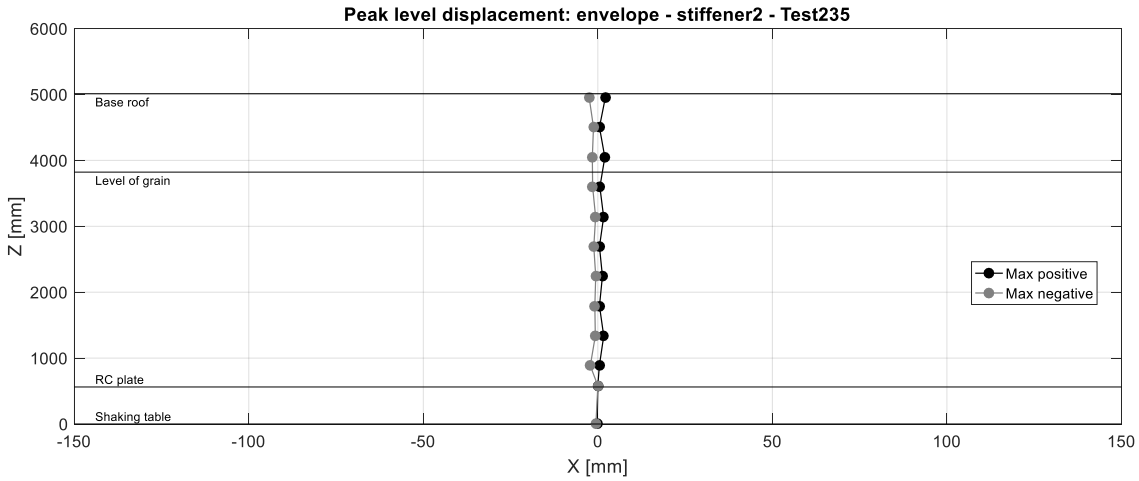


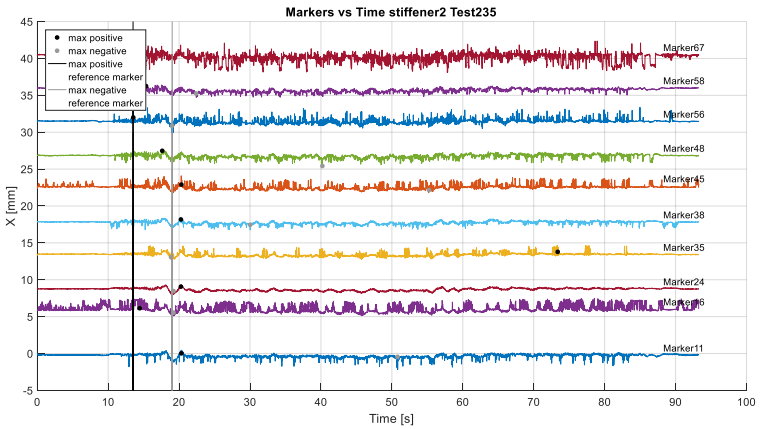


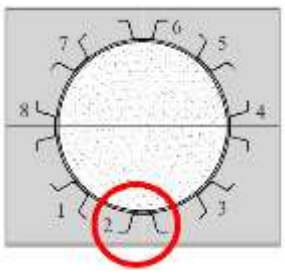


Montante 2


Peak level displacement: max of the red marker - stiffener2 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 48
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener2 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener2 Test235
max positive
max negative
max positive reference marker
max negative reference marker
Marker67
Marker58
Marker56
Marker48
Marker45
Marker38
Marker35
Marker24
Marker6
Marker11
X [mm]
Time [s]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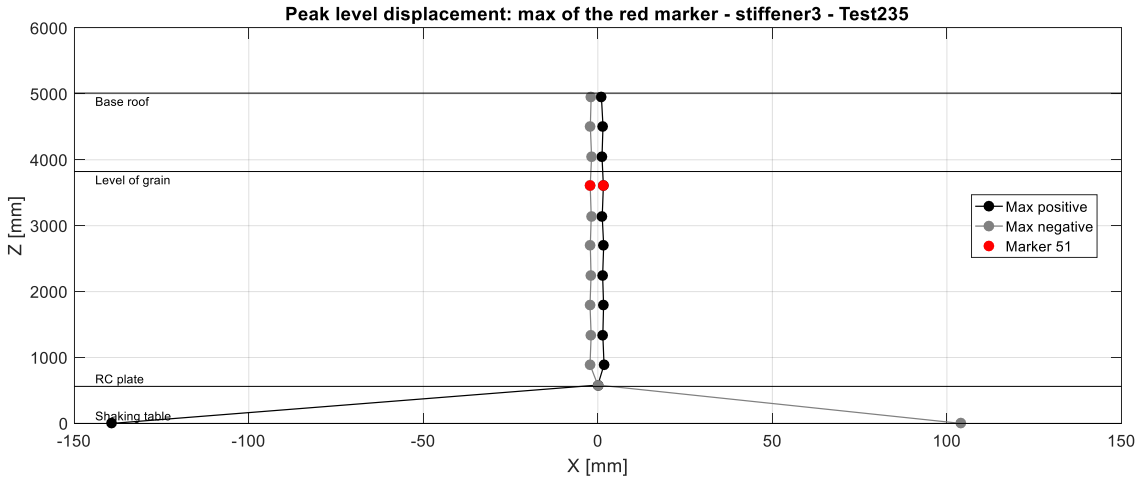
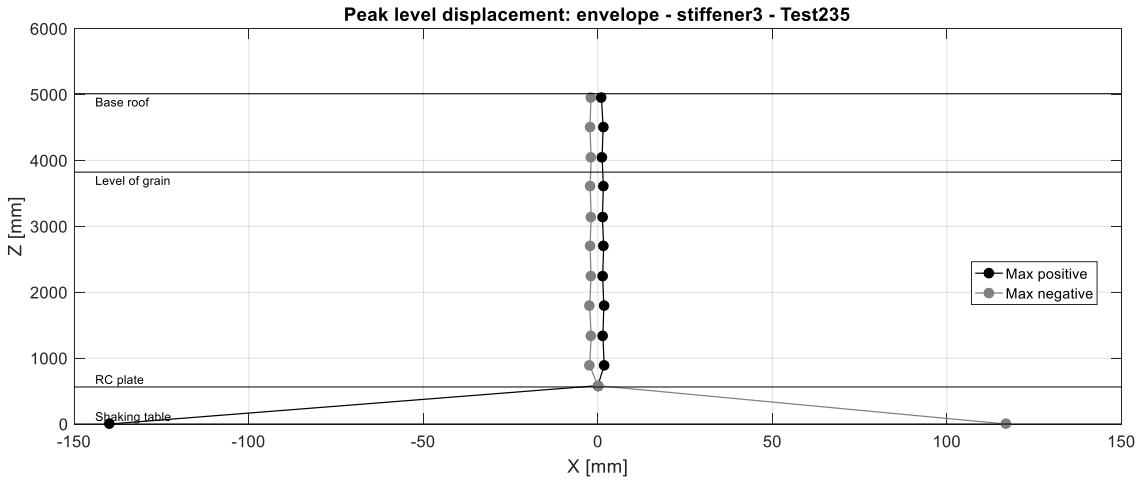
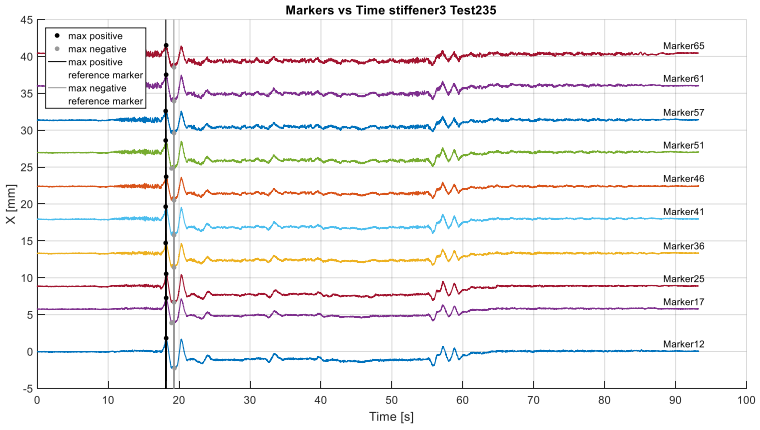
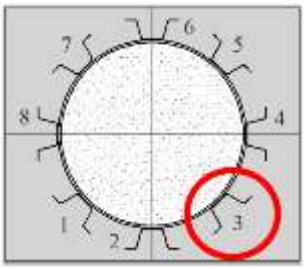
Montante 3


Peak level displacement: max of the red marker - stiffener3 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 51
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener3 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener3 Test235
max positive
max negative
max positive reference marker
max negative reference marker
Marker65
Marker61
Marker57
Marker51
Marker46
Marker41
Marker36
Marker25
Marker17
Marker12
X [mm]
Time [s]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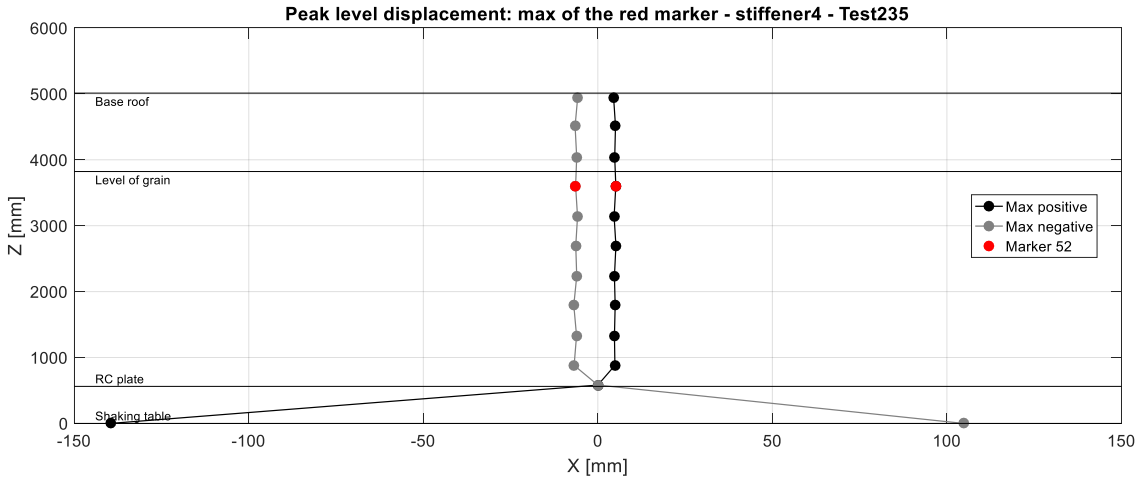
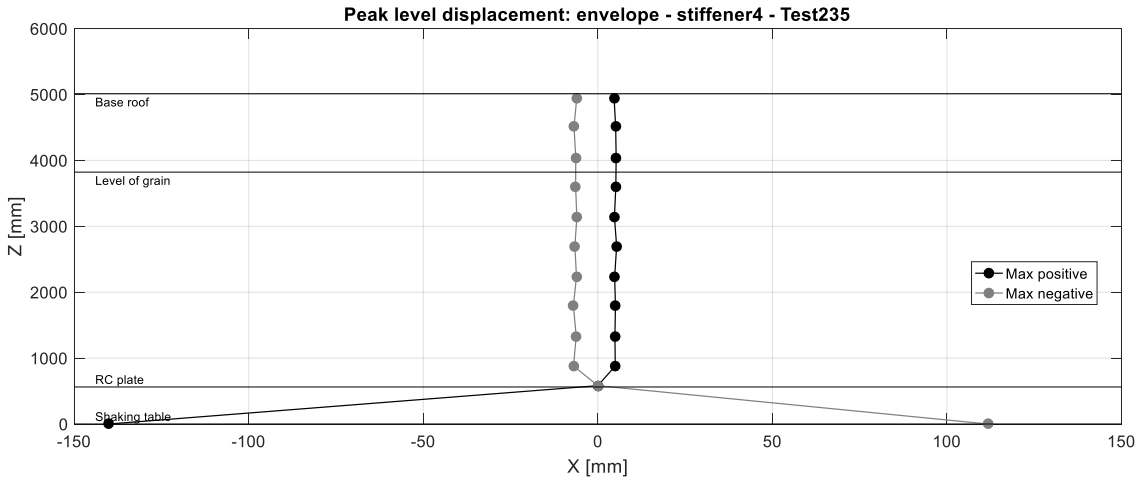
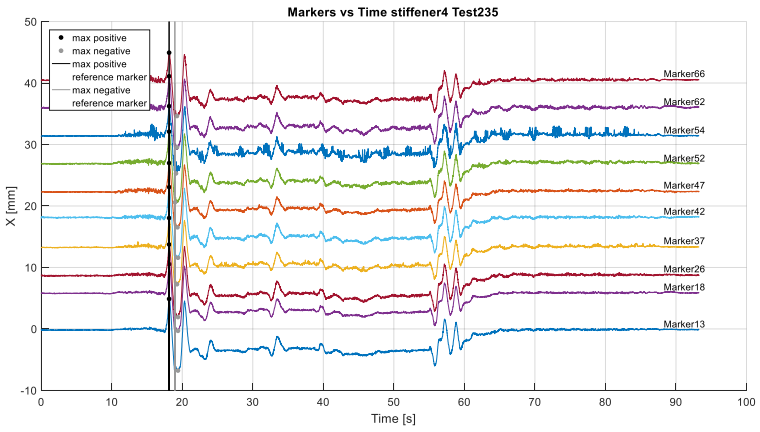
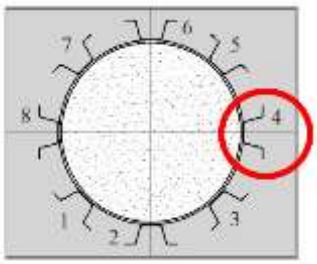
Montante 4


Peak level displacement: max of the red marker - stiffener4 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 52
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener4 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener4 Test235
max positive
max negative
max positive reference marker
max negative reference marker
Marker66
Marker62
Marker54
Marker52
Marker47
Marker42
Marker37
Marker26
Marker18
Marker13
X [mm]
Time [s]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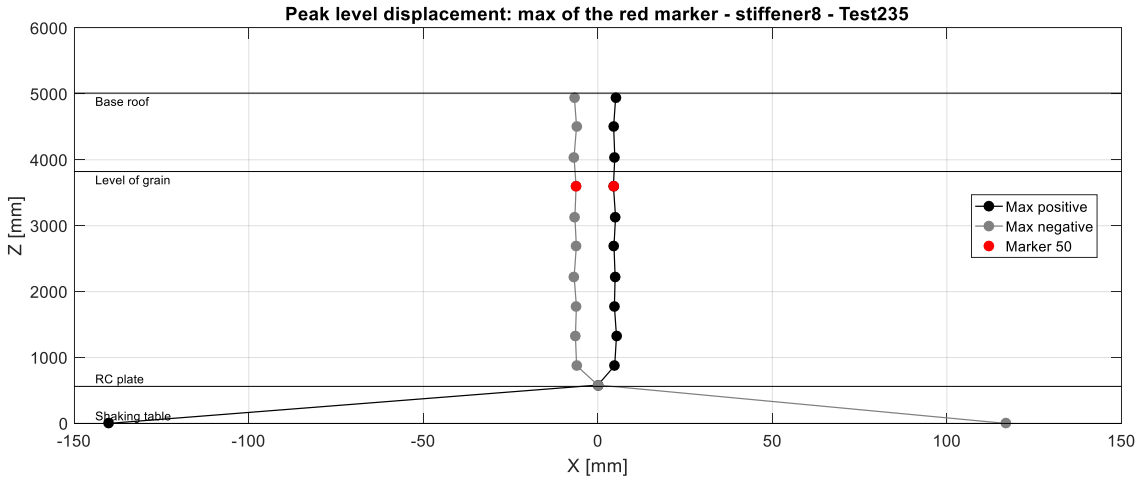
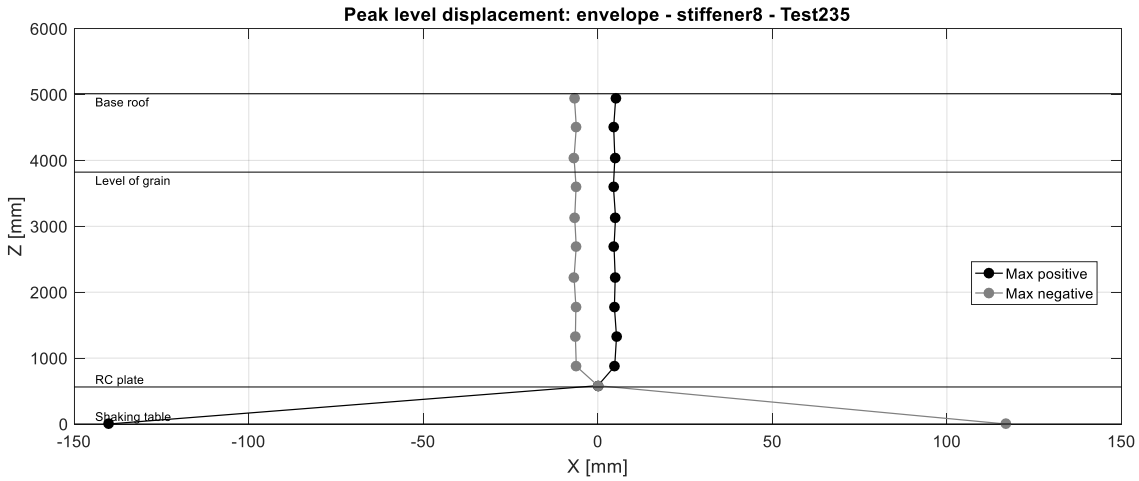
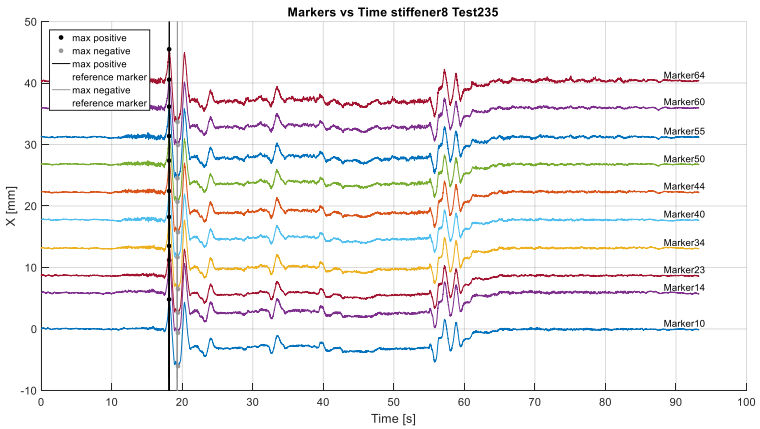
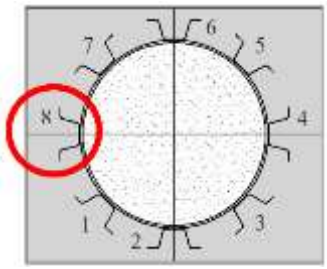
Montante 8


Peak level displacement: max of the red marker - stiffener8 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Marker 50
Z [mm]
X [mm]


Peak level displacement: envelope - stiffener8 - Test235
Base roof
Level of grain
RC plate
Shaking table
Max positive
Max negative
Z [mm]
X [mm]


Markers vs Time stiffener8 Test235
max positive
max negative
max positive reference marker
max negative reference marker
Marker64
Marker60
Marker55
Marker50
Marker44
Marker40
Marker34
Marker23
Marker14
Marker10
X [mm]
Time [s]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