

**RAPPORT D'ESSAI - TEST REPORT
COLLISION FRONTALE DE RECHERCHE
RESEARCH FRONTAL IMPACT**

VÉHICULE D'ESSAI / TEST VEHICLE FORD FREESTAR 2005 TC # 05-211

**ESSAIS DE RECHERCHE CONJOINTS TC/NHTSA SUR LES
SACS GONFLABLES FRONTAUX
JOINT TC/NHTSA FRONTAL AIRBAGS RESEARCH TESTS**

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N° de contrat : **05-6008**
Rapport N°: **RR05-213**

Pour :
TRANSPORTS CANADA
SÉCURITÉ ET SÛRETÉ
Programmes de sécurité routière
Recherche et essais de véhicules
Ottawa (Ontario)

Prepared by :
PMG TECHNOLOGIES
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SAFETY AND SECURITY
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Vehicle Testing
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Les résultats des essais figurant dans ce compte-rendu ne représentent pas une décision officielle du Ministère des Transports quant à l'acceptation de la performance sécuritaire, de la consommation de carburant ou de la conformité d'un véhicule ou des composantes d'un véhicule aux normes de sécurité et d'antipollution. Le Ministère des Transports ne certifie, n'approuve ou n'endosse aucun produit de véhicule automobile.

The test results presented herein do not, in themselves, represent an official determination by the Department of Transport with fuel consumption or compliance with safety and emission standards of any motor vehicle or motor vehicle component. The Department of Transport does not certify, approve or endorse any motor vehicle product.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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VÉHICULE D'ESSAI - TEST VEHICLE

Fabricant - Manufacturer FORD MOTOR CO.	Type de carrosserie - Body Style Fourgonnette / Minivan	Marque, modèle, Année - Make, model, Year FORD FREESTAR 2005
Classe de véhicule - Class of vehicle VTUM / MPV	Boîte de vitesse - Transmission Type Auto. avant / Auto. Front wheel	Moteur - Engine V6 trans. avant / V6 trans. front
Date de fabrication - Date of Manufacture 08/04	Cylindres - Cylinders 4.2 Lit.	N° d'ident. du véhicule - Vehicle Ident. No. 2FMZA502X5BA14055
Lecture de l'odomètre - Odometer Reading 23 km	Nombre de places assises désignées Number of Designated Seating Positions 7	Numéro d'ident. PMG - PMG Ident. Number UN5-186
PNBV - GVWR 2576 kg	PNBE (Avant) - GAWR (Front) 1326 kg	PNBE (Arrière) - GAWR (Rear) 1258 kg

CONFIGURATION D'ESSAI - TEST CONFIGURATION

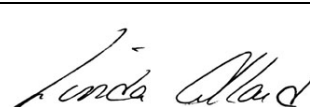
Type d'essai - Test type	Vitesse d'impact- Impact velocity		Angle d'impact Impact angle	Masse du véhicule d'essai Test vehicle mass
Véh. vs barrière - Veh. vs barrier	Prévu / Intended : 40.0 km/h	Obtenu / Obtained : 39.0 km/h	0 °	2267.8 kg
Description et position du mannequin (conducteur) Dummy description and position (driver) Description Hybrid III (5 %)	Position ** 0 mm	Description et position du mannequin (passager avant) Dummy description and position (front passenger) Description Hybrid III (5 %)	Position ** 1 mm	
Description et position du mannequin (passager arrière gauche) Dummy description and position (left rear passenger) Description Hybrid III (6 ans / 6 years old)	Position ** N/A	Description et position du mannequin (passager arrière droit) Dummy description and position (right rear passenger) Description Hybrid III (6 ans / 6 years old)	Position ** N/A	
Description et position du mannequin (passager arrière centre, 3 ^e rangée) Dummy description and position (centre rear passenger, 3 rd row) Description Hybrid III (10 ans / 10 years old)	Position ** N/A	Description et position du mannequin (passager arrière droit, 3 ^e rangée) Dummy description and position (right rear passenger, 3 rd row) Description N/A	Position ** N/A	

RÉSULTATS GÉNÉRAUX - GENERAL RESULTS

Déploiement des sacs gonflables - Airbags deployment Coussins frontaux - Frontal airbags		Déploiement des sacs gonflables - Airbags deployment Coussins latéraux - Lateral airbags	
Conducteur / Driver	Passager / Passenger	Conducteur / Driver	Passager / Passenger
Déployé / Deployed 25.5ms	Déployé / Deployed 25.1ms	N/A 0.0	N/A 0.0
Rétracteurs de ceintures-prétensionneurs Seat belts retractors-pretensioners Conducteur / Driver		Limiteur de charge des ceintures de sécurité Seat belts load limiter Conducteur / Driver	
Non-équipé / Not equipped		Non-équipé / Not equipped	

Essai réalisé selon la procédure de PMG : Collision frontale de recherche, version 3, révision 10 avril 2000.

Test performed according to PMG procedure: Research frontal impact, version 3, revised april 10, 2000.

Préparé par : Prepared by : 	Digitally signed by Pierre Beauchamp Date: 2005.09.14	Approuvé par : Approved by : 	Digitally signed by Alain Bussières Date: 2005.09.16 10:52:13 -04'00'
Vérifié par : Verified by : 	Digitally signed by Linda Allard Date: 2005.09.14	Accepté par : Accepted by :	

* Tel qu'observé avec l'application d'une charge de 12V après l'essai.

* As observed by a 12V application after the test.



**COLLISION FRONTALE
RECHERCHE**

**FRONTAL IMPACT
RESEARCH**

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Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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**** Référence : 0 est la position la plus avancée. / ** Reference : 0 is the foremost position.**

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DONNÉES DU VÉHICULE D'ESSAI / TEST VEHICLE DATA

Capacité du véhicule - Vehicle Capacity		Masse des bagages - Cargo Load		Type de sièges – Type of seats			Types de dossiers - Type of seat back		
544 kg					Avt - Frt	Arr - Rr		Avt - Frt	Arr - Rr
Nombre d'occupants (places assises désignées) Number of Occupants (Designated Seating Positions)				Banquette Bench		X	Dossier ajustable Adjustable Seat Back	X	
Avant – Front 2 Arrière – Rear 2+3 Total 7				Baquet Bucket	X		Dossier non-ajustable Non-adjustable Seat Back		X
Volume de carburant pour l'essai Fuel system test volume		Pression à froid - Cold Tire Pressure					Dimension - Size		
89.50 l		Avant - Front 240 kPa		Arrière - Rear 240 kPa		Secours - Spare 415 kPa		P225/60R16	

PREMIÈRE PESÉE : VÉHICULE TEL QUE LIVRÉ (AVEC LIQUIDES AU MAXIMUM)

FIRST WEIGHT : VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS)

Avant gauche - Left front	Avant droit - Right front	Masse avant totale - Total front weight
582.1 kg	570.4 kg	1152.5 kg
Arrière gauche - Left rear	Arrière droit - Right rear	Masse arrière totale - Total rear weight
389.3 kg	392.0 kg	781.3 kg
Masse totale côté gauche - Total left side weight	Masse totale côté droit - Total right side weight	Masse totale - Total weight
971.4 kg	962.4 kg	1933.8 kg

TROISIÈME PESÉE : VÉHICULE PRÊT POUR L'ESSAI

THIRD WEIGHT : VEHICLE READY FOR TEST

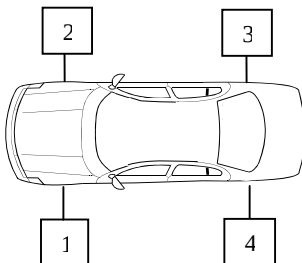
Avant gauche - Left front	Avant droit - Right front	Masse avant totale - Total front weight
618.7 kg	615.7 kg	1234.4 kg
Arrière gauche - Left rear	Arrière droit - Right rear	Masse arrière totale - Total rear weight
506.7 kg	526.7 kg	1033.4 kg
Masse totale côté gauche - Total left side weight	Masse totale côté droit - Total right side weight	Masse totale - Total weight
1125.4 kg	1142.4 kg	2267.8 kg

ATTITUDE DU VÉHICULE / VEHICLE ATTITUDE

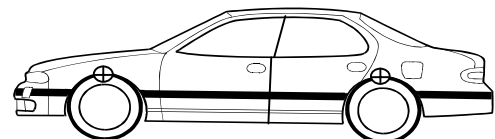
		Attitude tel que livré Attitude on delivery	Attitude tel que testé Attitude as tested
1	Roue avant gauche* Left front wheel*	746 mm	738 mm
2	Roue avant droite* Front right wheel*	750 mm	736 mm
3	Roue arrière droite* Rear right wheel*	765 mm	713 mm
4	Roue arrière gauche* Rear left wheel*	762 mm	714 mm

* Mesures prises aux puits de roues. // *Measurements taken at wheel openings.

Vue de plan / Plan view



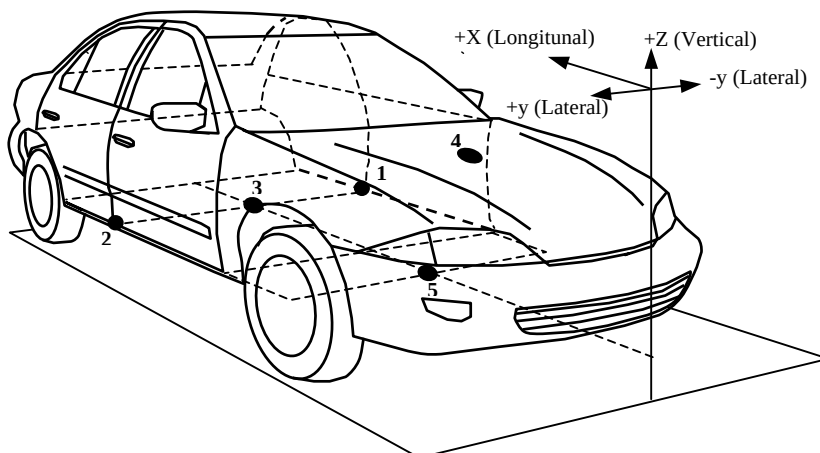
Vue de côté / Side view



⊕ Points de mesure / Measurement points

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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EMPLACEMENT DES ACCÉLÉROMÈTRES
ACCELEROMETER LOCATIONS

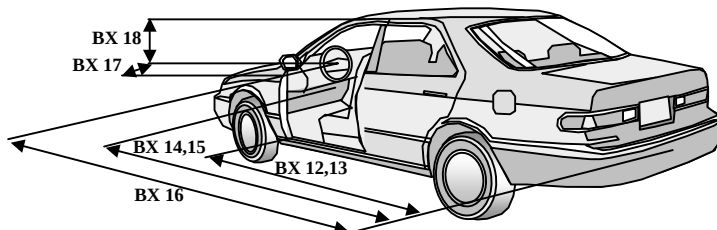
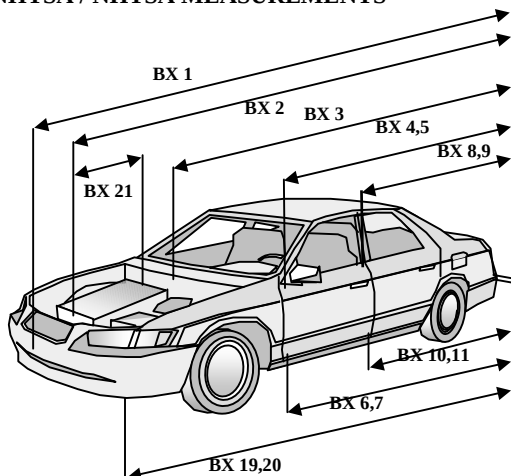


Point de référence : Centre transversal du véhicule, au point le plus avancé, au niveau du sol. Selon SAE J182a.
Reference point : Transversal center of the vehicle, at the foremost point and at ground level. As per SAE J182a.

EMPLACEMENT LOCATION	DESCRIPTIONS	COORDONNÉES / COORDINATES (mm)		
		X	Y	Z
#1	Seuil de la porte gauche @ pilier "B" Left door sill @ pillar "B"	2533	-531	390
#2	Seuil de la porte droite @ pilier "B" Right door sill @ pillar "B"	2582	527	391
#3	Centre de gravité Centre of gravity	2535	48	382
#4	Le dessus du moteur Top of engine	-	-	-
#5	Le dessous du moteur Bottom of engine	-	-	-

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MESURES NHTSA / NHTSA MEASUREMENTS



- 1 - Longueur totale du véhicule
Total length of vehicle
- 2 - Surface arrière à l'avant du bloc moteur
Rear surface at front of engine block
- 3 - Surface arrière à la cloison pare-feu
Rear surface at fire-wall
- 4 - Surface arrière à la partie supérieure avant porte avant droite
Rear surface of front superior part of right front door
- 5 - Surface arrière à la partie supérieure avant porte avant gauche
Rear surface of front superior part of left front door
- 6 - Surface arrière à la partie inférieure avant porte avant droite
Rear surface of front inferior part of right front door
- 7 - Surface arrière à la partie inférieure avant porte avant gauche
Rear surface of front inferior part of left front door
- 8 - Surface arrière à la partie supérieure arrière porte avant droite
Rear surface of rear superior part of right rear door
- 9 - Surface arrière à la partie supérieure arrière porte avant gauche
Rear surface of rear superior part of left rear door
- 10 - Surface arrière à la partie inférieure arrière porte avant droite
Rear surface of rear inferior part of right rear door
- 11 - Surface arrière à la partie inférieure arrière porte avant gauche
Rear surface of rear inferior part of left rear door
- 12 - Surface arrière à la partie inférieure du pilier "A" droit
Rear surface of rear inferior part of right pillar "A"
- 13 - Surface arrière à la partie inférieure du pilier "A" gauche
Rear surface of rear inferior part of left pillar "A"
- 14 - Surface arrière à la cloison pare-feu côté droit
Rear surface of right side of fire-wall
- 15 - Surface arrière à la cloison pare-feu côté gauche
Rear surface of left side of fire-wall
- 16 - Surface arrière à la colonne de direction
Rear surface of steering column
- 17 - Centre de la colonne de direction au pilier "A"
Centre of steering column to pillar "A"
- 18 - Centre de la colonne de direction au toit
Centre of steering column to roof
- 19 - Surface arrière du véhicule au coin droit du pare-choc avant
Rear surface of vehicle to right corner of front bumper
- 20 - Surface arrière du véhicule au coin gauche du pare-choc avant
Rear surface of vehicle to left corner of front bumper
- 21 - Longueur du bloc moteur
Length of engine block

	BX*	AX**	Δx		BX*	AX**	Δx
1	5105	4815	290	12	3614	3611	3
2	4492	4410	82	13	3612	3606	6
3	4181	4181	0	14	3719	3709	10
4	3669	3666	3	15	3840	3833	7
5	3665	3663	2	16	3141	3148	-7
6	3574	3579	-5	17	390	384	6
7	3579	3585	-6	18	511	520	-9
8	2484	2481	3	19	5058	4753	305
9	2480	2478	2	20	5059	4777	282
10	2530	2536	-6	21	319	307	12
11	2528	2535	-7				

Mesures en mm / Measurements in mm

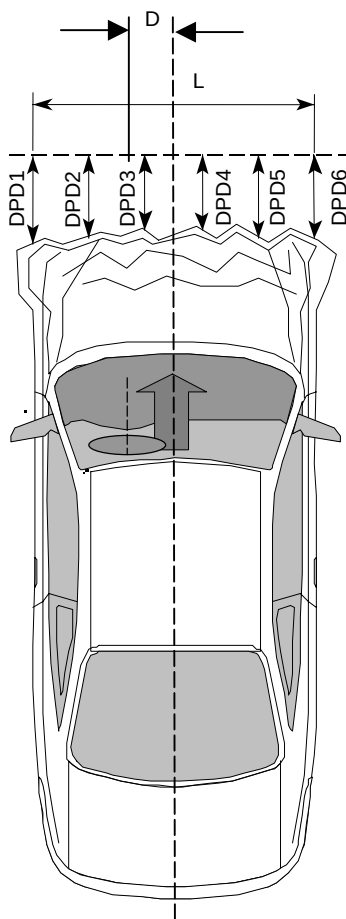
* BX : Mesures du véhicule avant-essai. / Pre-test vehicle measurements data.

** AX : Mesures du véhicule après-essai. / Post-test vehicle measurements data.

REMARQUES / COMMENTS : Aucune / None.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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MESURES DES DPD / DPD'S MEASUREMENTS



DPD 1:
DPD 2:
DPD 3:
DPD 4:
DPD 5:
DPD 6:
MESURE L:
MEASUREMENT L:
MESURE D:
MEASUREMENT D:

AVANT ESSAI PRE-TEST	APRÈS ESSAI POST-TEST	Δx
208	343	-135
42	332	-290
7	282	-275
6	286	-280
42	333	-291
217	308	-91
	1600	
	0	

Mesures en mm / Measurements in mm

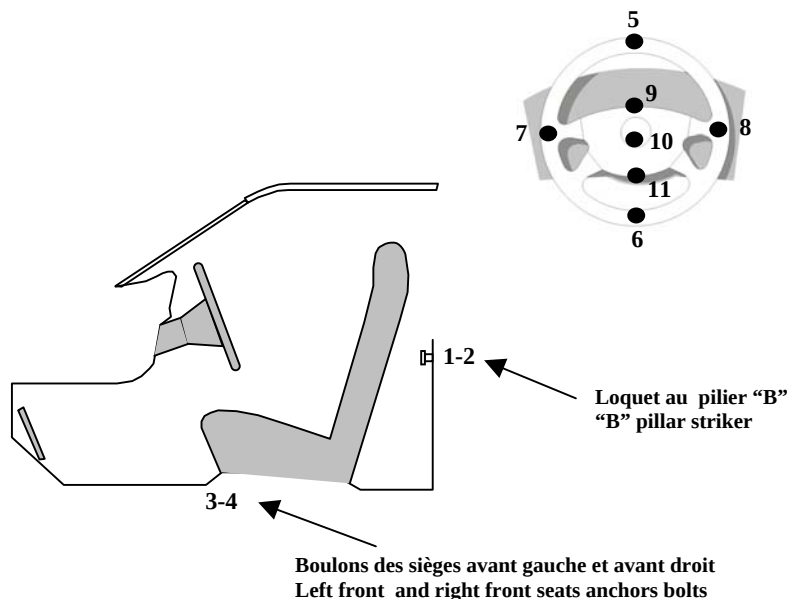
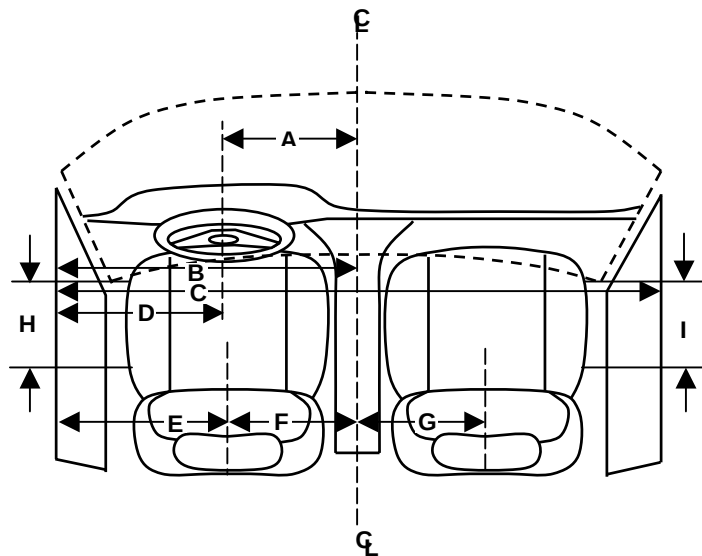
L : Longueur de la région endommagée
Length of damaged region

D : Distance du centre de déformation à la ligne de centre du véhicule
Midpoint of damage to Vehicle Longitudinal Centerline

REMARQUES / COMMENTS : Aucune / None.

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MESURES DE VÉHICULE
VEHICLE MEASUREMENTS



Code	Description	mm
A	Centre du volant à la ligne de centre du véhicule Steering wheel center to center line of vehicle	410
B	Seuil de fenêtre à la ligne de centre du véhicule Window edge to center line of the vehicle	895
C	Fenêtre à fenêtre Window to window	1794
D	Centre du volant au seuil de la fenêtre Steering wheel center to window edge	485
E	Seuil de la fenêtre au centre du siège (conducteur) Window edge to seat midline (driver)	481
F	Centre du siège à la ligne de centre du véhicule (conducteur) Seat midline to center line of vehicle (driver)	414
G	Centre du siège à la ligne de centre du véhicule (passager) Seat midline to center line of vehicle (passenger)	425
H	Course du siège (conducteur) Seat travel (driver)	180
I	Course du siège (passager) Seat travel (passenger)	180
J	Ajustement du volant Steering wheel adjustment	43
K	Ajustement de la ceinture baudrier Upper torso belt adjustment	74

Code	Description	X(mm)	Y(mm)	Z(mm)
1	Loquet au pilier "B" (conducteur) "B" pillar striker (driver)	2503	-832	745
2	Loquet au pilier "B" (passager) "B" pillar striker (passenger)	2500	837	743
3	Boulon siège avant, extérieur (conducteur) Front seat bolt, outboard (driver)	2101	-592	352
4	Boulon siège avant, extérieur (passager) Front seat bolt, outboard (passenger)	2105	607	350
5	Jante du volant, centre haut Steering wheel rim, top centre	1880	-412	1234
6	Jante du volant, centre bas Steering wheel rim, bottom centre	2008	-411	876
7	Jante du volant, centre gauche Steering wheel rim, left centre	1948	-601	1056
8	Jante du volant, centre droit Steering wheel rim, right centre	1947	-222	1055
9	Moyeu du volant, centre haut Steering wheel hub, top centre	1922	-412	1105
10	Moyeu du volant, centre Steering wheel hub, centre	1974	-412	1034
11	Moyeu du volant, centre bas Steering wheel hub, bottom centre	1991	-411	965
12	Centre du volant Center of steering wheel	1964	-410	1055

Point de référence : Centre transversal du véhicule, au point le plus avancé, au niveau du sol. Selon SAE J182a.
Reference point : Transversal center of the vehicle, at the foremost point and at ground level. As per SAE J182a.

Remarques - Comments: Aucune / None.

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**POINTS DE MESURES DES CEINTURES DE SÉCURITÉ EN UTILISANT L'APPAREIL (BTD)
PASSENGER CAR BELT FIT MEASUREMENTS USING THE BELT DEPLOYMENT TEST DEVICE (BTD)**

Type de siège
Seat type

baquet / bucket ☒ banquette / bench ☐ banquette 60-40 / bench 60-40 ☐

Type de ceinture
Belt system

3 points ☒ passive ☐ active ☒ automatique / automatic ☐ motorisée / motorised ☐

Localisation du siège
Seat location

Av-G / F-L ☒ Av-D / F-R ☐ Arr-G / R-L ☐ Arr-D / R-R ☐

Espacement du genou gauche
Left knee spacing

102 mm

Espacement du genou droit
Right knee spacing

104 mm

Essai no: / Trial no:		1	2	3
Angle du dossier BTD Back pan angle		24.4 deg.	24.9 deg.	25.0 deg.
Angle de la cuvette BTD Seat pan angle		14.8 deg.	16.8 deg.	14.9 deg.
Angle du pied Foot angle	gauche / left	99 deg.	110 deg.	105 deg.
	droit / right	119 deg.	120 deg.	123 deg.
Angle du genou Knee angle	gauche / left	112 deg.	105 deg.	113 deg.
	droit / right	109 deg.	106 deg.	109 deg.
Mesure sous-abdominale Lap belt score	gauche / left	46 mm / 0 mm	46 mm / 0 mm	46 mm / 0 mm
	droit / right	36 mm / 0 mm	36 mm / 0 mm	37 mm / 0 mm
Ceinture en contact Belt in contact	gauche / left	Oui/Yes	Oui/Yes	Oui/Yes
	droit / right	Oui/Yes	Oui/Yes	Oui/Yes
Mesure ceinture baudrier Upper torso belt score	Sternum	191 mm / - *	182 mm / - *	184 mm / - *
	Clavicule	127 mm / 0 mm	124 mm / 1 mm	120 mm / 2 mm
Ceinture en contact Belt in contact	Clavicule	Oui/Yes	Oui/Yes	Oui/Yes

Mesure Score	/	Jeu Slack
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* Mesure ceinture baudrier (jeu sternum) : (-) signifie un jeu causé par l'appareil BTD. Impossible à éliminer.
* Upper torso belt score (sternum slack) : (-) means a slack impossible to eliminate due to BTD machine.

Remarques – Comments : **Aucune / None.**

**Selon le manuel d'opérations pour mesures géométriques des ceintures de sécurité, ébauche,
Transports Canada, janvier 1993.
As per the operational manual for the belt deployment test device,
draft, Transport Canada, January 1993.**

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**POINTS DE MESURES DES CEINTURES DE SÉCURITÉ EN UTILISANT L'APPAREIL (BTD)
PASSENGER CAR BELT FIT MEASUREMENTS USING THE BELT DEPLOYMENT TEST DEVICE (BTD)**

Type de siège
Seat type

baquet / bucket ☒ banquette / bench ☐ banquette 60-40 / bench 60-40 ☐

Type de ceinture
Belt system

3 points ☒ passive ☐ active ☒ automatique / automatic ☐ motorisée / motorised ☐

Localisation du siège
Seat location

Av-G / F-L ☐ Av-D / F-R ☒ Arr-G / R-L ☐ Arr-D / R-R ☐

Espacement du genou gauche
Left knee spacing

104 mm

Espacement du genou droit
Right knee spacing

110 mm

Essai no: / Trial no:		1	2	3
Angle du dossier BTD Back pan angle		24.8 deg.	24.5 deg.	24.2 deg.
Angle de la cuvette BTD Seat pan angle		14.7 deg.	14.8 deg.	15.8 deg.
Angle du pied Foot angle	gauche / left	104 deg.	108 deg.	110 deg.
	droit / right	109 deg.	110 deg.	110 deg.
Angle du genou Knee angle	gauche / left	114 deg.	108 deg.	111 deg.
	droit / right	114 deg.	109 deg.	112 deg.
Mesure sous-abdominale Lap belt score	gauche / left	36 mm / 0 mm	37 mm / 0 mm	37 mm / 0 mm
	droit / right	46 mm / 0 mm	46 mm / 0 mm	46 mm / 0 mm
Ceinture en contact Belt in contact	gauche / left	Oui/Yes	Oui/Yes	Oui/Yes
	droit / right	Oui/Yes	Oui/Yes	Oui/Yes
Mesure ceinture baudrier Upper torso belt score	Sternum	168 mm / - *	170 mm / - *	165 mm / - *
	Clavicule	108 mm / 0 mm	110 mm / 0 mm	106 mm / 0 mm
Ceinture en contact Belt in contact	Clavicule	Oui/Yes	Oui/Yes	Oui/Yes

Mesure Score	/	Jeu Slack
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* Mesure ceinture baudrier (jeu sternum) : (-) signifie un jeu causé par l'appareil BTD. Impossible à éliminer.
* Upper torso belt score (sternum slack) : (-) means a slack impossible to eliminate due to BTD machine.

Remarques - Comments: **Aucune / None.**

**Selon le manuel d'opérations pour mesures géométriques des ceintures de sécurité, ébauche,
Transports Canada, janvier 1993.
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POSITIONNEMENT DES MANNEQUINS / MEASUREMENTS OF DUMMY POSITIONS

		<u>MESURES / MEASUREMENTS :</u>					
Conducteur/Driver : Hybrid III (5 %)		Toutes les mesures sont en mm / All measurements are in mm					
Angle du pelvis - Pelvic angle :	20.5°						
Angle transversal - Transversal angle :	0.5°	Conducteur / Driver			Passager / Passenger		
Angle de la tête - Head angle :	0.0°	Ajustement du siège : Seat adjustment :			Ajustement du siège : Seat adjustment :		
Seuil de porte - Door sill :	0.0°	1 de 19 crans/notches			1 de 19 crans/notches		
Mouvement du lacet / Yaw movement :	1 mm	Angle du dossier : Seat back angle :			Angle du dossier : Seat back angle :		
Position de la rail du siège / Seat track position * :	0 mm	N/A			N/A		
Passager avant/Front Passenger: Hybrid III (5 %)		X	Y	Z	X	Y	Z
Angle du pelvis - Pelvic angle :	21.4°	2355	-482	1268	2323	490	1265
Angle transversal - Transversal angle :	0.5°	2198	-574	716	2192	578	704
Angle de la tête - Head angle :	0.0°	1869	-535	790	1861	542	800
Seuil de porte - Door sill :	0.0°						
Mouvement du lacet / Yaw movement :	2 mm						
Position de la rail du siège / Seat track position * :	1 mm						
Cible de tête / Head target :							
Point-H / H-Point :							
Rotule / Knee joint :							

Remarques – Comments : **Aucune / None.**

*** Référence : 0 est la position la plus avancée.**

*** Reference : 0 is the foremost position.**

Selon la procédure de positionnement de mannequin 5^e percentile Hybrid III, 49 CFR 552, 571, 585 and 595, Docket No. NHTSA 00-7013; Notice 1, RIN 2127-AG70, Federal Motor Vehicle Safety Standards, Occupant Crash Protection (Paragraphe S16.3).

As per procedure for placement of a 5th percentile Hybrid III 49 CFR 552, 571, 585 and 595, Docket No. NHTSA 00-7013; Notice 1, RIN 2127-AG70, Federal Motor Vehicle Safety Standards, Occupant Crash Protection (Section S16.3).

Point de référence : **Centre transversal du véhicule, au point le plus avancé, au niveau du sol. Selon SAE J182a.**

Reference point : **Transversal center of the vehicle, at the foremost point and at ground level. As per SAE J182a.**

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POSITIONNEMENT DES MANNEQUINS / MEASUREMENTS OF DUMMY POSITIONS

		MESURES / MEASUREMENTS :					
Passager arrière gauche : Rear left passenger :		Toutes les mesures sont en mm / All measurements are in mm					
Angle du pelvis - Pelvic angle :		N/A			Passager arrière gauche Rear left passenger		
Angle transversal - Transversal angle :		N/A			Passager arrière droit Rear right passenger		
Angle de la tête - Head angle :		N/A			Ajustement du siège : Seat adjustment :		
Mouvement du lacet / Yaw movement :		N/A			N/A		
Passager arrière droit : Rear right passenger :		N/A			Ajustement du dossier : Seat back adjustment :		
Angle du pelvis - Pelvic angle :		N/A			N/A		
Angle transversal - Transversal angle :		N/A			X		
Angle de la tête - Head angle :		N/A			Y		
Mouvement du lacet / Yaw movement :		N/A			Z		
Cible de tête / Head target :		2355			-482		
		1268			2323		
					490		
					1265		

Point de référence : Centre transversal du véhicule, au point le plus avancé, au niveau du sol. Selon SAE J182a.
Reference point : Transversal center of the vehicle, at the foremost point and at ground level. As per SAE J182a.

Passager arrière gauche : Rear left passenger :	Hybrid III (6 ans / 6 years old)	
	Méthodes d'attaches : Attachment methods:	Siège / Seat : ancrage sup. et système d'ancrage univ. / with tether and latch Enfant / Child : ceinture baudrier gauche / left shoulder belt
	Manufacturier du siège : Seat manufacturer :	Cenutury Brevera Contour
	Modèle du siège : Seat model :	44875LBLCA
	No. de série du siège : Seat serial number :	N/A
	Date de fabrication du siège : Seat fabrication date :	3/25/2003

Passager arrière droit : Rear right passenger :	Hybrid III (6 ans / 6 years old)	
	Méthodes d'attaches : Attachment methods:	Siège / Seat : ceinture baudrier droit / right shoulder belt Enfant / Child : ceinture baudrier droit / right shoulder belt
	Manufacturier du siège : Seat manufacturer :	Graco Turbo Booster
	Modèle du siège : Seat model :	8675FIRCA
	No. de série du siège : Seat serial number :	N/A
	Date de fabrication du siège : Seat fabrication date :	1/8/2005

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POSITIONNEMENT DES MANNEQUINS / MEASUREMENTS OF DUMMY POSITIONS

		<u>MESURES / MEASUREMENTS :</u>				
Passager arrière centre, 3 ^e rangée : Rear centre passenger, 3 rd row :		Toutes les mesures sont en mm / All measurements are in mm				
Angle du pelvis - Pelvic angle : Angle transversal - Transversal angle : Angle de la tête - Head angle : Mouvement du lacet / Yaw movement :		N/A		Passager arrière centre, 3 ^e rangée Rear centre passenger, 3 rd row		
		N/A		Passager arrière droit, 3 ^e rangée Rear right passenger, 3 rd row		
		N/A		Ajustement du siège : Seat adjustment :		
		N/A		N/A		
Passager arrière droit, 3 ^e rangée : Rear right passenger, 3 rd row :		N/A		Ajustement du dossier : Seat back adjustment :		
		N/A		N/A		
Angle du pelvis - Pelvic angle : Angle transversal - Transversal angle : Angle de la tête - Head angle : Mouvement du lacet / Yaw movement :		N/A		X	Y	Z
		N/A				
		N/A				
		N/A				
Cible de tête / Head target :		4174	-99	1331	-	-

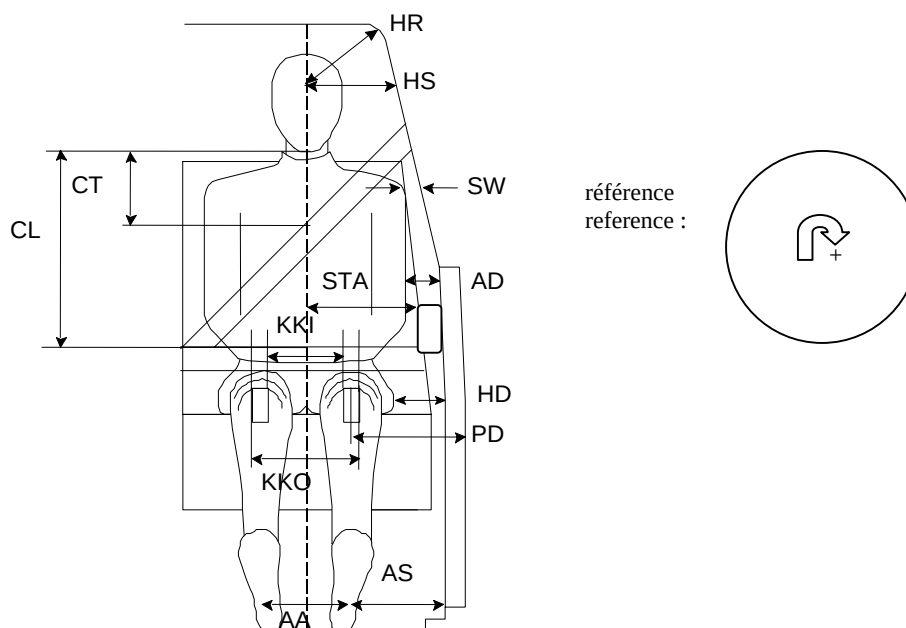
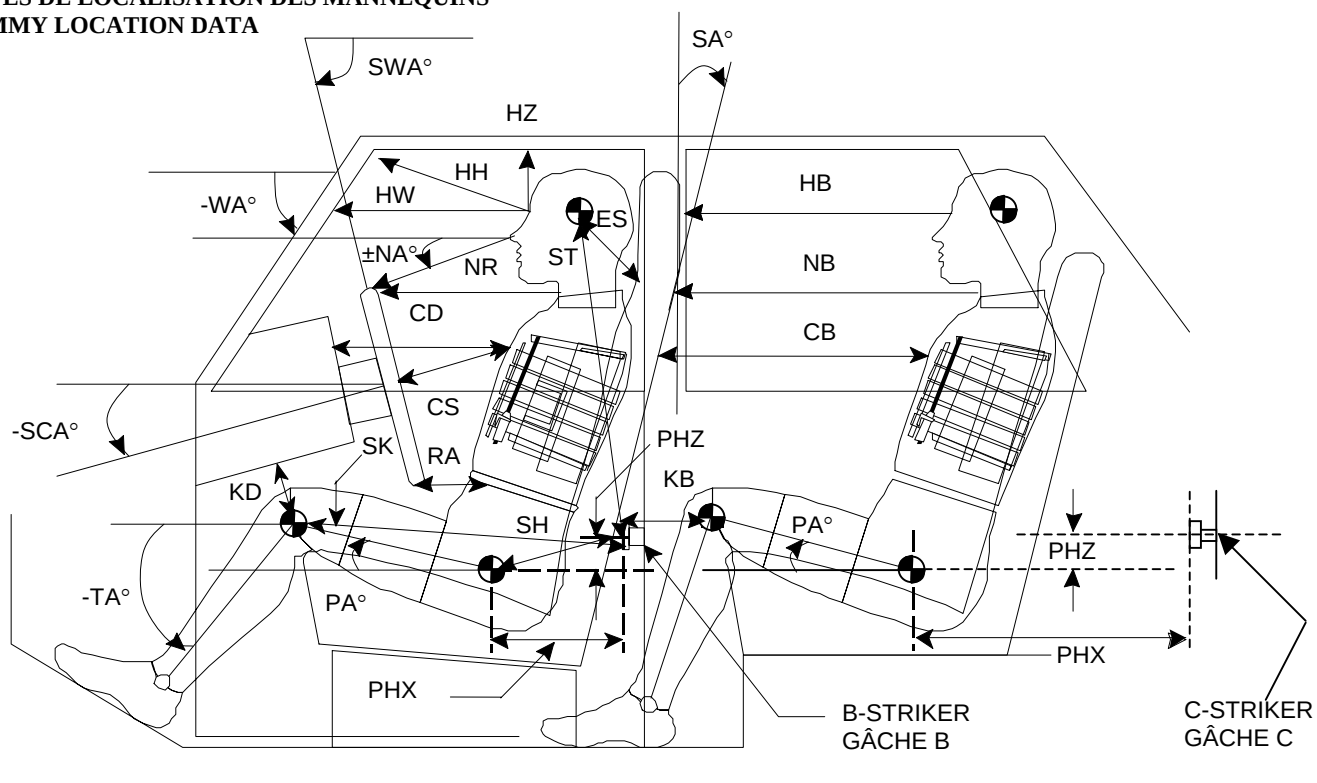
Point de référence : Centre transversal du véhicule, au point le plus avancé, au niveau du sol. Selon SAE J182a.
Reference point : Transversal center of the vehicle, at the foremost point and at ground level. As per SAE J182a.

Passager arrière gauche : Rear left passenger :	Hybrid III (10 ans / 10 years old)				
	Méthodes d'attaches : Attachment methods:	Siège / Seat : ceinture boudrier gauche / left shoulder belt Enfant / Child : ceinture boudrier gauche / left shoulder belt			
	Manufacturier du siège : Seat manufacturer :	3rd row Graco Turbo Booster			
	Modèle du siège : Seat model :	8675FIRCA			
	No. de série du siège : Seat serial number :	N/A			
	Date de fabrication du siège : Seat fabrication date :	1/8/2005			

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COTES DE LOCALISATION DES MANNEQUINS

DUMMY LOCATION DATA



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**COTES DE LOCALISATION DES MANNEQUINS (suite)
DUMMY LOCATION DATA (continued)**

(Mesures prises en mm / Measurements taken in mm)

DESCRIPTION	CODE	CONDUCTEUR DRIVER	PASSAGER Av. F. PASSENGER	PASSAGER Arr.G. L.R. PASSENGER	PASSAGER Arr.D. R.R. PASSENGER
De cheville à cheville (boulon extérieur) Ankle to ankle (exterior bolt)	AA	300	260		
Genou à genou (plaque) Intérieur / Interior Centre / Center Knee to knee (plate) Extérieur / Extérieur	KKI	110	90		
	KKC	180	160		
	KKO	250	230		
De la cheville jusqu'au seuil de porte (horizontalement) Ankle to door sill (horizontal)	AS	190	135		
Centre du genou au tableau de bord ou siège horizontalement (minimum) Knees centre to dash or seat back horizontal (minimum)	KDL	95	75		
	KDR	85	75		
Sternum au tableau de bord (horizontalement) Chest to dash (horizontal)	CD		430		
Milieu du sternum au centre du moyeu du volant ou siège avant Mid sternum to steering hub center or front seat	CS/CB	270			
Milieu du front jusqu'au pare-brise (horizontalement) Mid forehead to windshield (horizontal)	HW	749	738		
Milieu du front jusqu'au haut du pare-brise Mid forehead to windshield header	HH	410	396		
Nez à la jante du volant de direction (haut) ou siège avant Nose to steering wheel rim (top) or front seat	NR/HB	345			
Milieu du front jusqu'au début du toit Mid forehead to edge roof	HR	290	300		
Haut de l'oreille au haut du siège avant Ear top to front seat top	ES	250	240		
Menton au haut de la ceinture sous-abdominale (verticalement) Chin to lap belt upper edge (vertical)	CL	370	340		
Menton au haut de la ceinture baudrier (verticalement) Chin to thorax belt upper edge (vertical)	CT	160	140		
Milieu du front à la fenêtre latérale (horizontalement) Mid forehead to side window (horizontal)	HS	348	340		
La rotule à la porte (horizontalement) Patella to door (horizontal)	PD	213	198		
Du point-H à la porte (horizontalement) H-point to door (horizontal)	HD	218	223		
Du milieu du bras à la porte (horizontalement) Mid upper arm to door (horizontal)	AD	133	165		
Cou jusqu'au volant ou tableau de bord (horizontalement) ou siège avant Neck to steering wheel or dash board (horizontal) or front seat	NB	440	570		
Épaule à la fenêtre de côté Shoulder to side window	SW	185	195		
Abdomen à l'appui-bras Abdomen to armrest	STA	165	165		
Milieu du front au toit (verticalement) Mid forehead to roof (vertical)	HZ	280	280		
Tête au loquet (plan (x,z)) Striker to head ((x,z) plan)	ST	544	551		
Abdomen à la jante du volant de direction (bas) Steering wheel rim to abdomen (bottom)	RA	170			
Genou au loquet (plan (x,z)) Striker to knee ((x,z) plan)	SK	636	642		
Point-H au loquet (plan (x,z)) Striker to H-Point ((x,z) plan)	SH	306	310		
Point-H au loquet en X (horizontalement) Striker to H-Point in X (horizontal)	PHX	305	308		
Point-H au loquet en Z (verticalement) Striker to H-Point in Z (vertical)	PHZ	29	39		

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COTES DE LOCALISATION DES MANNEQUINS (suite)

DUMMY LOCATION DATA (continued)

(Mesures prises en deg. / Measurements taken in deg.)

DESCRIPTION	CODE	CONDUCTEUR DRIVER	PASSAGER Av. F. PASSENGER	PASSAGER Arr.G. L.R. PASSENGER	PASSAGER Arr.D. R.R. PASSENGER
Angle du volant Steering wheel angle	+SWA	69.2°			
Angle du pare-brise Windshield angle	-WA	-29.0°			
Angle de la colonne de direction Steering column angle	-SCA	-18.2°			
Angle du tibia gauche Left tibial angle	-TA	-23.3°	-24.0°		
Angle du tibia droit Right tibial angle	-TA	-23.0°	-18.7°		
Angle pelvis Pelvic angle	+PA	20.5°	21.4°		
Angle du nez à la jante de direction (haut) Nose to steering wheel rim (top) angle	±NA	-2.5°			
Angle du dossier Seat back angle	+SA	-	-		
Angle ST (horizontalement) ST angle (horizontal)	+ST-A	74.2°	71.3°		
Angle SK (horizontalement) SK angle (horizontal)	±SK-A	4.1°	5.1°		
Angle SH (horizontalement) SH angle (horizontal)	-SH-A	-5.4°	-7.2°		

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**MESURES DE MANNEQUIN DAE
TEST DUMMY MEASUREMENTS**

CONDUCTEUR / DRIVER

Description et emplacement du Mannequin
ATD description and location :

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Centre de gravité de la tête, extérieur - Head CG, outboard	2355	-482	1268
Base du nez - Glabella (root of nose)	2266	-415	1286
Menton - Chin (bottom)	2262	-416	1176
Jonction menton et cou - Chin / neck junction	2333	-416	1190
Thorax au niveau des côtes supérieures - Chest at upper rib level	2241	-419	1017
Thorax au niveau des côtes inférieures - Chest at lower rib level	2211	-414	911
Boulon supérieur avant de l'épaule, ext. - Shoulder bolt, top front outboard	2380	-575	1047
Boulon supérieur avant de l'épaule, int. - Shoulder bolt, top front inboard	2384	-259	1050
Boulon du coude, extérieur - Elbow bolt, outboard	2201	-678	972
Boulon du coude, intérieur - Elbow bolt, inboard	2195	-156	988
Boulon du poignet, extérieur - Wrist bolt, outboard	2007	-627	1055
Boulon du poignet, intérieur - Wrist bolt, inboard	1999	-190	1075
Point d'articulation de la hanche, extérieur - Hip point, outboard	2285	-536	752
Boulon du genou gauche, extérieur - Knee bolt, left leg, outboard	1868	-535	790
Boulon de la cheville gauche, extérieur - Ankle bolt, left leg , outboard	1698	-498	491
Point du talon gauche - Heel point, left leg	1761	-499	383
Plante du pied gauche vs plancher - Ball of foot at toeboard contact, left leg	1629	-529	413
Boulon du genou droit, intérieur - Knee bolt, right leg , inboard	1866	-351	774
Boulon de la cheville droite, intérieur - Ankle bolt, right leg , inboard	1681	-255	502
Point du talon droit - Heel point, right leg	1721	-248	382
Plante du pied droit vs plancher - Ball of foot at toeboard contact, right leg	1598	-273	437

Remarques – Comments : Aucune / None.

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**MESURES DE MANNEQUIN DAE
TEST DUMMY MEASUREMENTS**

PASSAGER / PASSENGER

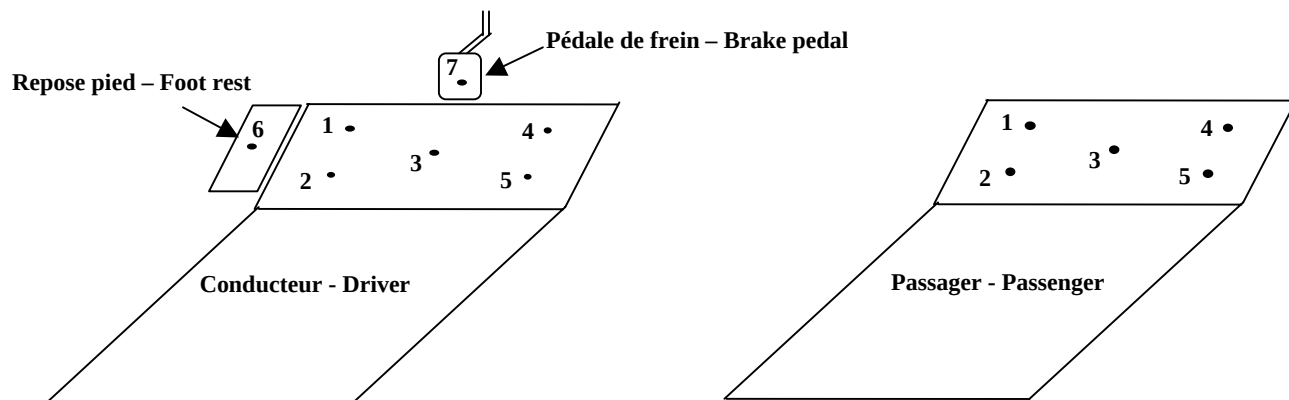
Description et emplacement du Mannequin
ATD description and location:

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Centre de gravité de la tête, extérieur - Head CG, outboard	2323	490	1265
Base du nez - Glabella (root of nose)	2234	425	1278
Menton - Chin (bottom)	2234	425	1171
Jonction menton et cou - Chin / neck junction	2303	425	1201
Thorax au niveau des côtes supérieures - Chest at upper rib level	2210	417	974
Thorax au niveau des côtes inférieures - Chest at lower rib level	2182	417	861
Boulon supérieur avant de l'épaule, ext. - Shoulder bolt, top front outboard	2346	572	1030
Boulon supérieur avant de l'épaule, int. - Shoulder bolt, top front inboard	2342	260	1041
Boulon du coude, extérieur - Elbow bolt, outboard	2295	627	818
Boulon du coude, intérieur - Elbow bolt, inboard	2280	213	836
Boulon du poignet, extérieur - Wrist bolt, outboard	2085	584	790
Boulon du poignet, intérieur - Wrist bolt, inboard	2069	255	801
Point d'articulation de la hanche, extérieur - Hip point, outboard	2279	536	747
Boulon du genou gauche, intérieur - Knee bolt, left leg, inboard	1855	382	788
Boulon de la cheville gauche, intérieur - Ankle bolt, left leg, inboard	1679	353	496
Point du talon gauche - Heel point, left leg	1737	351	390
Plante du pied gauche vs plancher - Ball of foot at toeboard contact, left leg	1606	390	416
Boulon du genou droit, extérieur - Knee bolt, right leg, outboard	1861	543	798
Boulon de la cheville droite, extérieur - Ankle bolt, right leg, outboard	1712	534	490
Point du talon droit - Heel point, right leg	1775	536	388
Plante du pied droit vs plancher - Ball of foot at toeboard contact, right leg	1647	587	412

Remarques – Comments : Aucune / None.

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MESURES PLANCHER / FOOTWELL MEASUREMENTS

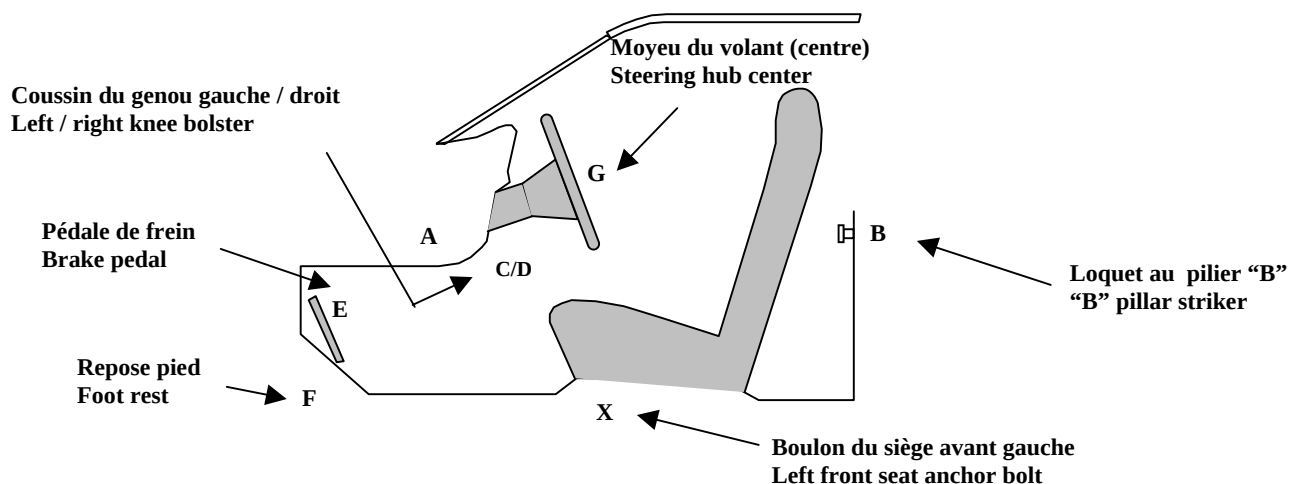


N° Cible	AVANT ESSAI	APRÈS ESSAI	
Target No.	PRE- TEST	POST- TEST	Δ mm
1	x	1366	1372
	y	-422	-409
	z	470	498
2	x	1509	1511
	y	-455	-443
	z	409	429
3	x	1439	1443
	y	-320	-307
	z	436	458
4	x	1381	1386
	y	-231	-219
	z	460	483
5	x	1515	1519
	y	-212	-201
	z	399	418
6	x	1496	1501
	y	-602	-589
	z	479	501
7	x	1496	1502
	y	-380	-369
	z	549	570

N° Cible	AVANT ESSAI	APRÈS ESSAI	
Target No.	PRE- TEST	POST- TEST	Δ mm
1	x	1381	1379
	y		
	z		
2	x	1515	1510
	y		
	z		
3	x	1417	1416
	y		
	z		
4	x	1382	1385
	y	579	587
	z	540	570
5	x	1480	1478
	y	582	592
	z	453	477

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PÉNÉTRATION DE L'HABITACLE DU CONDUCTEUR (Distances en mm)
DRIVER COMPARTMENT INTRUSION (Distances in mm)



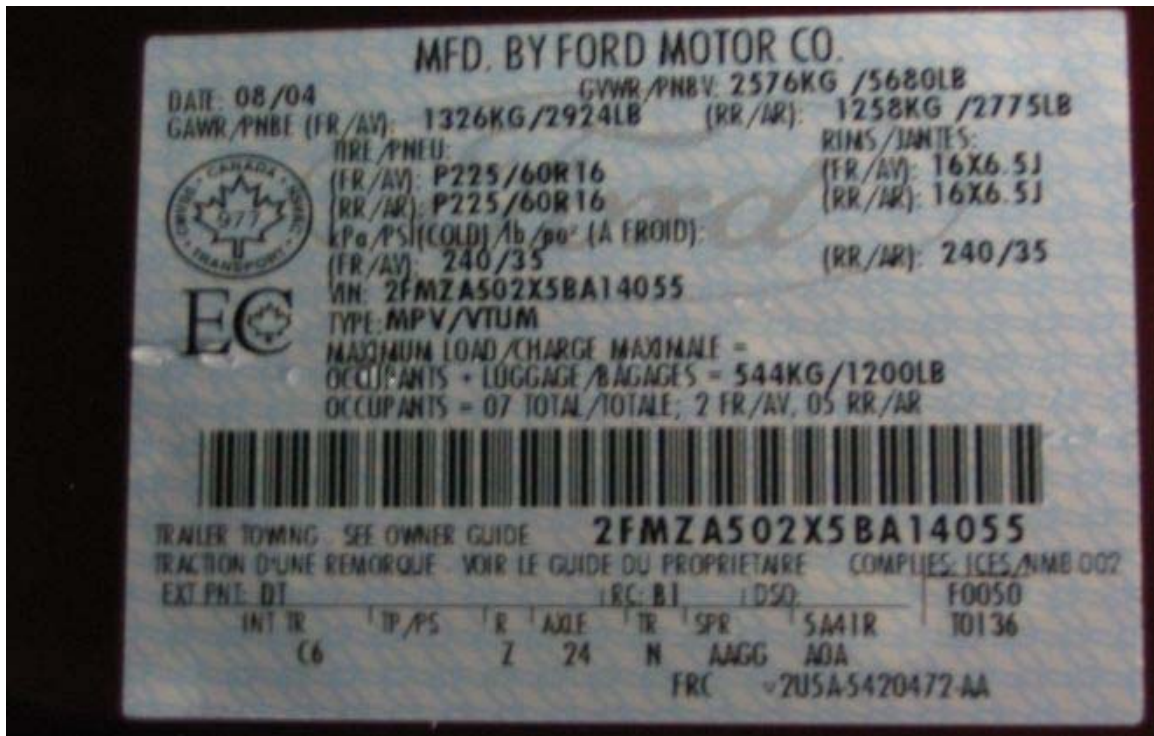
Habitacle du conducteur
Driver's compartment

	DESCRIPTION	Avant essai / Pre-test			Après essai / Post-test		
		X	Y	Z	X	Y	Z
A	Ouverture de porte Door opening	1646	-867	1082	1650	-859	1099
B	Loquet au pilier "B" "B" pillar striker	2503	-832	745	2506	-828	751
C	Coussin du genou gauche Left knee bolster	-	-	-	-	-	-
D	Coussin du genou droit Right knee bolster	-	-	-	-	-	-
E	Pédale de frein Break pedal	1496	-380	549	1502	-369	570
F	Repose pied Foot rest	1496	-602	479	1501	-589	501
G	Moyeu du volant (centre) Steering hub (center)	1974	-412	1034	1958	-406	1067
X	Boulon du siège avant gauche Left front seat anchor bolt	2101	-592	352	2103	-586	360

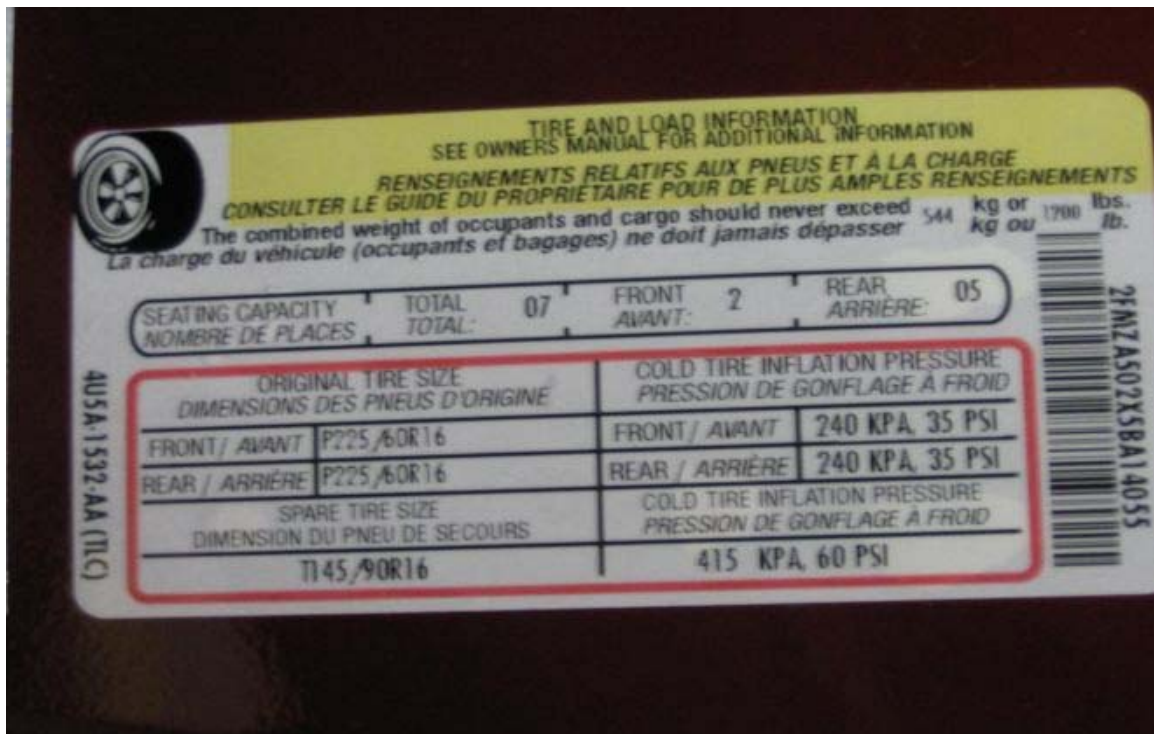
APPENDICE / APPENDIX A

**PHOTOGRAPHIES DE L'ESSAI
TEST PHOTOGRAPHS**

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1. Étiquette de déclaration de conformité du véhicule d'essai.
Statement of compliance label of the test vehicle.



2. Étiquette d'information des pneus.
Tire information label.

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3. Vue $\frac{3}{4}$ avant du véhicule d'essai.
 $\frac{3}{4}$ front view of the test vehicle.



4. Vue $\frac{3}{4}$ arrière du véhicule d'essai.
 $\frac{3}{4}$ rear view of the test vehicle.

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5. Vue générale côté gauche du véhicule d'essai, avant essai.
Left side view of the test vehicle, pre-test.



6. Vue générale côté gauche du véhicule d'essai, après essai.
Left side view of the test vehicle, post-test.

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7. Vue arrière du véhicule d'essai, avant essai.
Rear view of the test vehicle, pre-test.



8. Vue arrière du véhicule d'essai, après essai.
Rear view of the test vehicle, post-test.

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9. Vue générale côté droit du véhicule d'essai, avant essai.
General right side view of the test vehicle, pre-test.



10. Vue générale côté droit du véhicule d'essai, après essai.
General right side view of the test vehicle, post-test.

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11. Vue avant du véhicule d'essai, avant essai.
Front view of the test vehicle, pre-test.



12. Vue avant du véhicule d'essai, après essai.
Front view of the test vehicle, post-test.

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13. Vue de plan du véhicule d'essai, avant essai.
Over view of the test vehicle, pre-test.

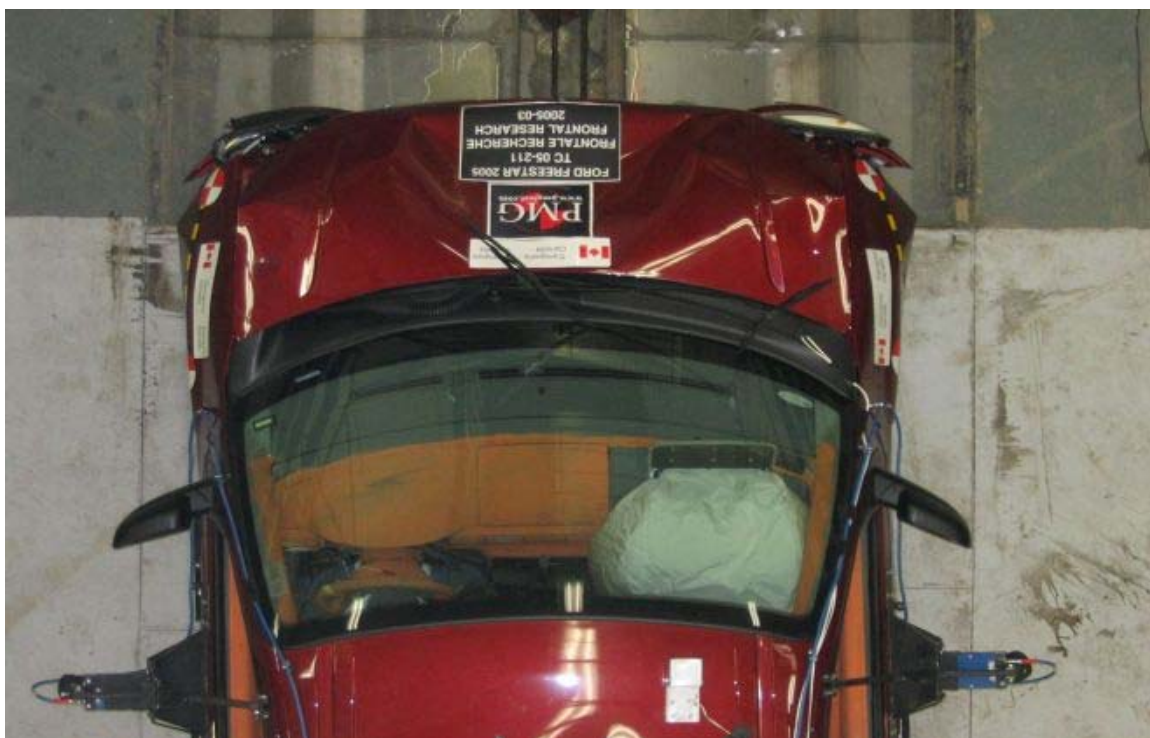


14. Vue de plan du véhicule d'essai, après essai.
Over view of the test vehicle, post-test.

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15. Vue de plan du devant du véhicule d'essai, avant essai.
Over view of the front part of the test vehicle, pre-test.

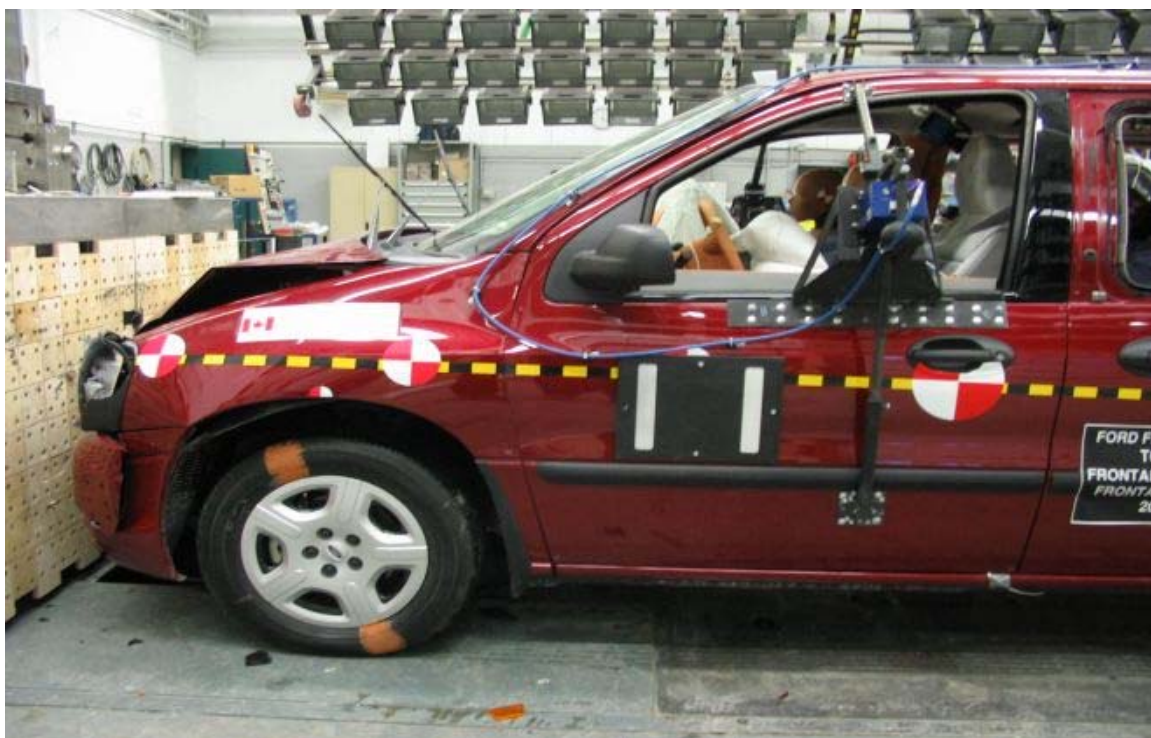


16. Vue de plan du devant du véhicule d'essai, après essai.
Over view of the front part of the test vehicle, post-test.

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17. Vue côté gauche de l'avant du véhicule d'essai, avant essai.
Left side view of front of test vehicle, pre-test.



18. Vue côté gauche de l'avant du véhicule d'essai, après essai.
Left side view of front of test vehicle, post-test.

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19. Vue côté droit de l'avant du véhicule d'essai, avant essai.
Right side view of front of test vehicle, pre-test.



20. Vue côté droit de l'avant du véhicule d'essai, après essai.
Right side view of front of test vehicle, post-test.

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21. Vue du compartiment moteur du véhicule d'essai, avant essai.
Engine compartment view of the vehicle, pre-test.



22. Vue du compartiment moteur du véhicule d'essai, après essai.
Engine compartment view of the vehicle, post-test.

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23. Vue du dessous du compartiment moteur, avant essai.
Under view of the engine compartment , pre-test.



24. Vue du dessous du compartiment moteur, après essai.
Under view of the engine compartment , post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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25. Position du conducteur, avant essai.
Driver's position, pre-test.



26. Position du conducteur, après essai.
Driver's position, post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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27. Point de contact de tête du conducteur, après essai.
Driver's head contact point, post-test.



28. Point de contact de tête du conducteur, après essai.
Driver's head contact point, post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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29. Point de contact des genoux du conducteur, après essai.
Driver's knees contact point, post-test.



30. Contact du volant sur l'abdomen du conducteur, après essai.
Steering wheel's contact point with driver's abdomen.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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31. Position du passager, avant essai.
Passenger's position, pre-test.



32. Position du passager, après essai.
Passenger's position, post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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33. Point de contact de tête du passager, après essai.
Passenger's head contact point, post-test.



34. Point de contact de tête du passager, après essai.
Passenger's head contact point, post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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**35. Point de contact des genoux du passager, après essai.
Passenger's knees contact point, post-test.**

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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36. Position du passager arrière droit, avant essai.
Rear right passenger's position, pre-test.



37. Position du passager arrière droit, après essai.
Rear right passenger's position, post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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38. Position du passager arrière gauche, avant essai.
Rear left passenger's position, pre-test.



39. Position du passager arrière gauche, après essai.
Rear left passenger's position, post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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40. Position du passager arrière centre, 3^e rangée, avant essai.
Rear centre passenger's position, 3rd row, pre-test.



41. Position du passager arrière centre, 3^e rangée, après essai.
Rear centre passenger's position, 3rd row, post-test.

Date de collision Crash date	2005-03-01	Véhicule Vehicle	FORD FREESTAR 2005	T.C. N° T.C.No	05-211
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42. Affichage du lecteur de vitesse.
Speed trap reading.

APPENDICE / APPENDIX B

**DONNÉES GRAPHIQUES
GRAPHICAL DATA**



Nom du client
Client Name **TRANSPORT CANADA**

Type de véhicule
Type of Vehicle **FORD FREESTAR 2005**

Numéro de TC
Tc Number **TC05-211**

Numéro de contrat
Contract No **05-5001**

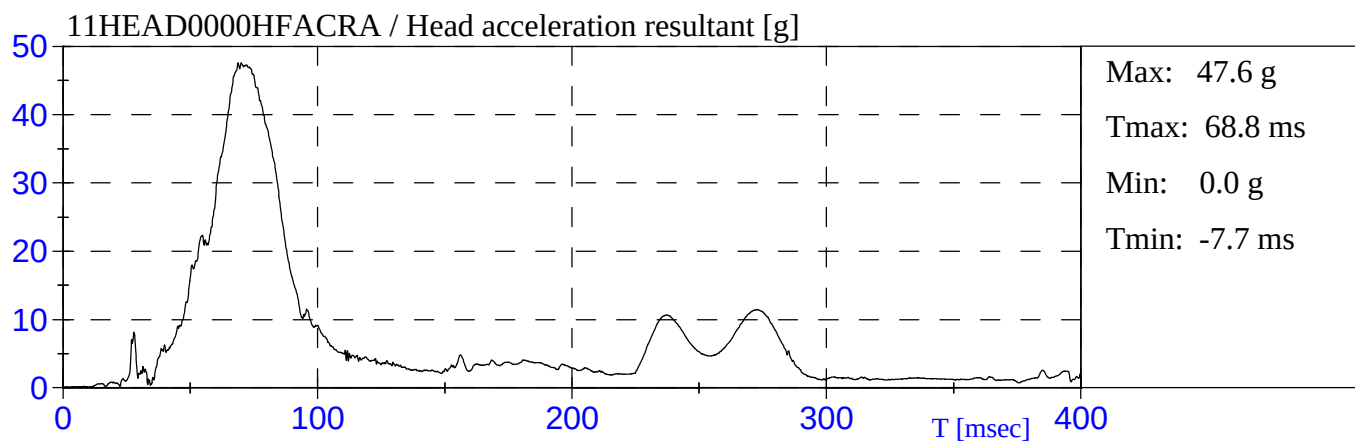
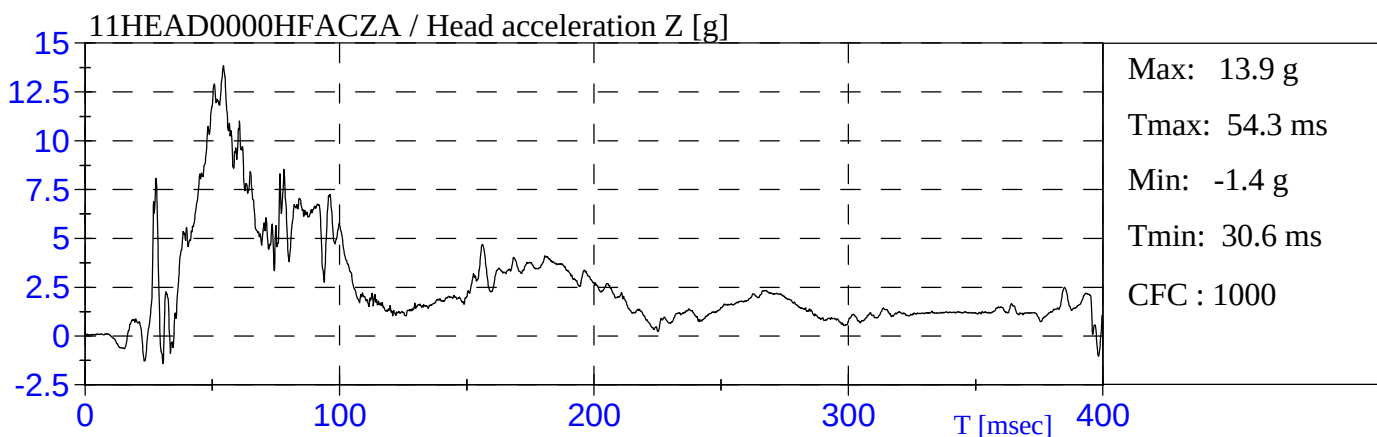
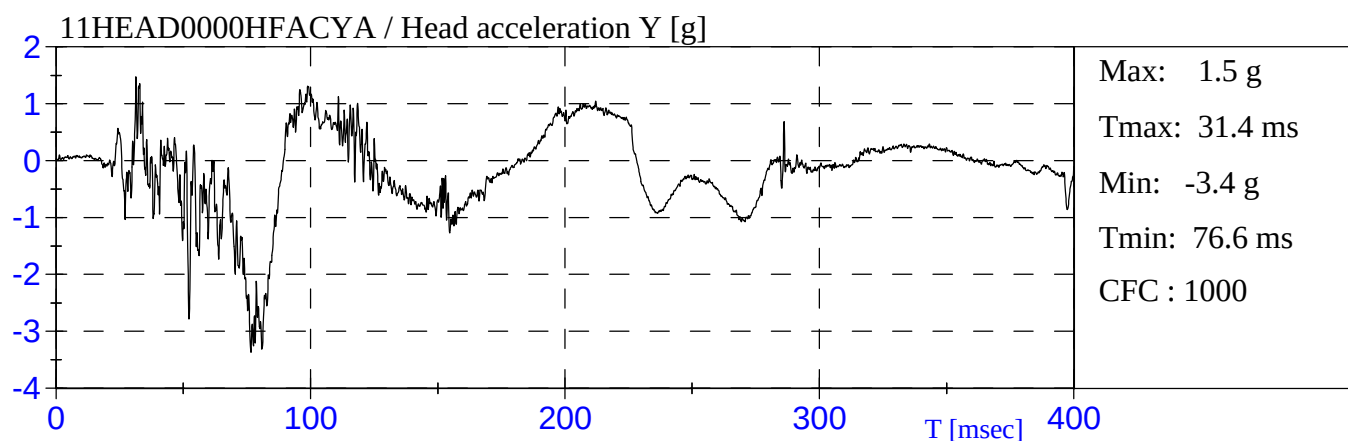
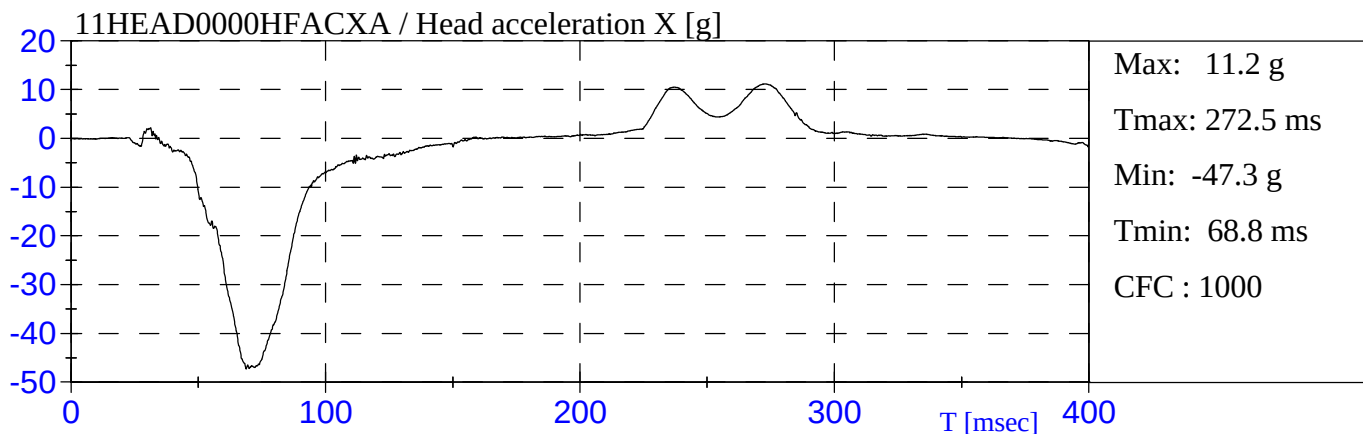
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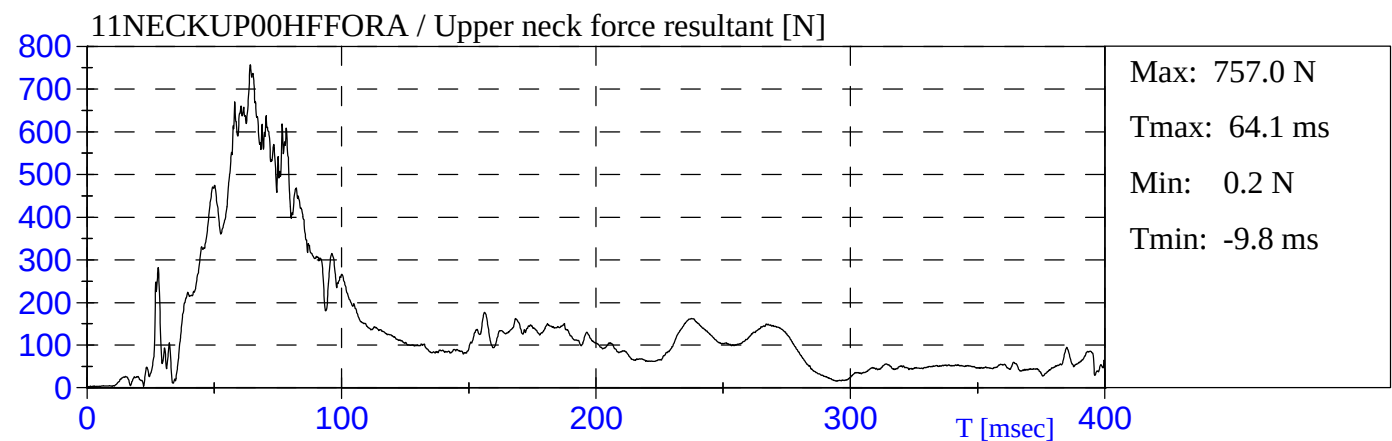
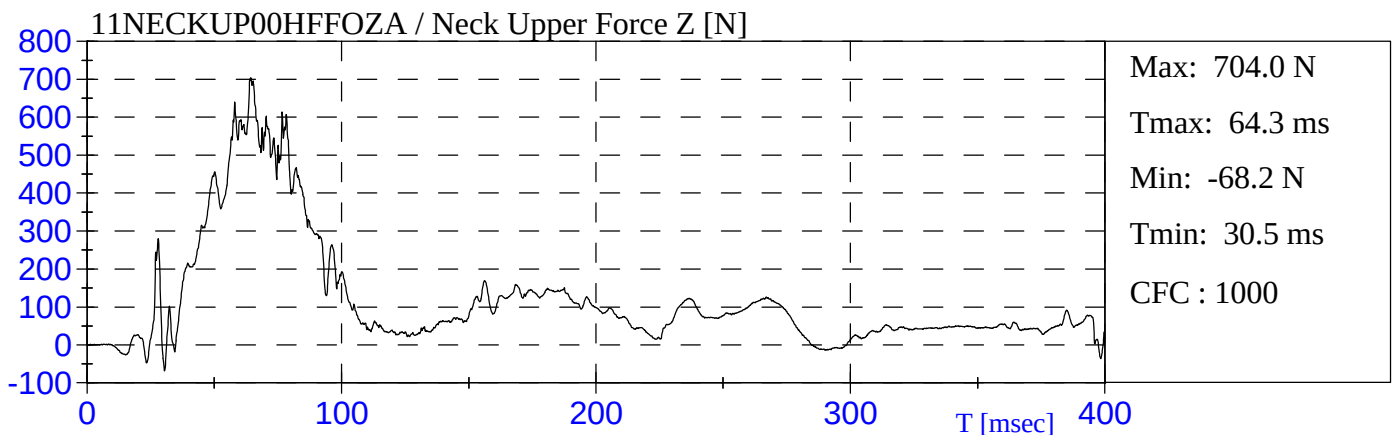
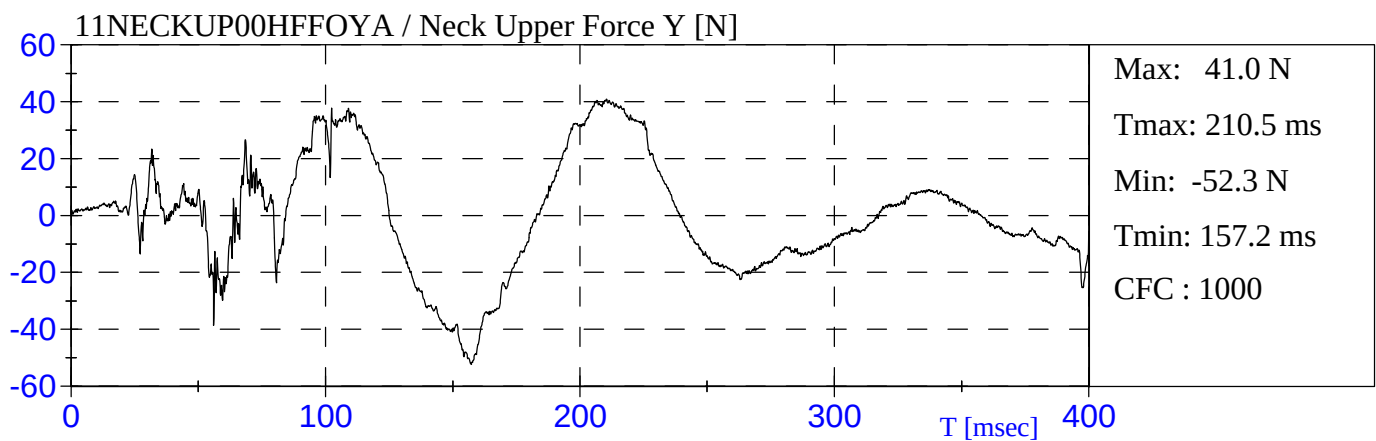
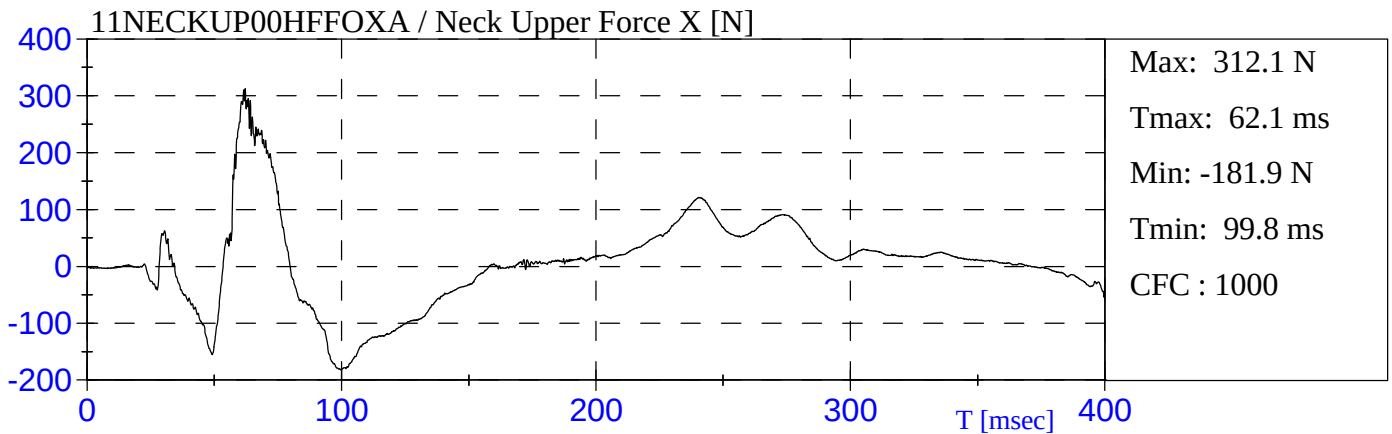
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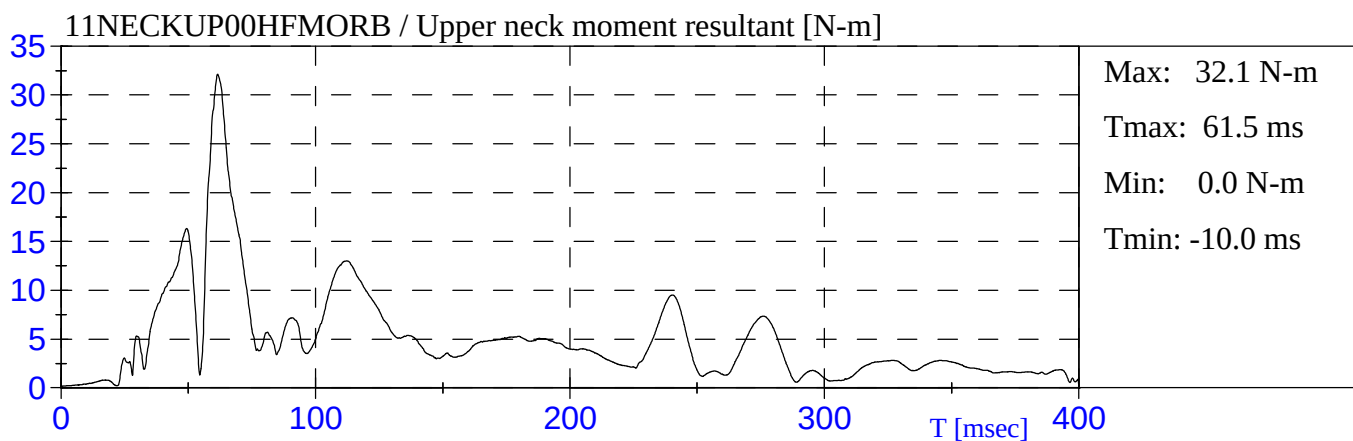
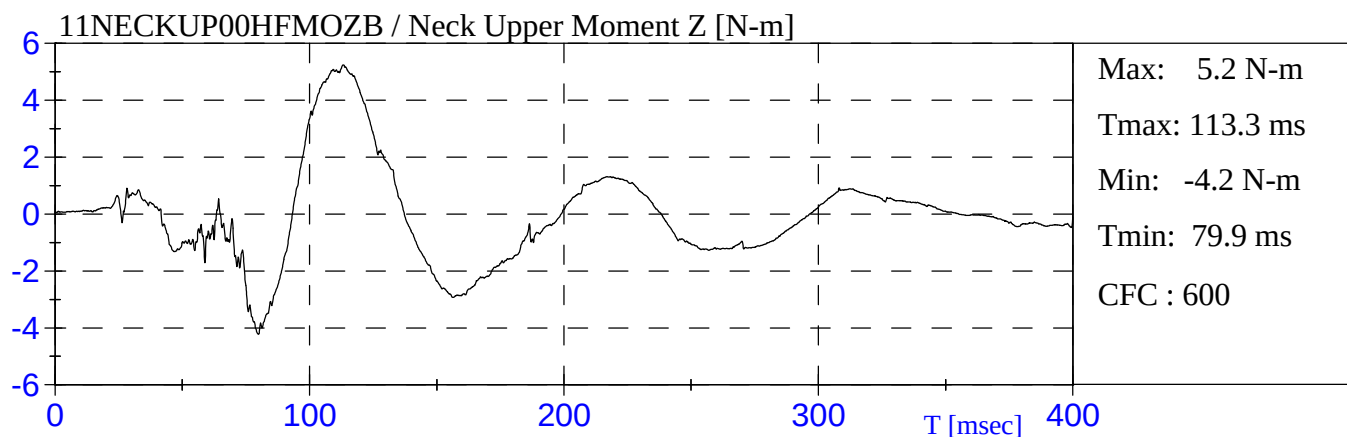
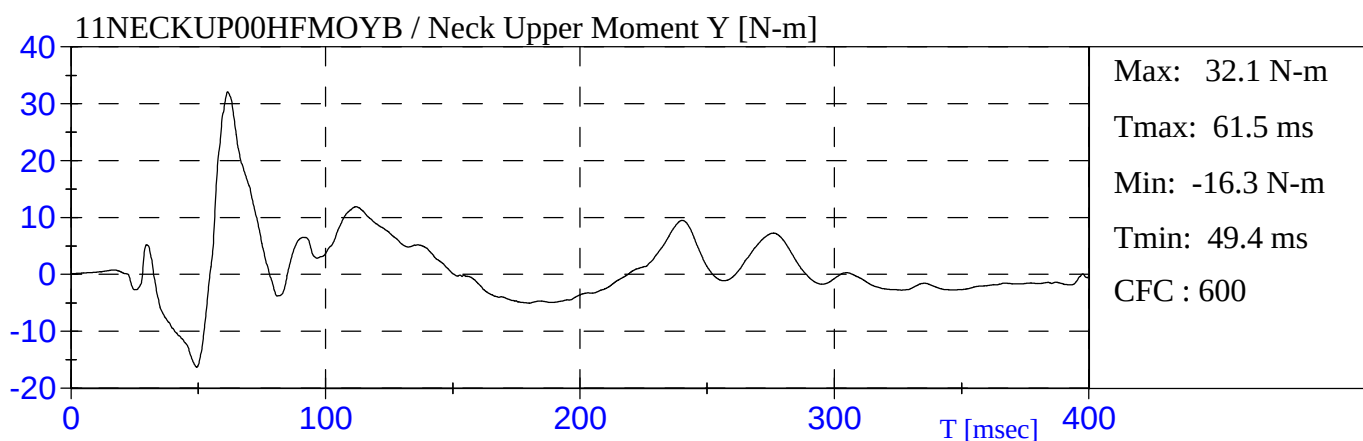
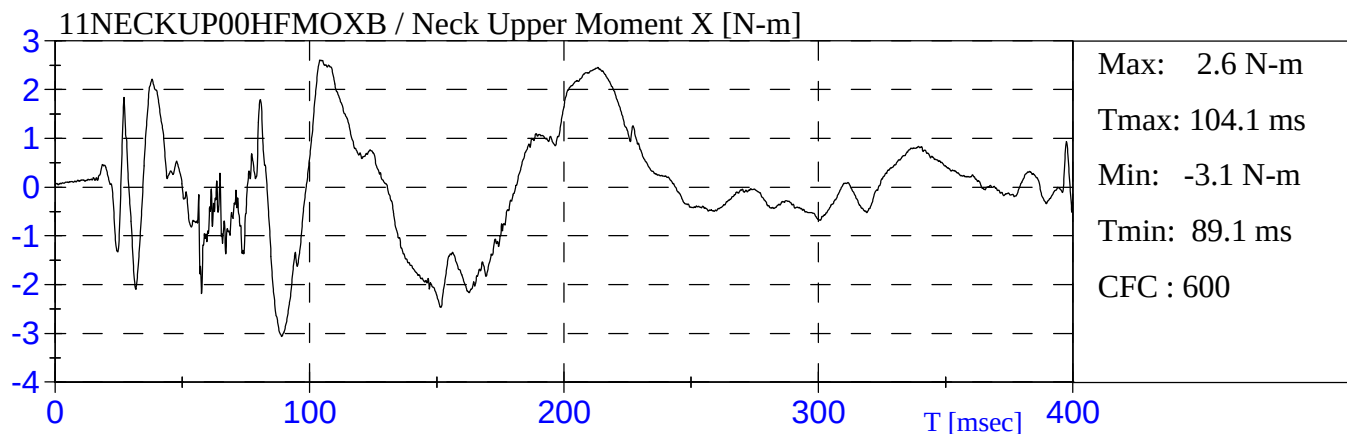
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COLLISION FRONTALE
RESEARCH COLLISION TEST
FRONTAL CRASH

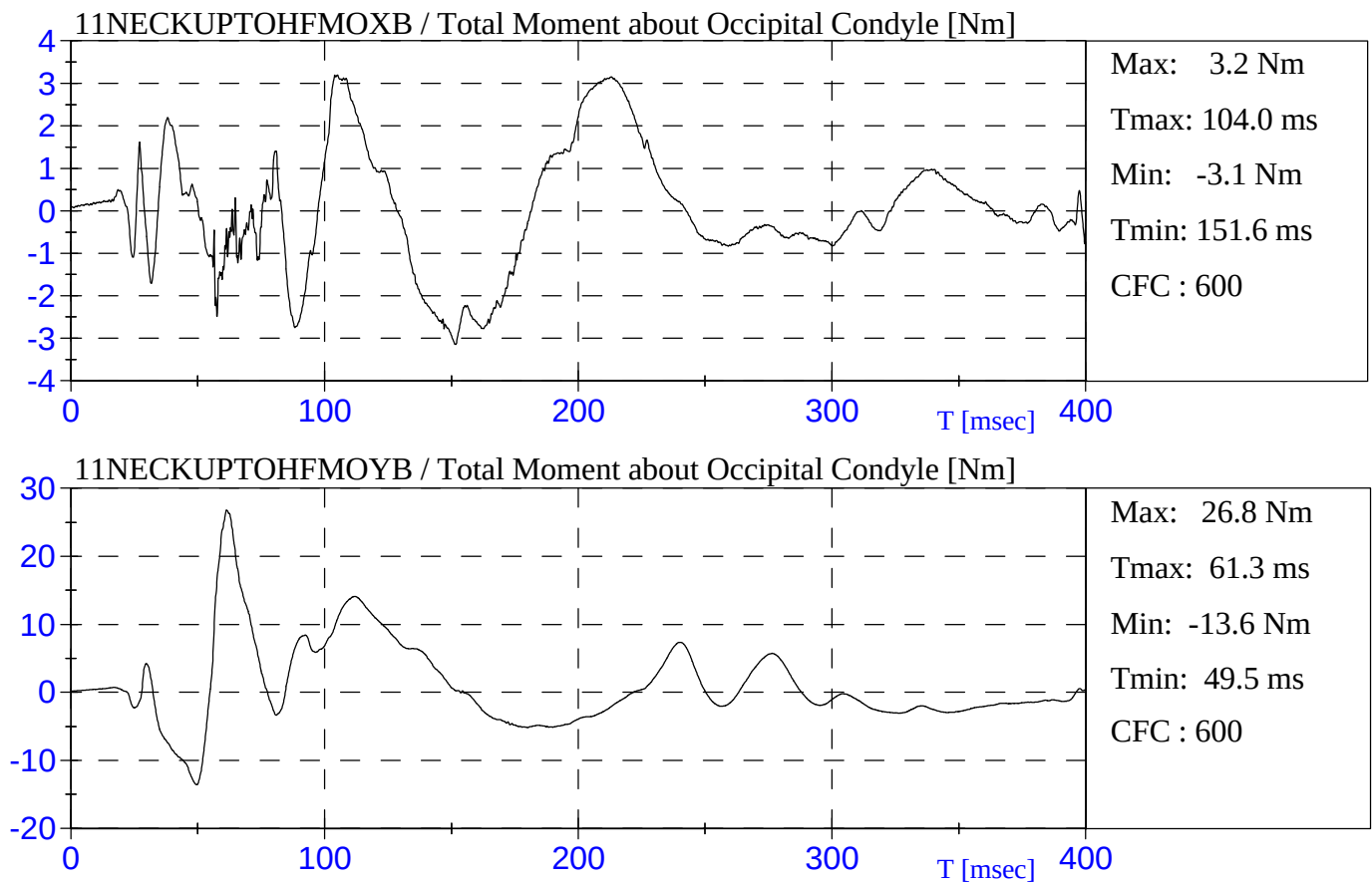
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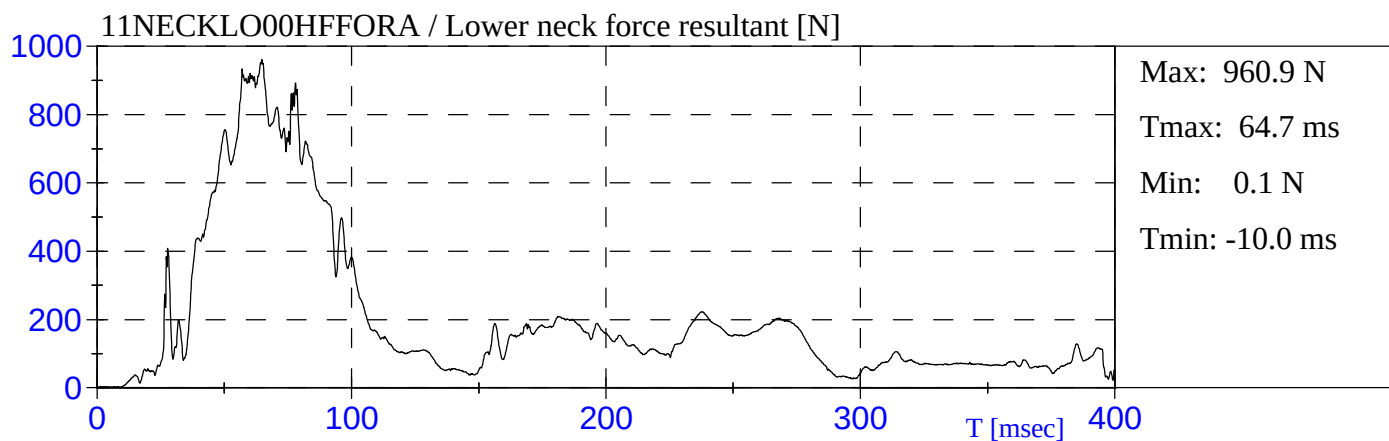
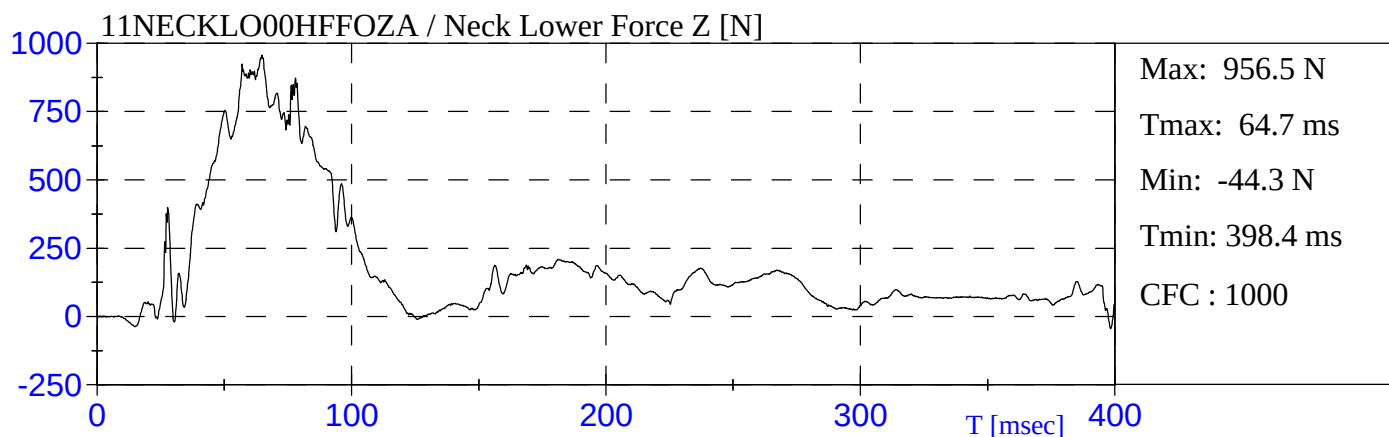
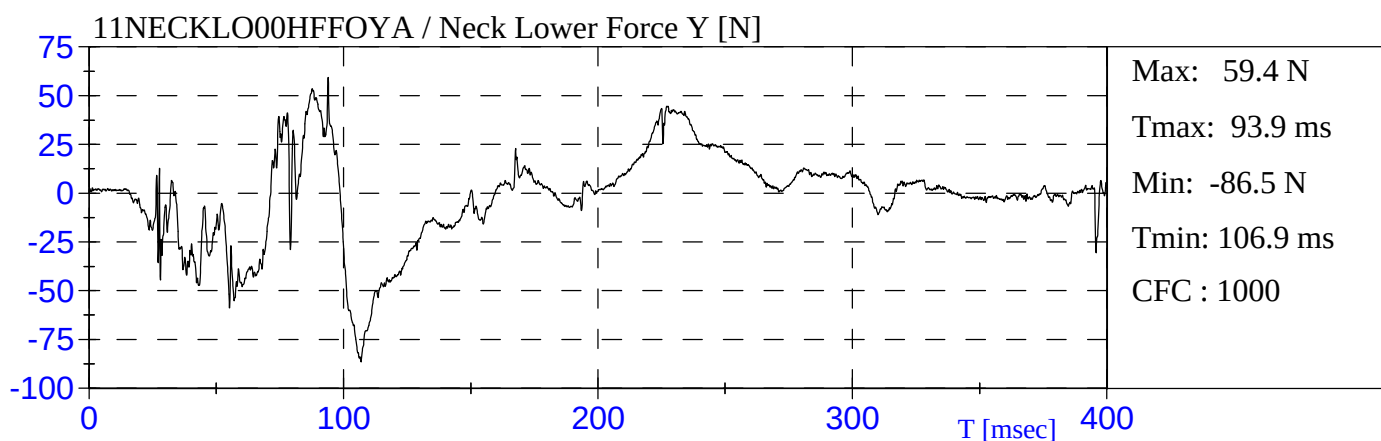
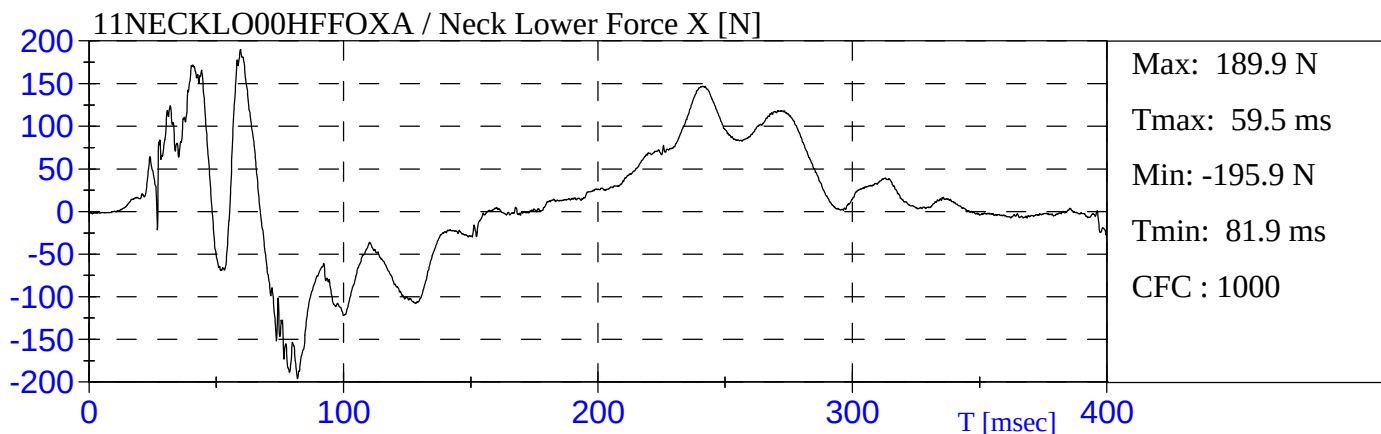
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Position 4	Position 5	Position 6
Y7		Y7
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	Y0	

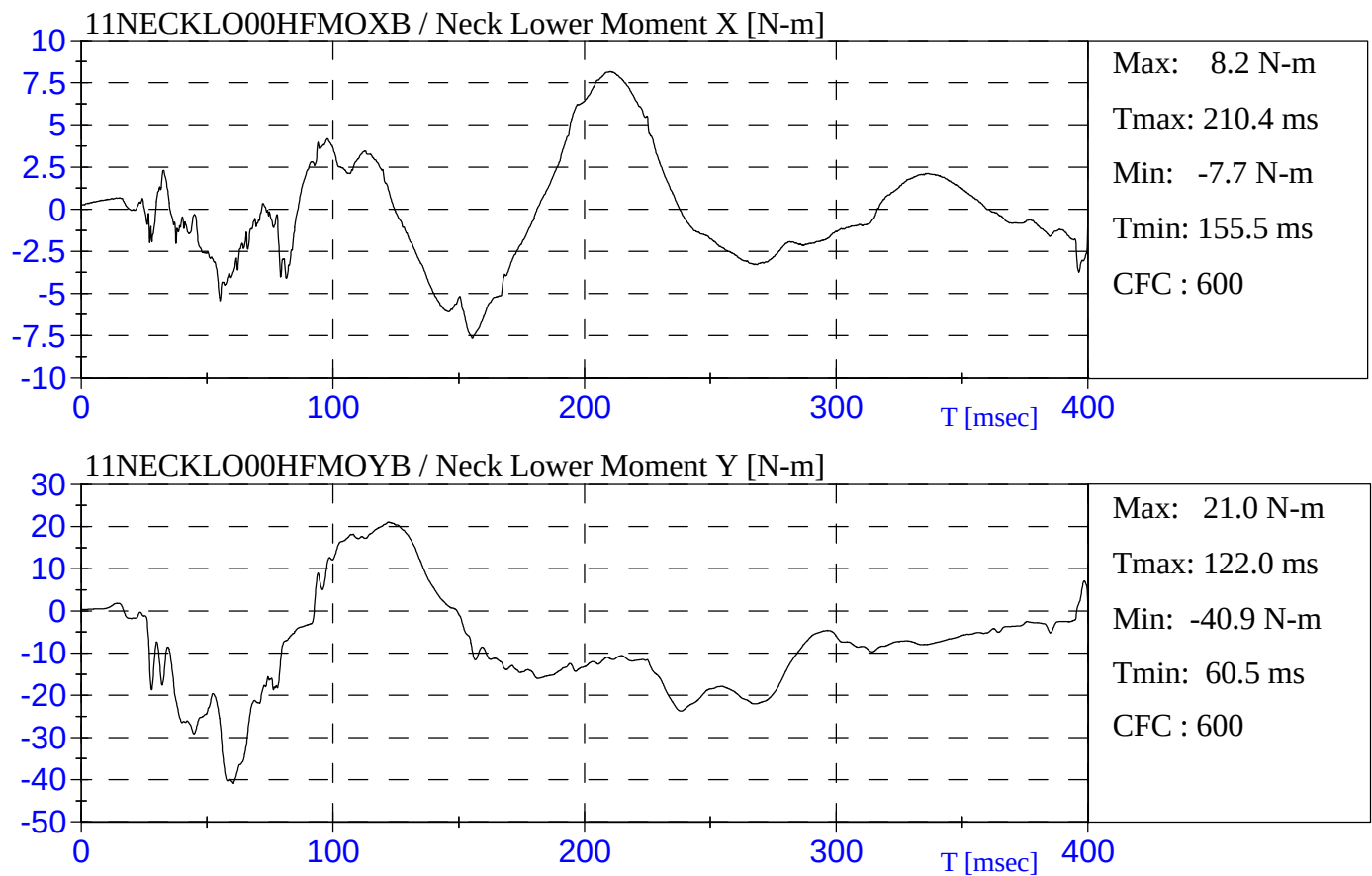


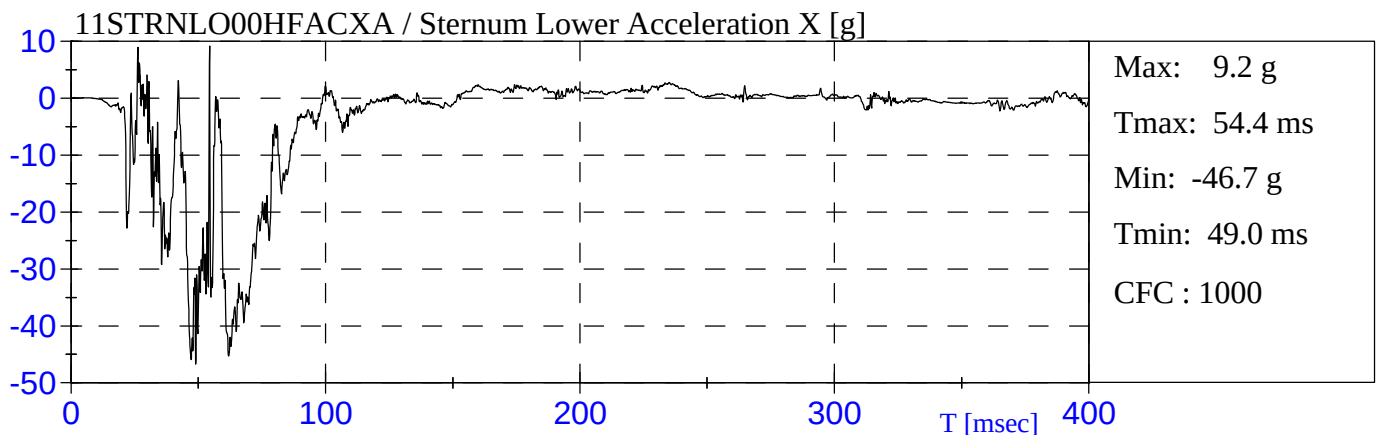
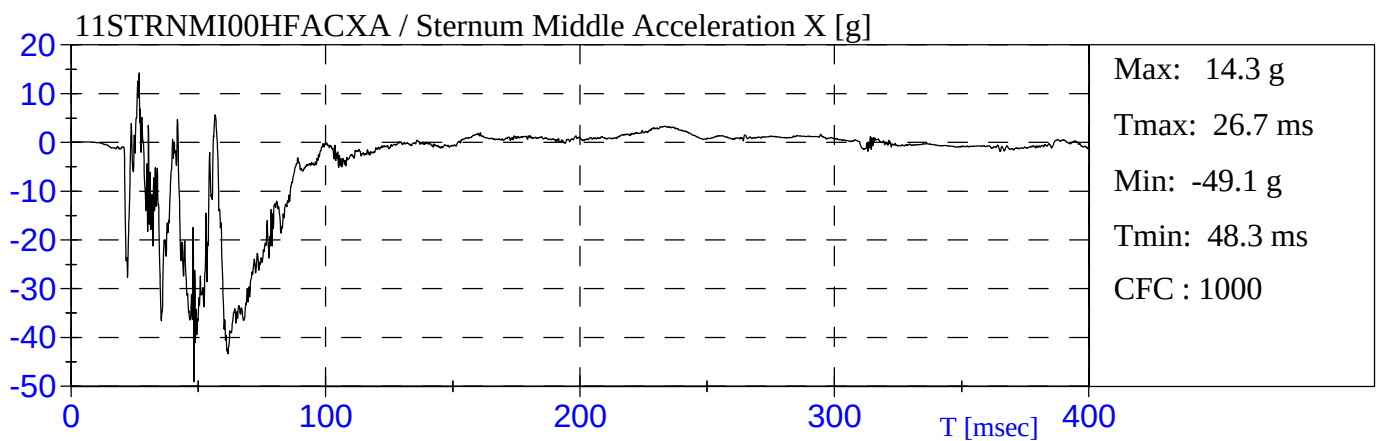
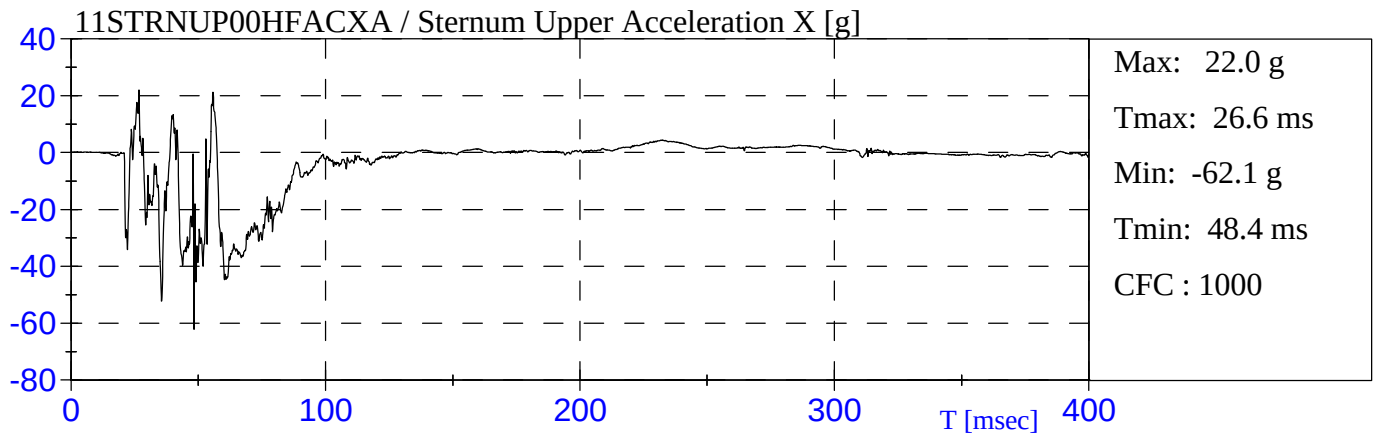


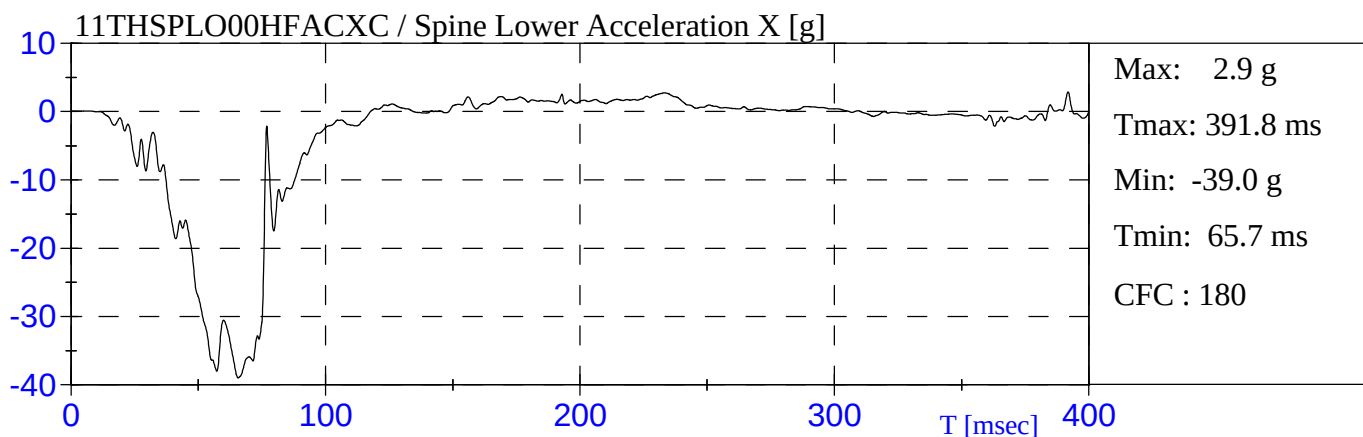
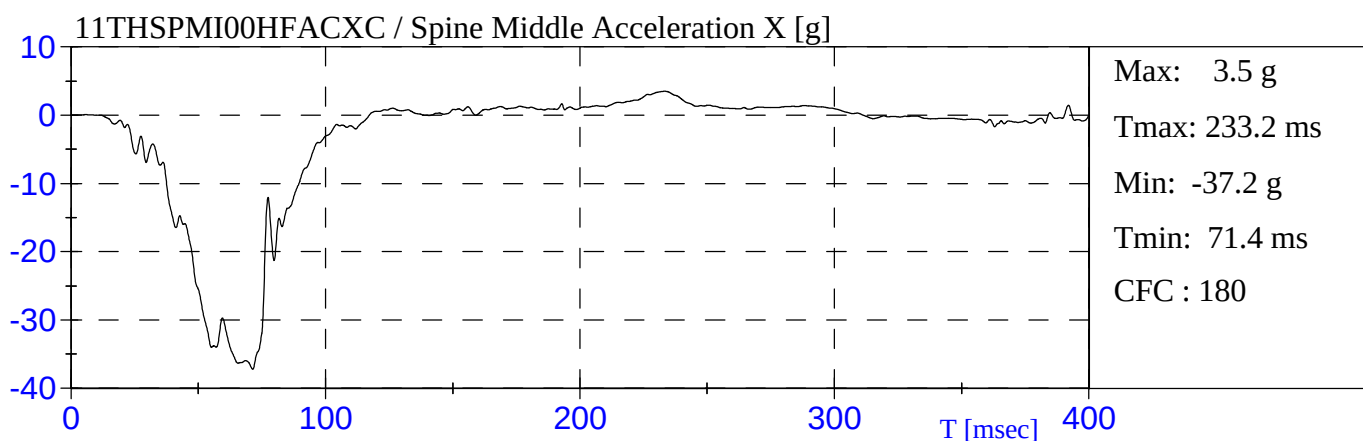
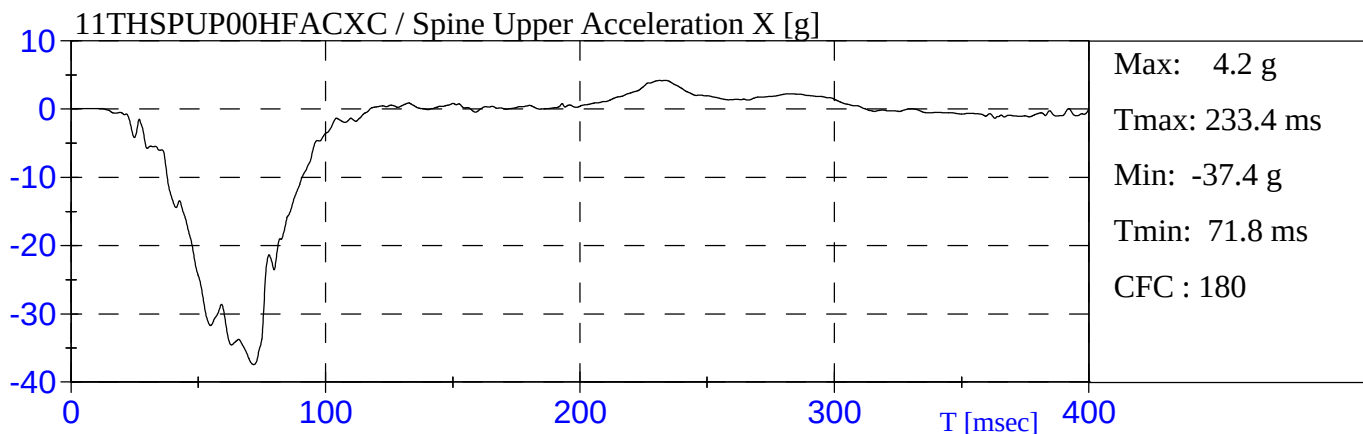


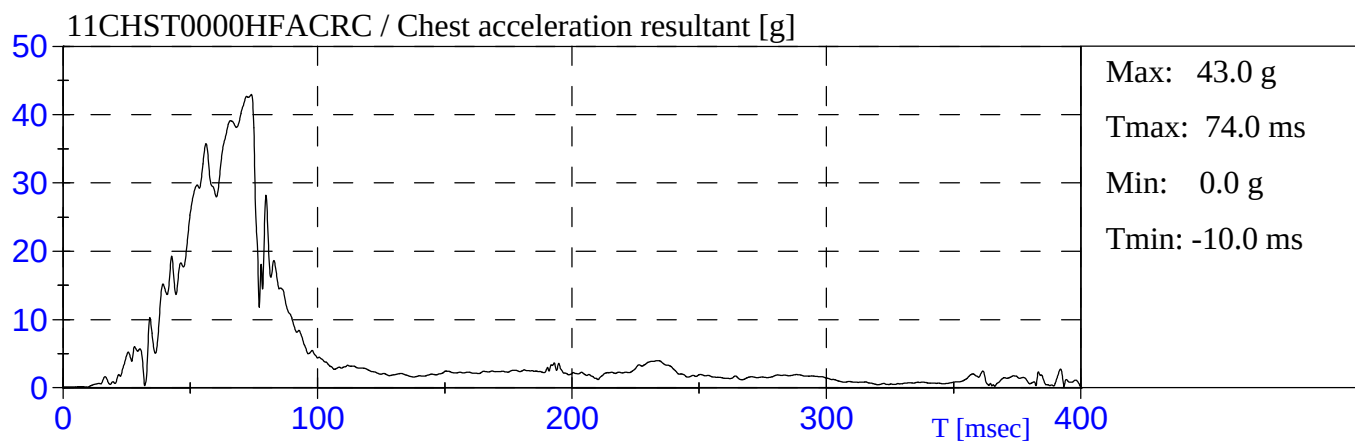
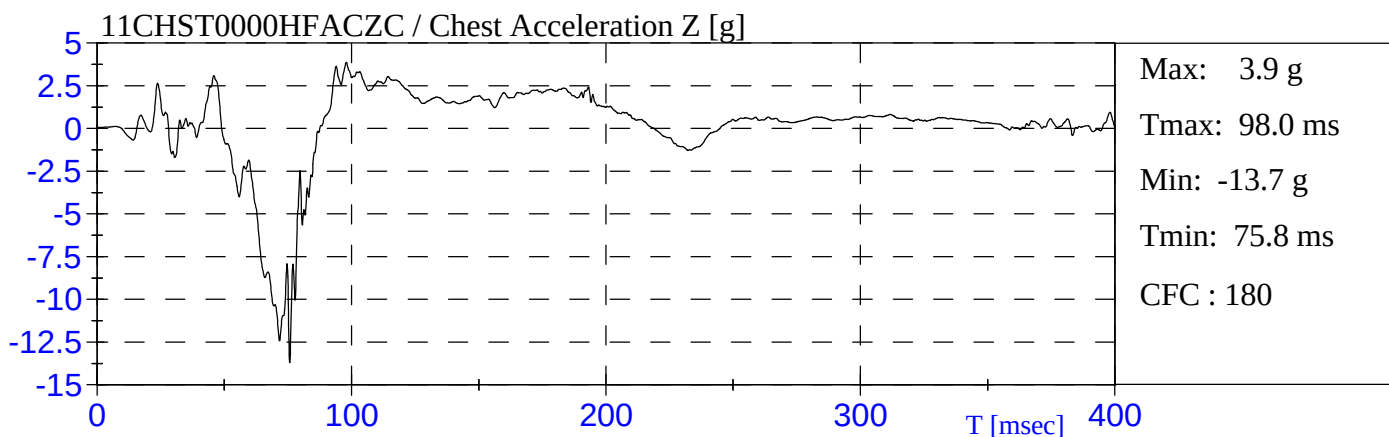
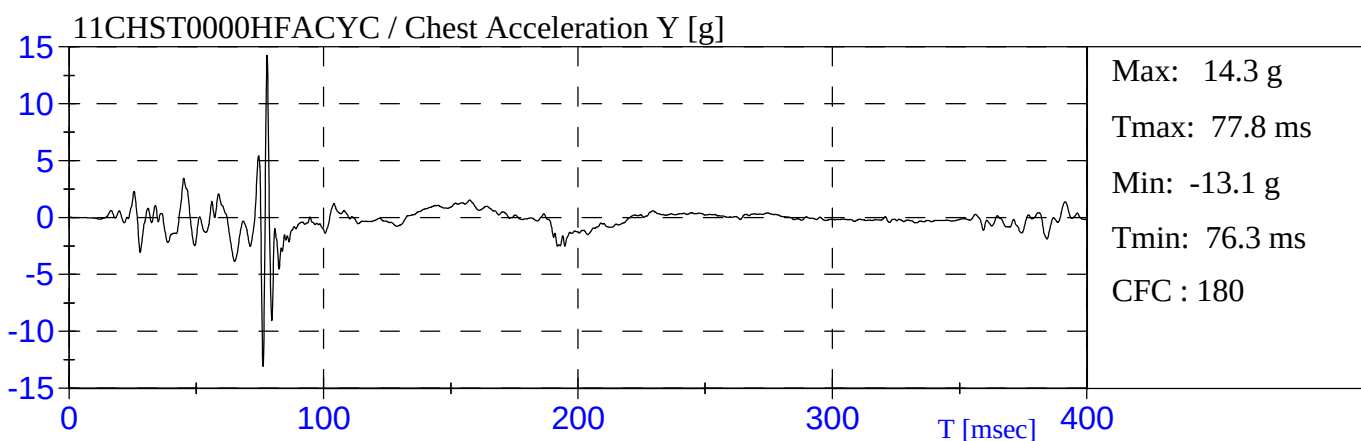
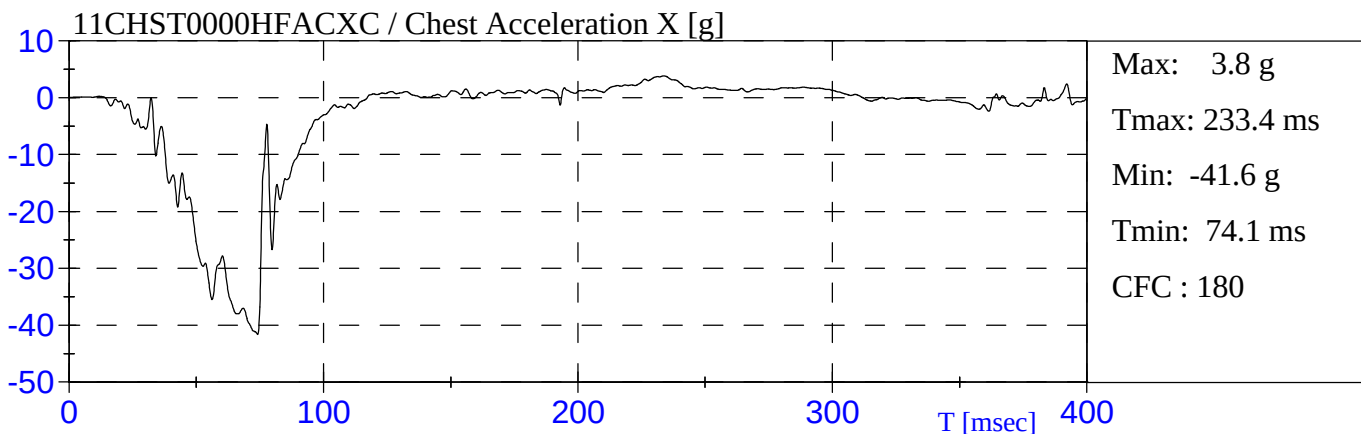


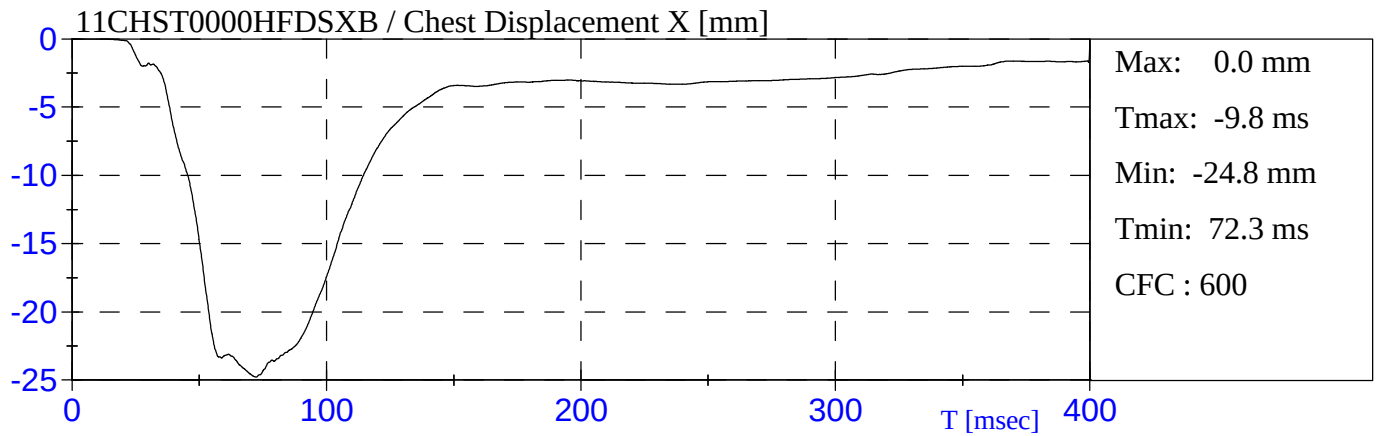


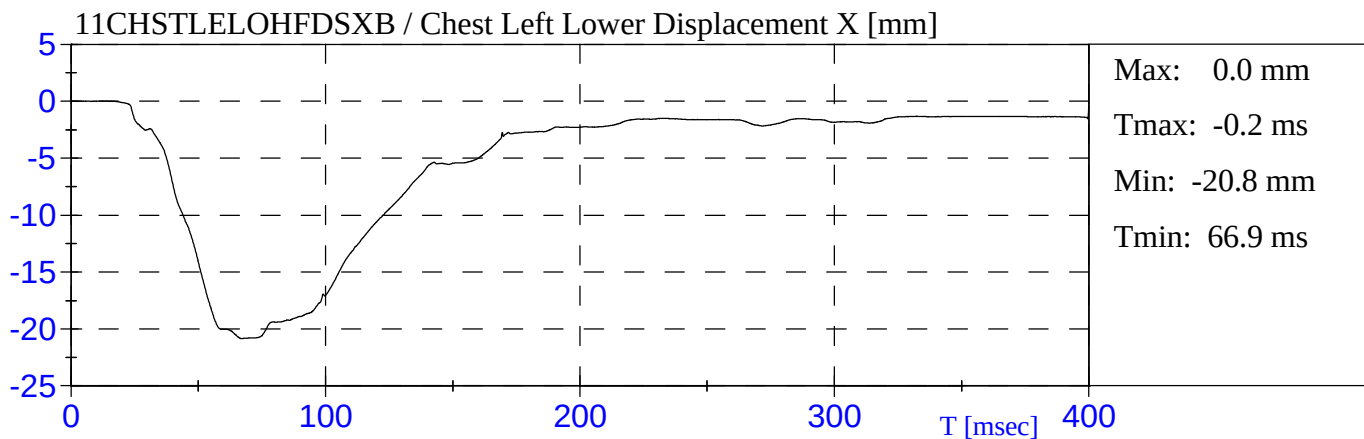
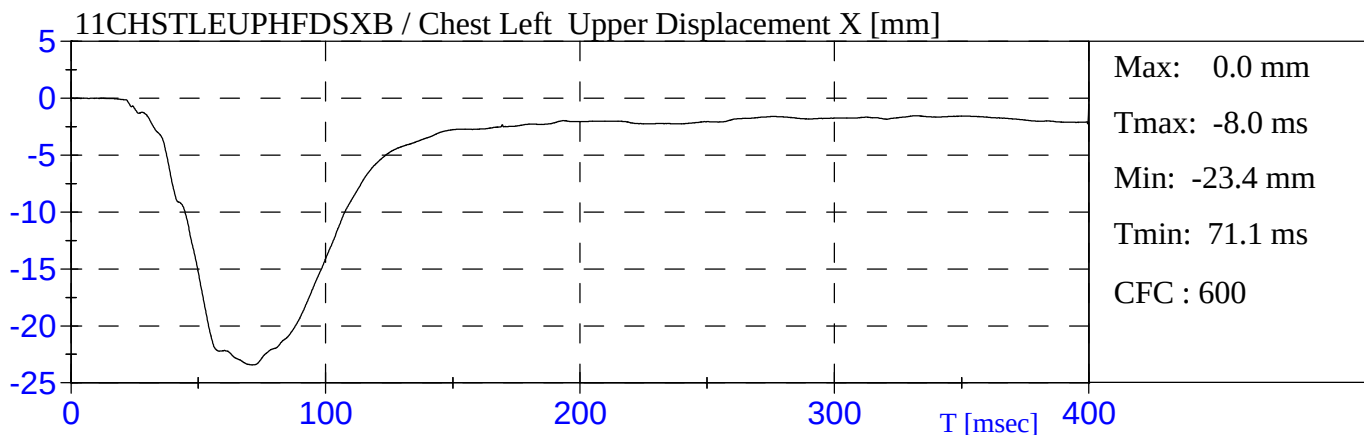
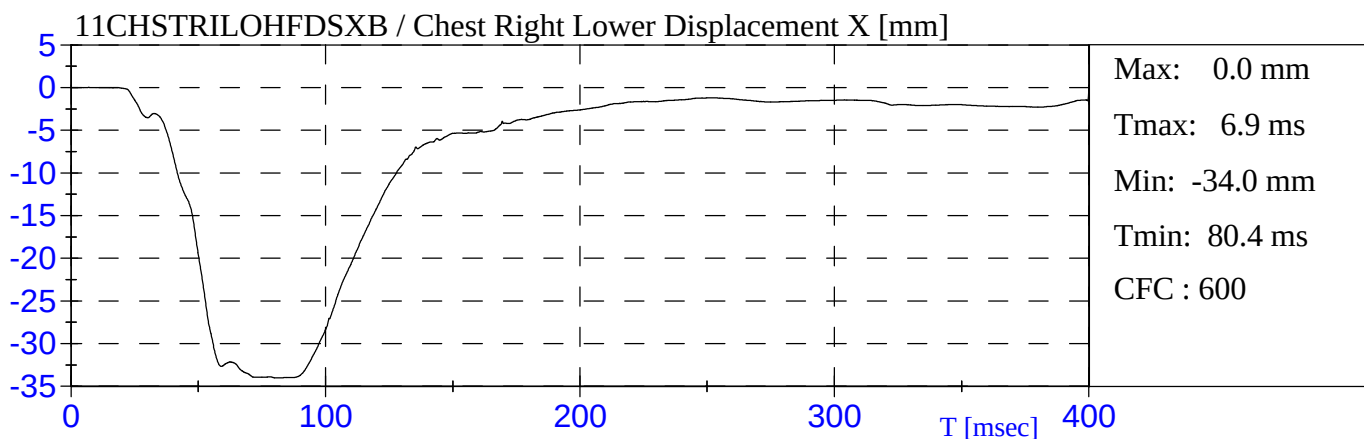
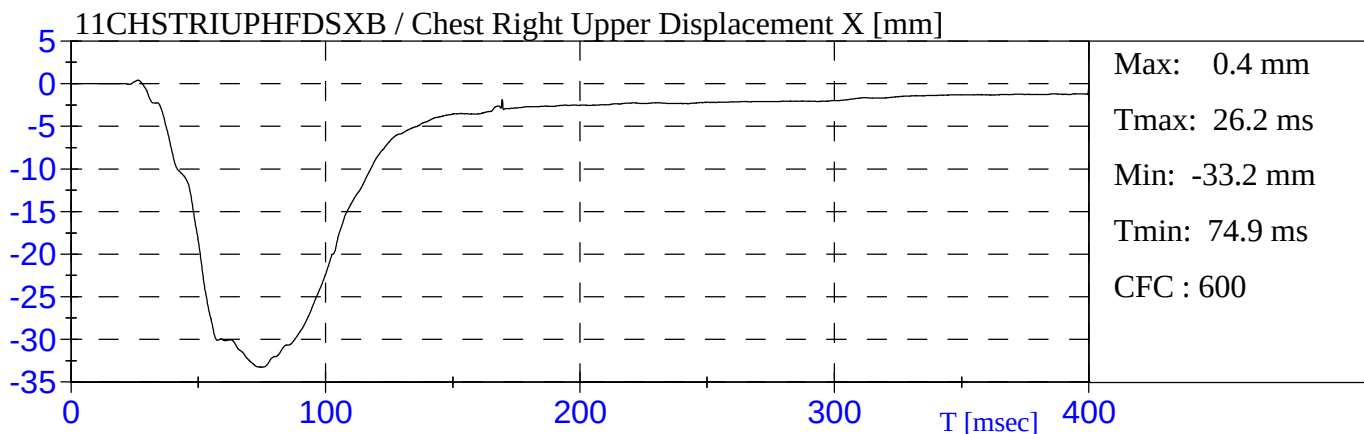


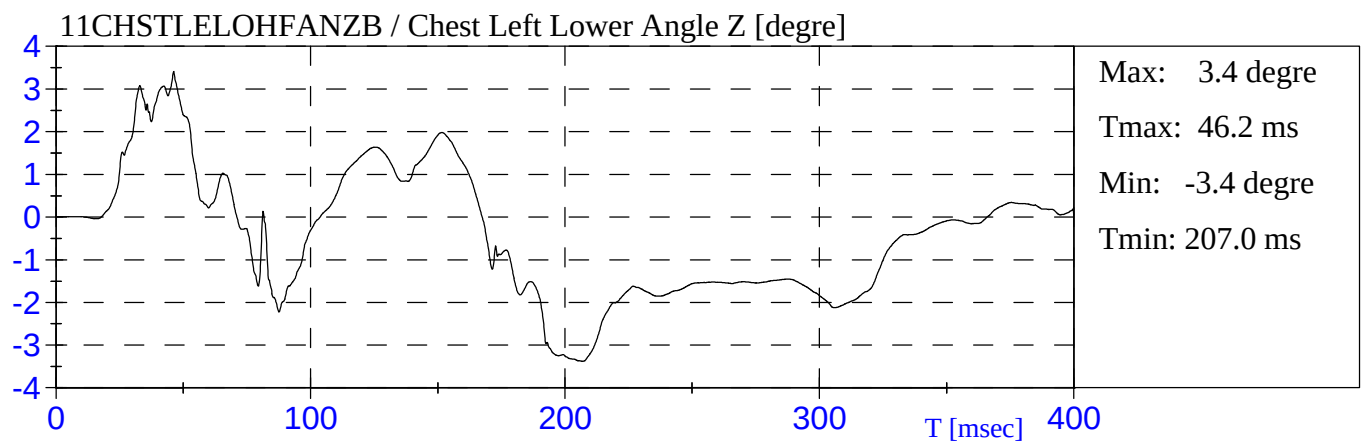
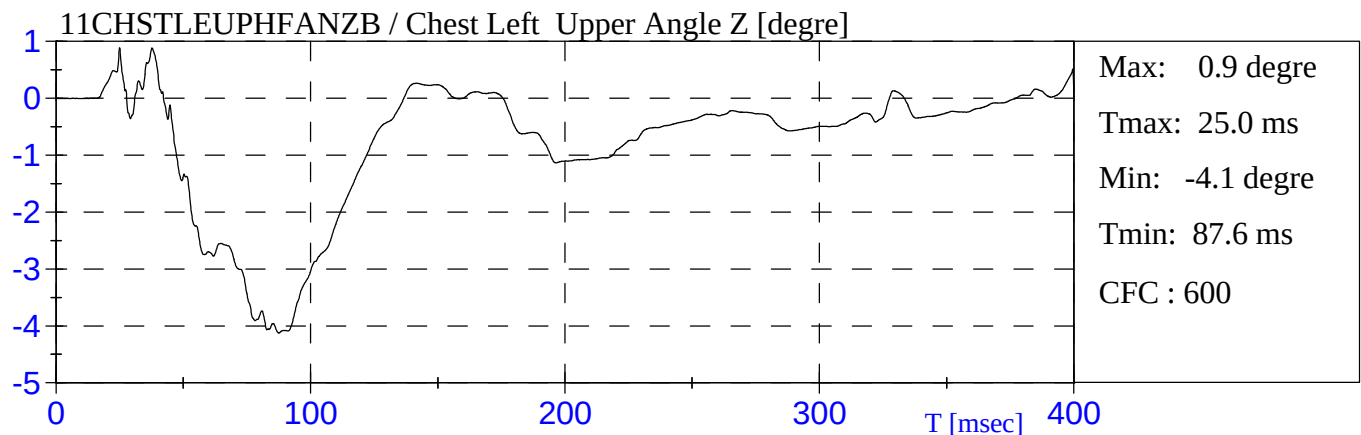
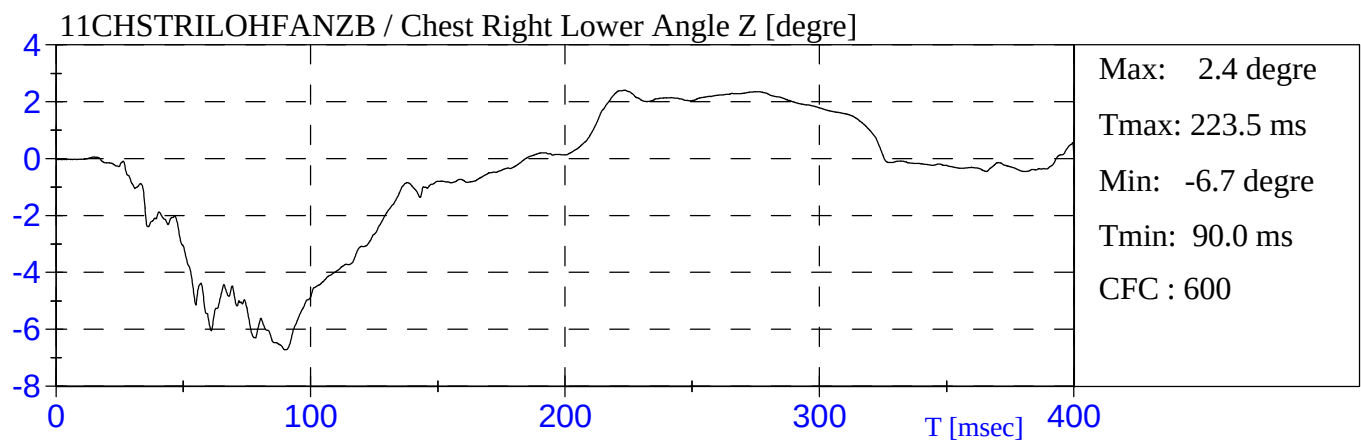
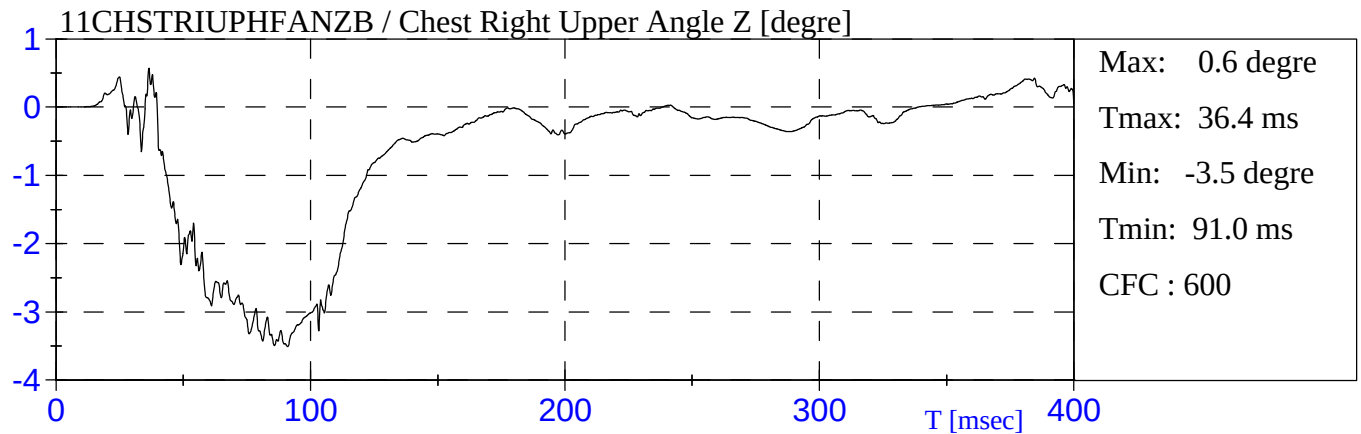


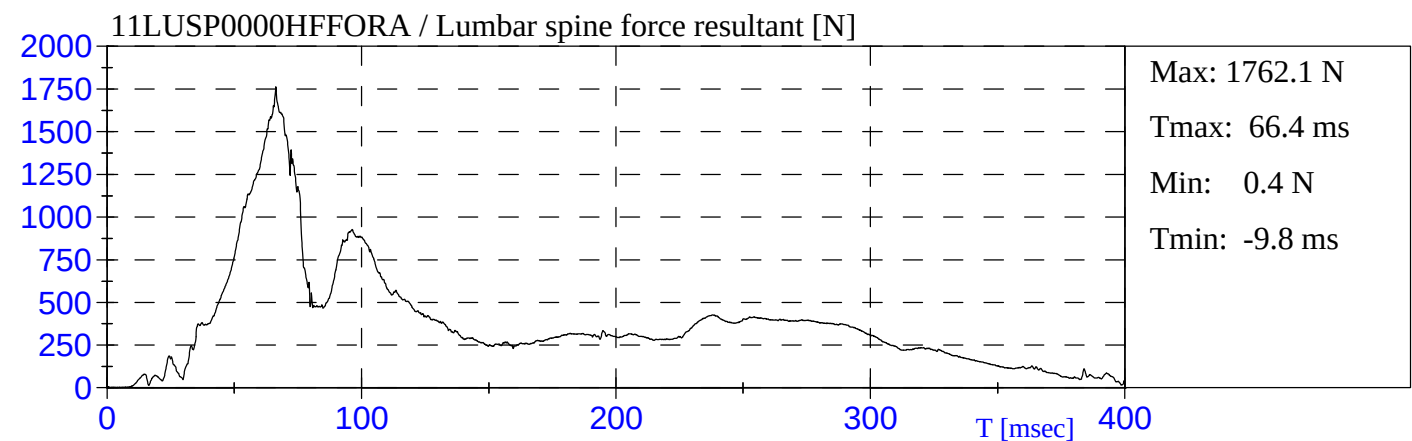
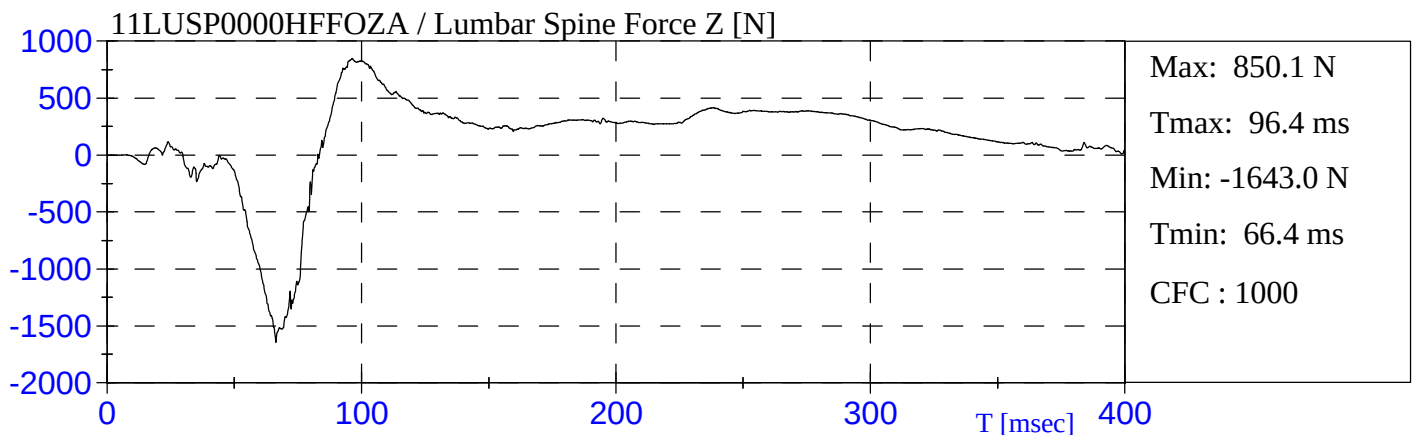
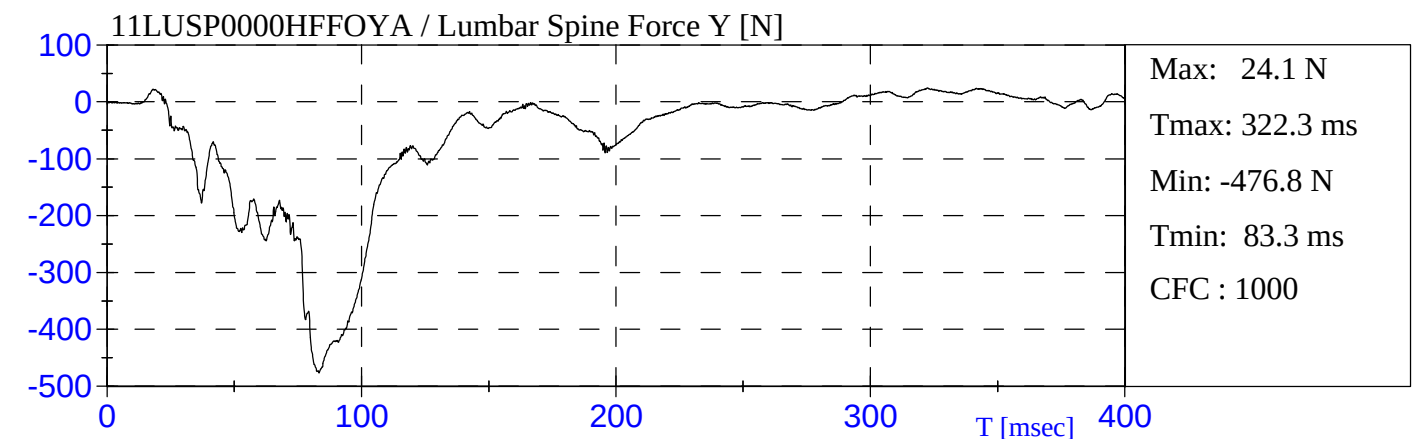
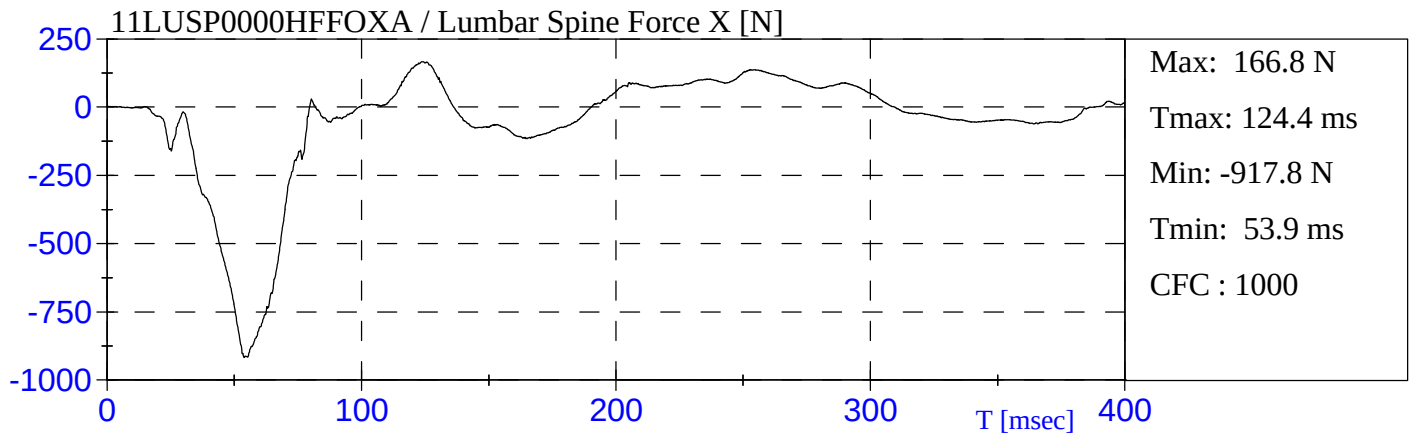


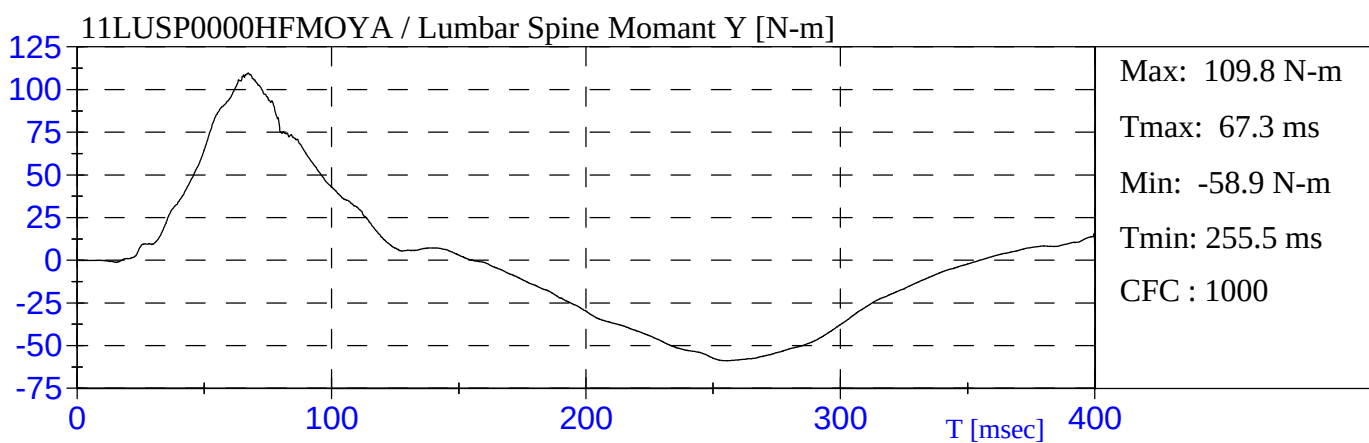
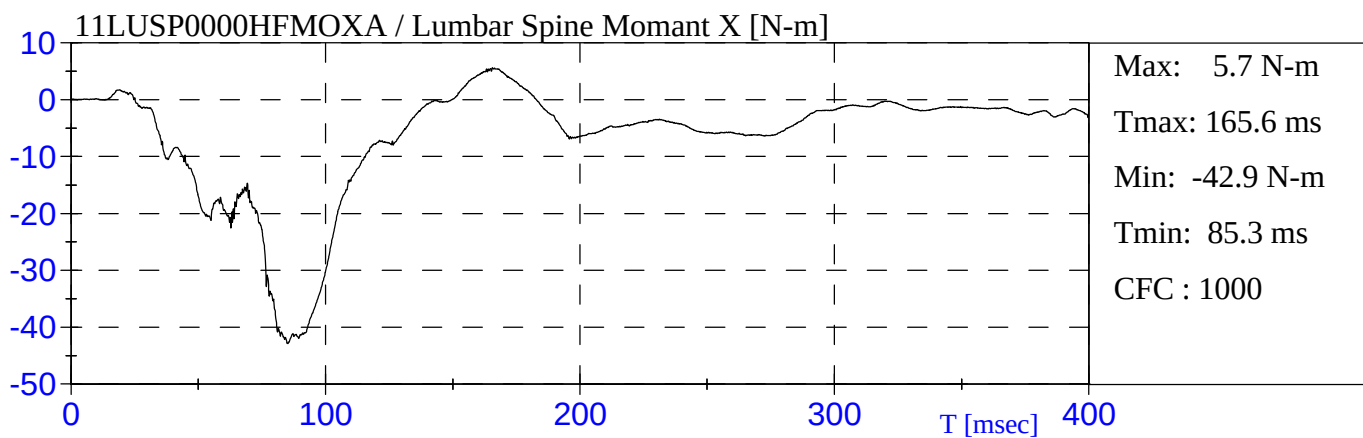


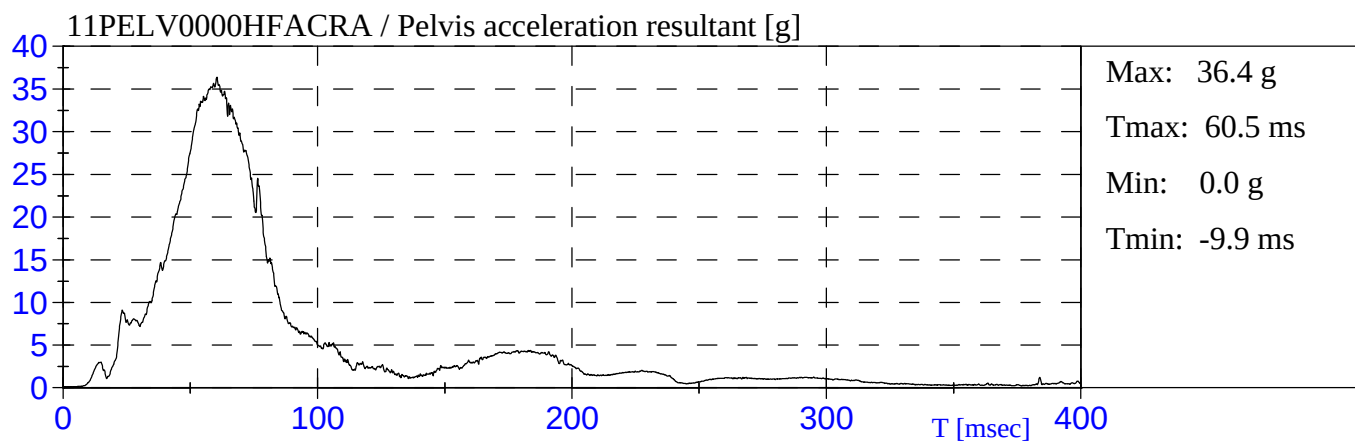
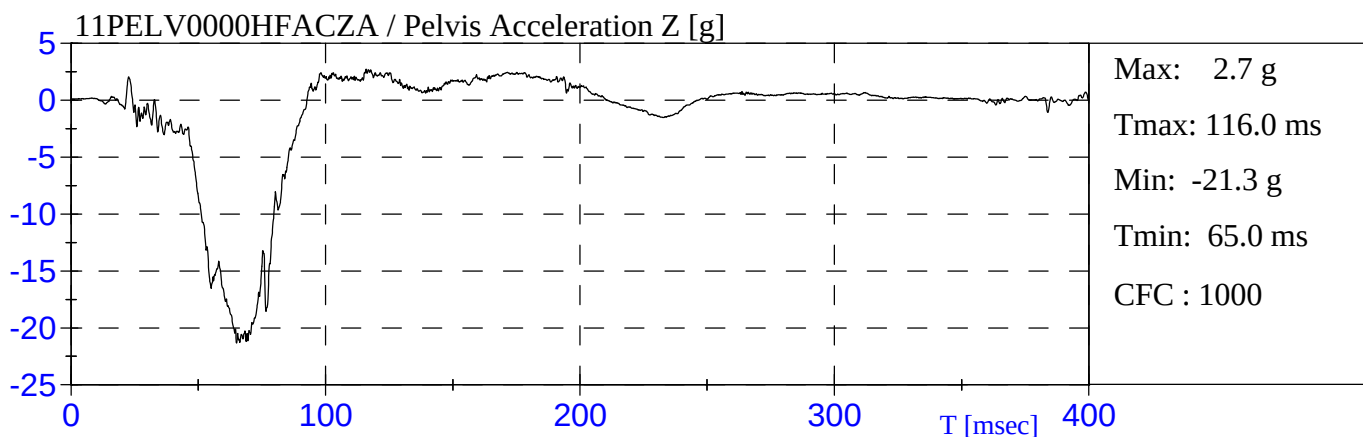
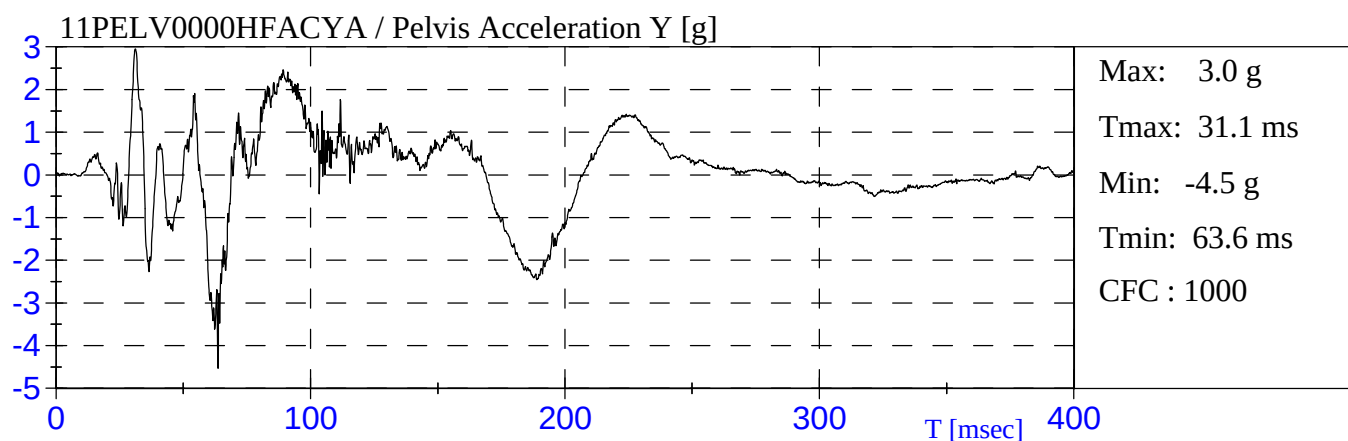
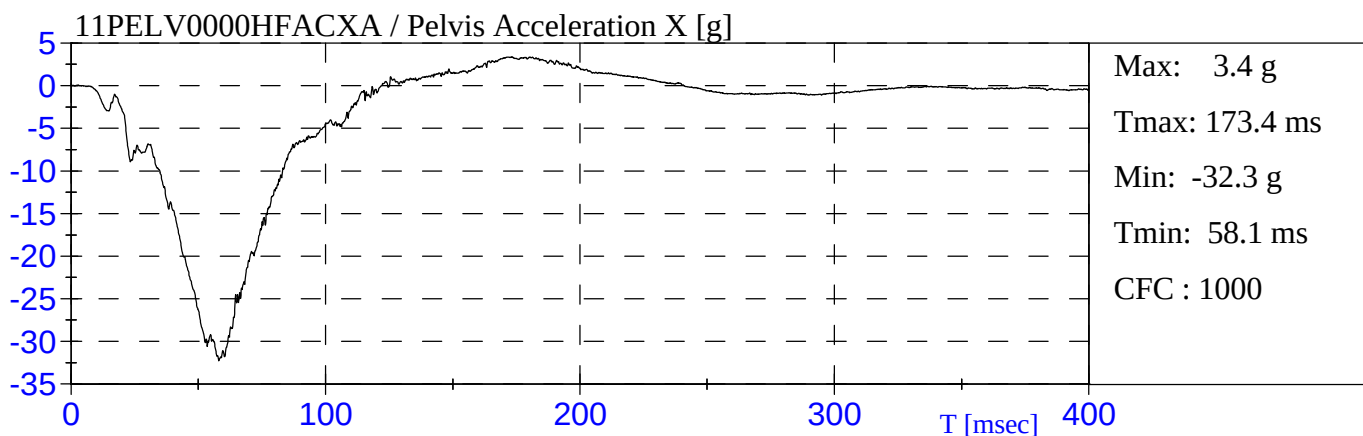


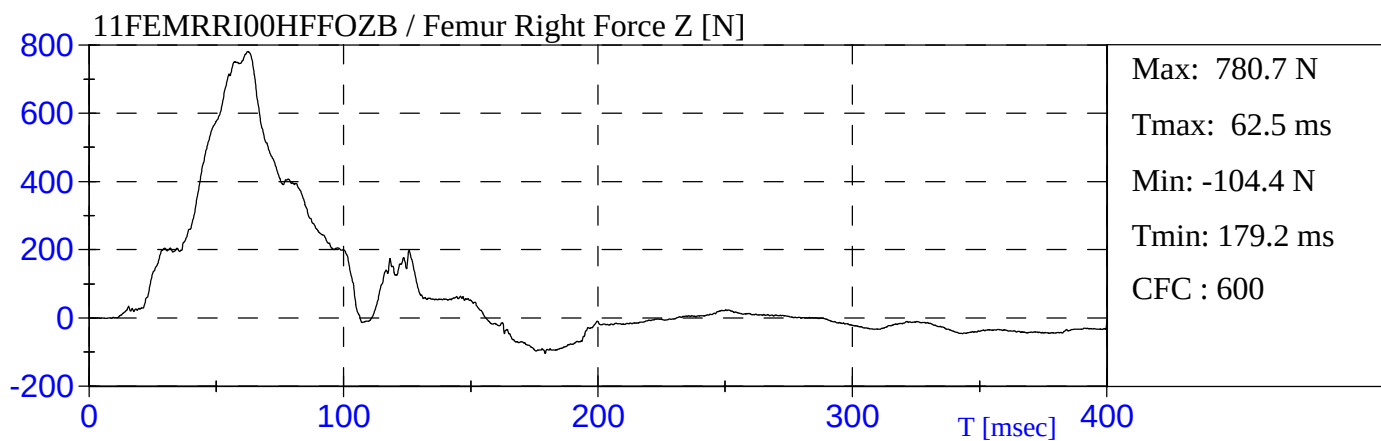
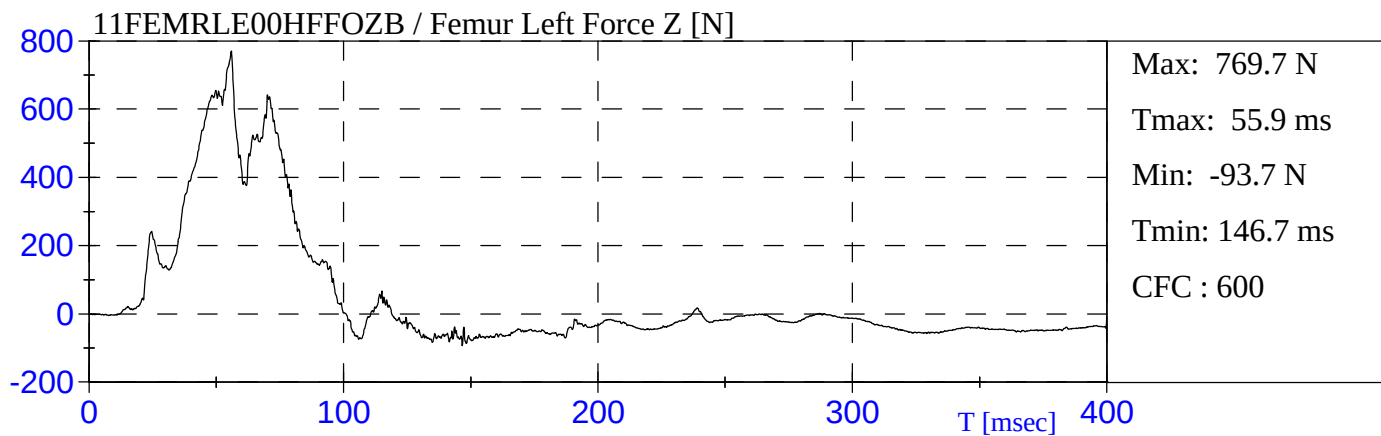


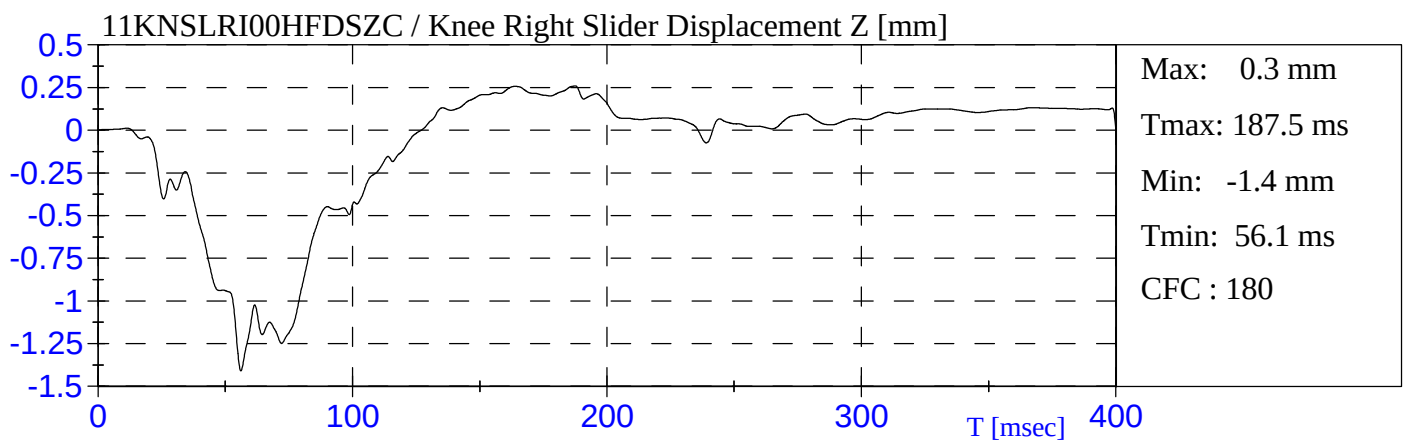
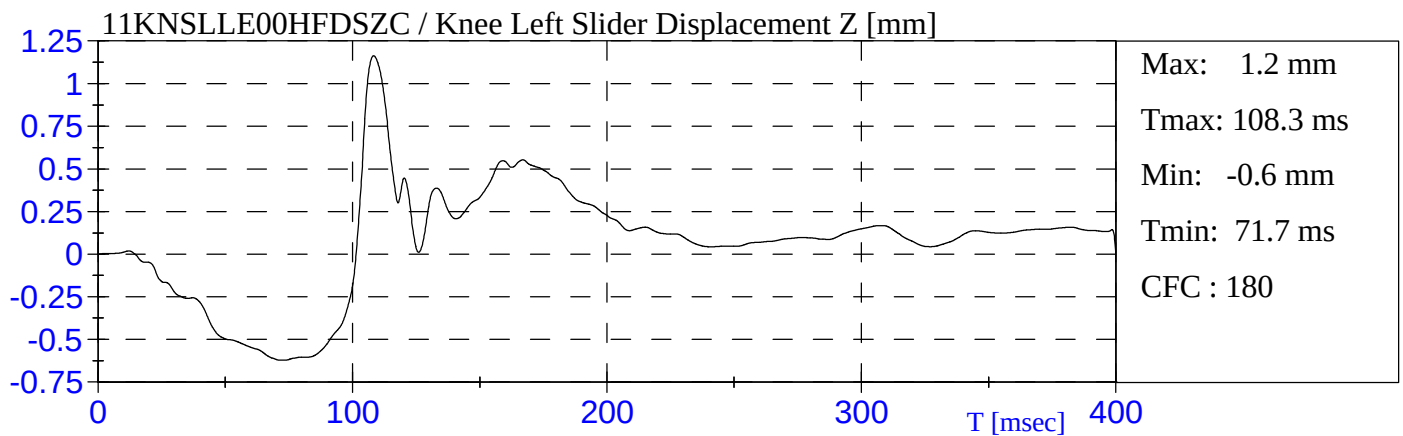


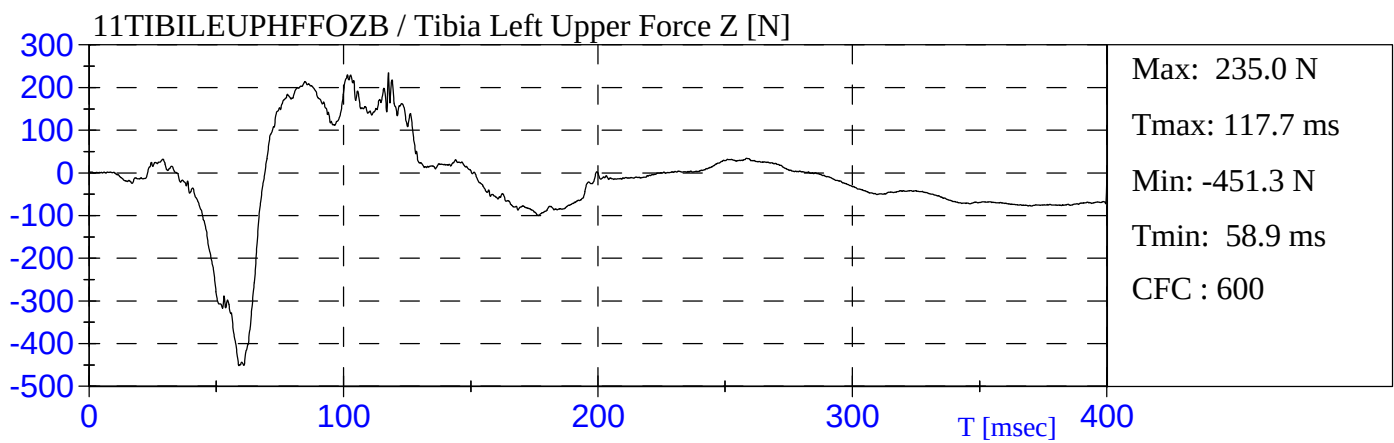
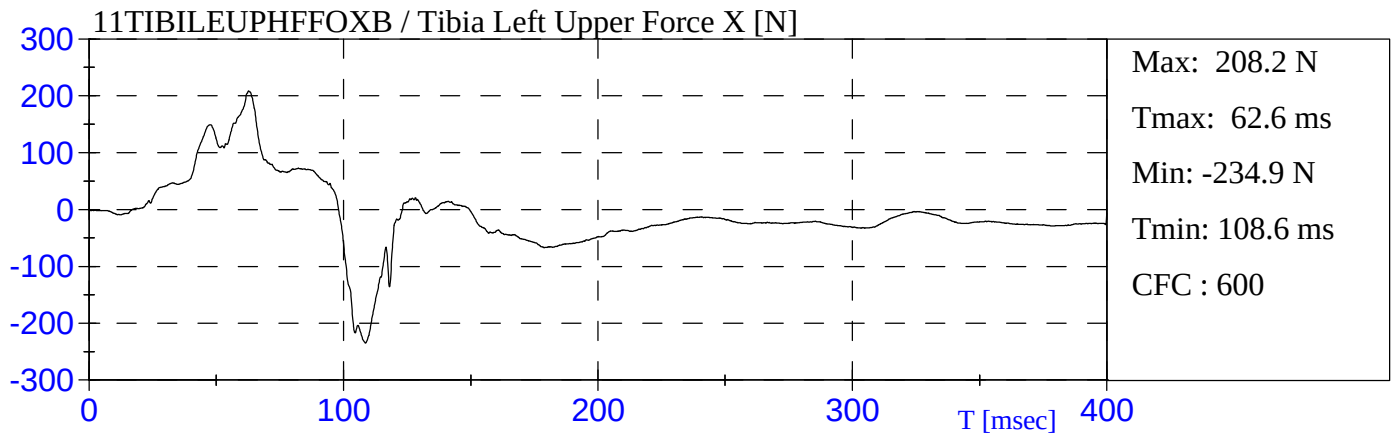


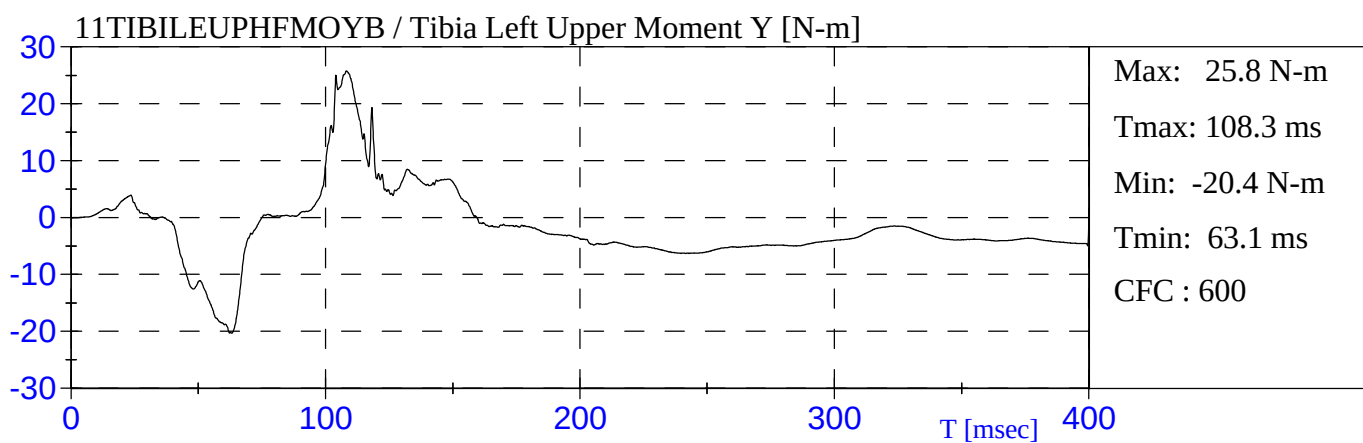
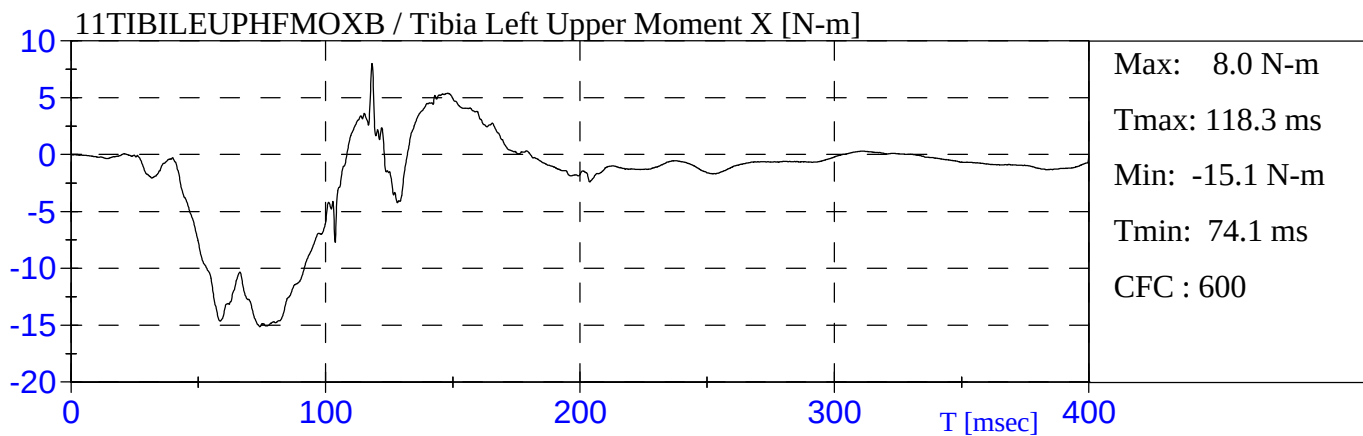


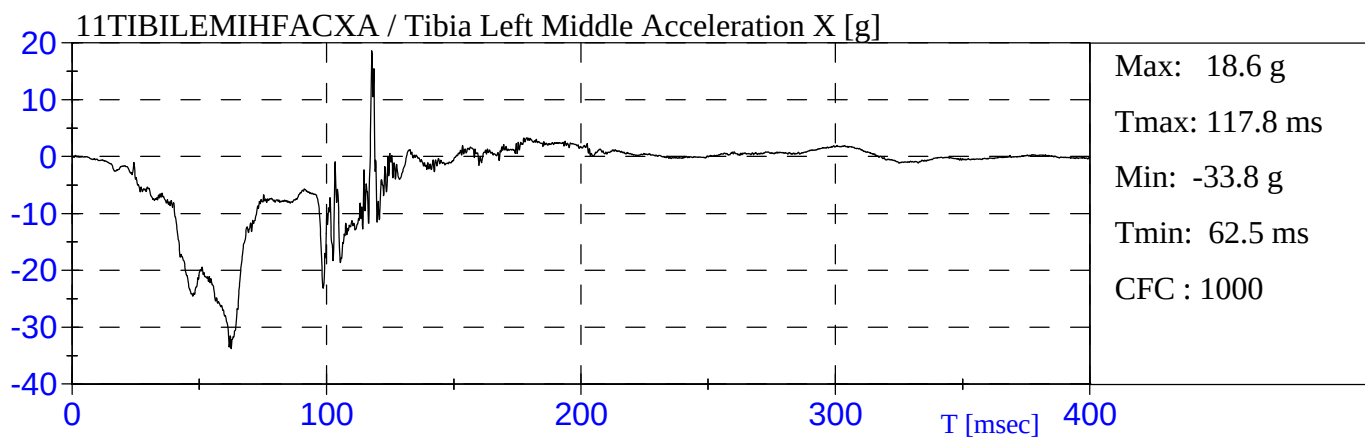


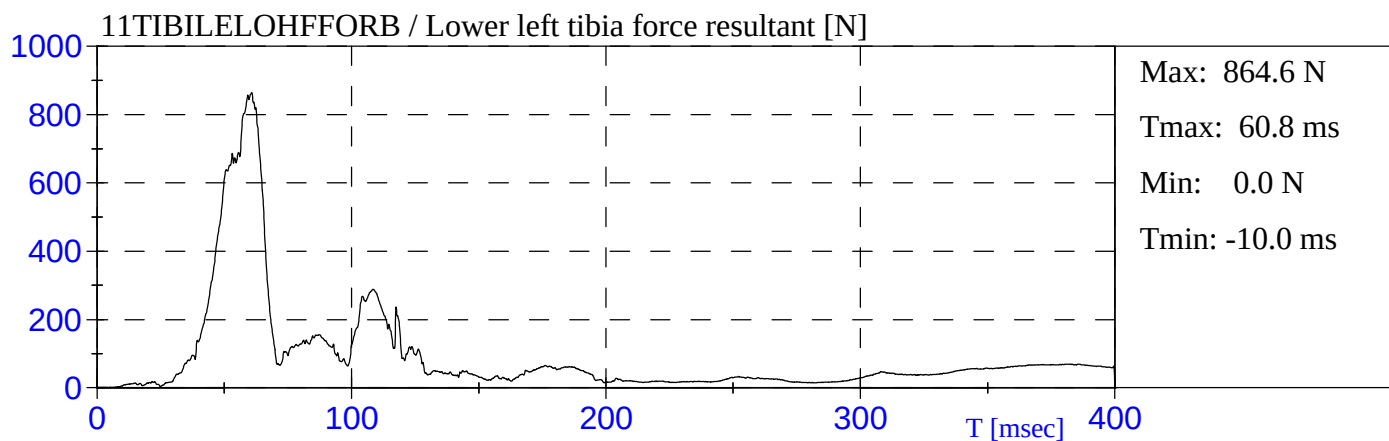
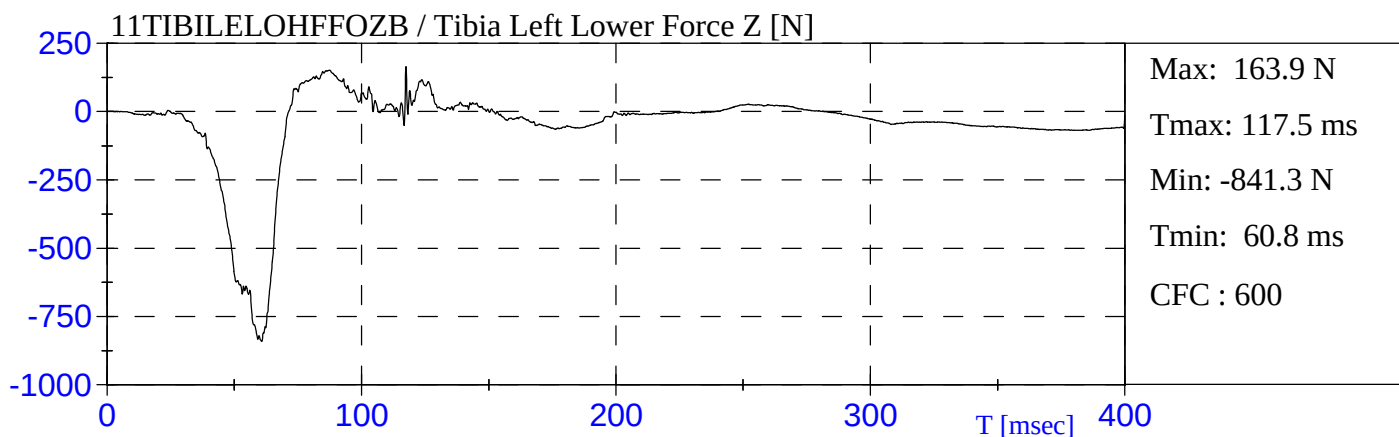
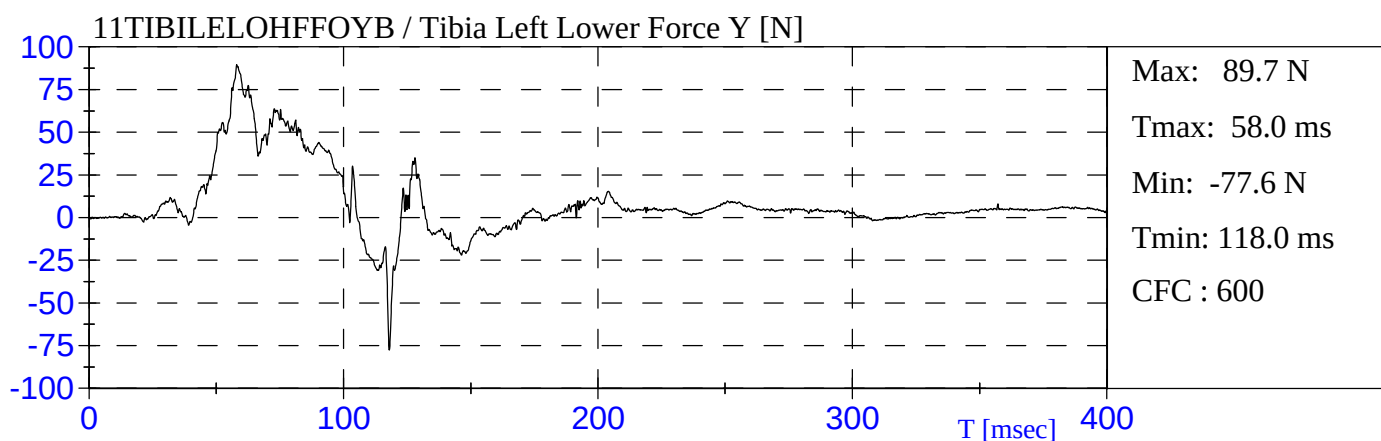
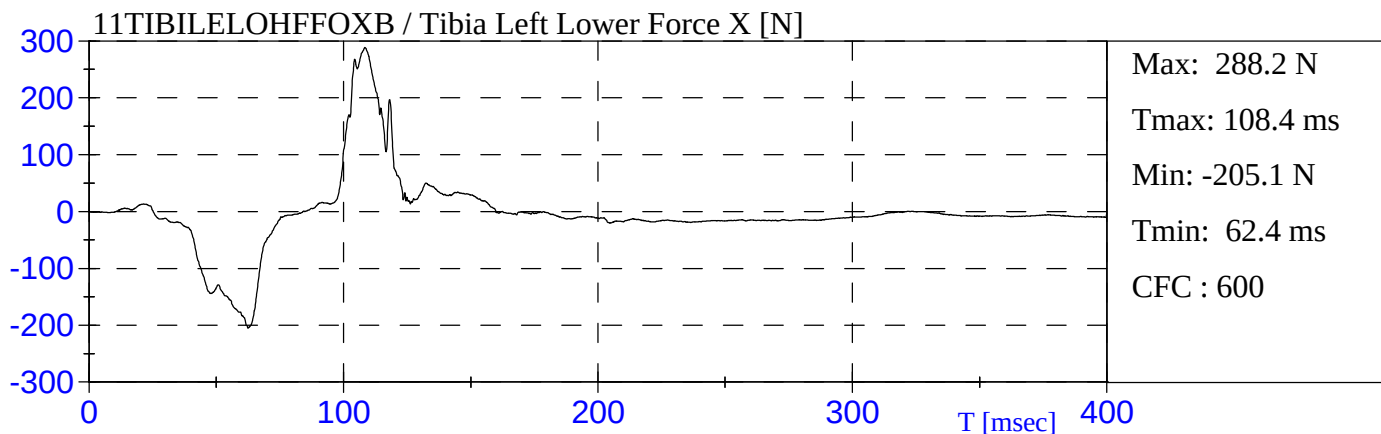


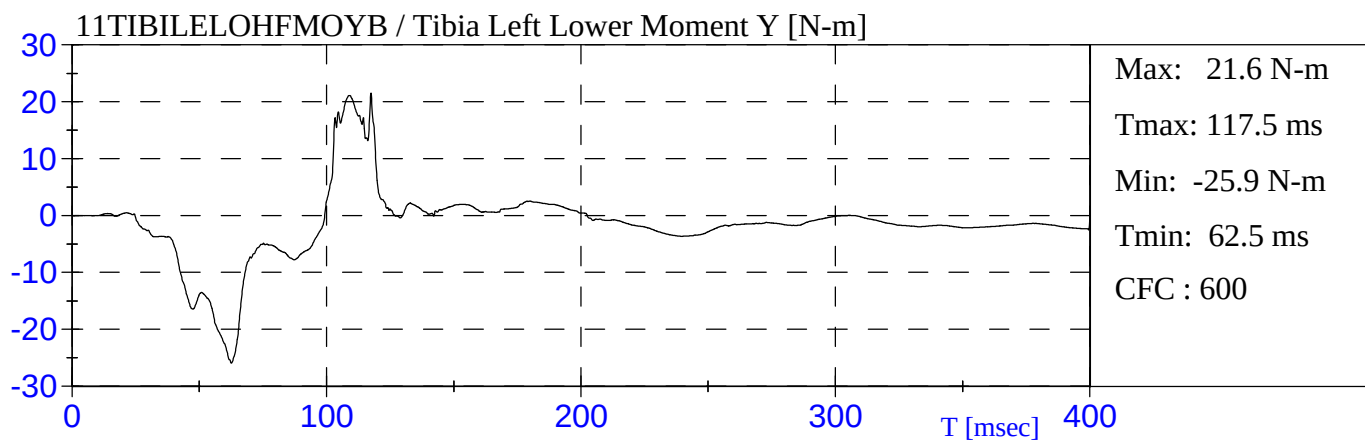
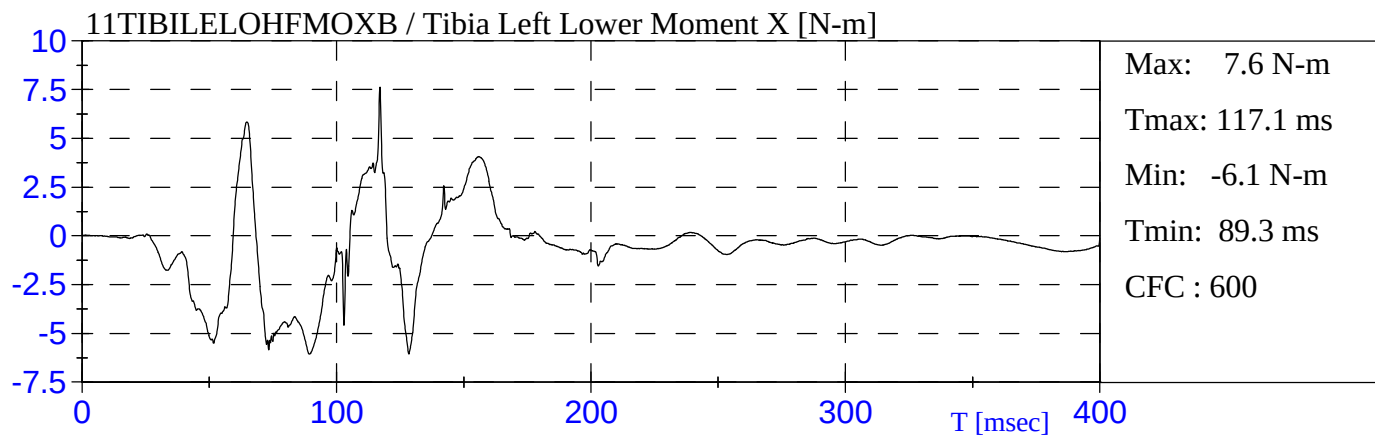


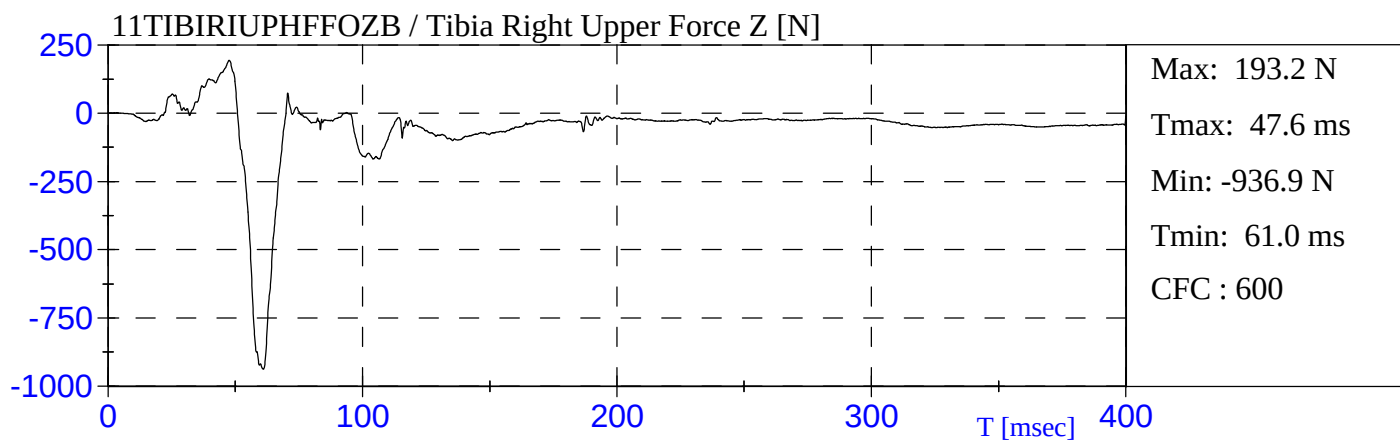
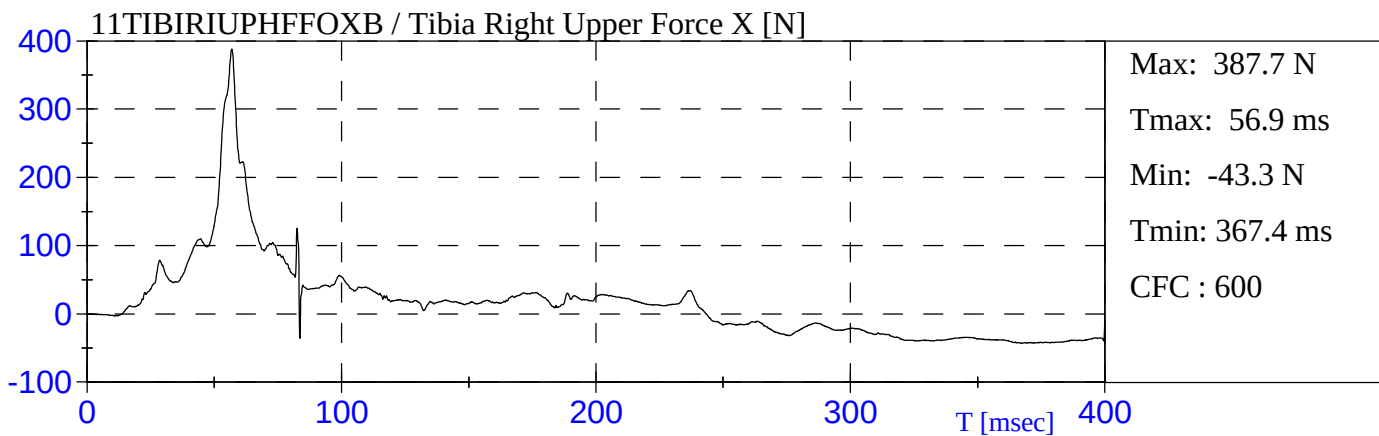


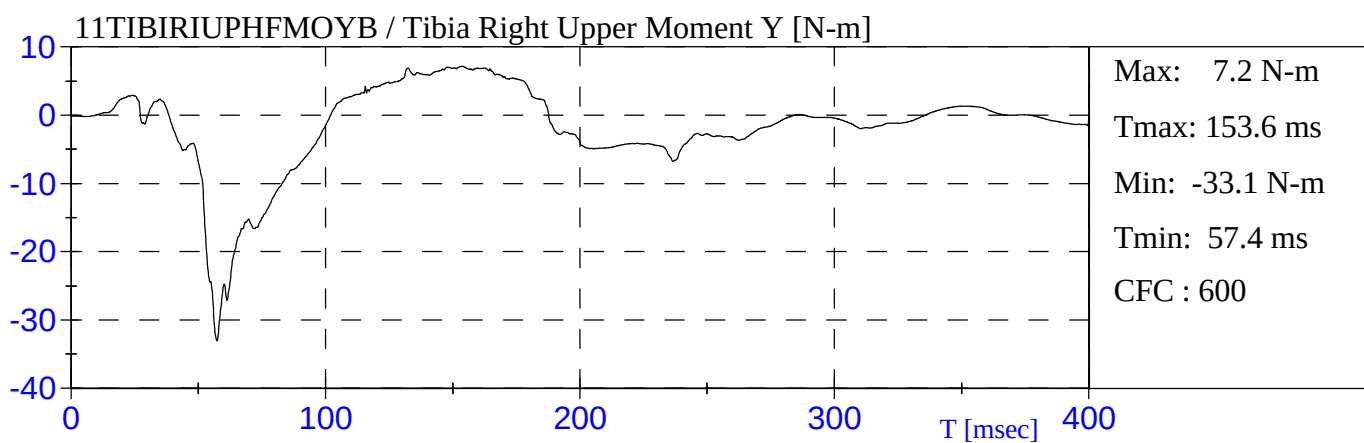
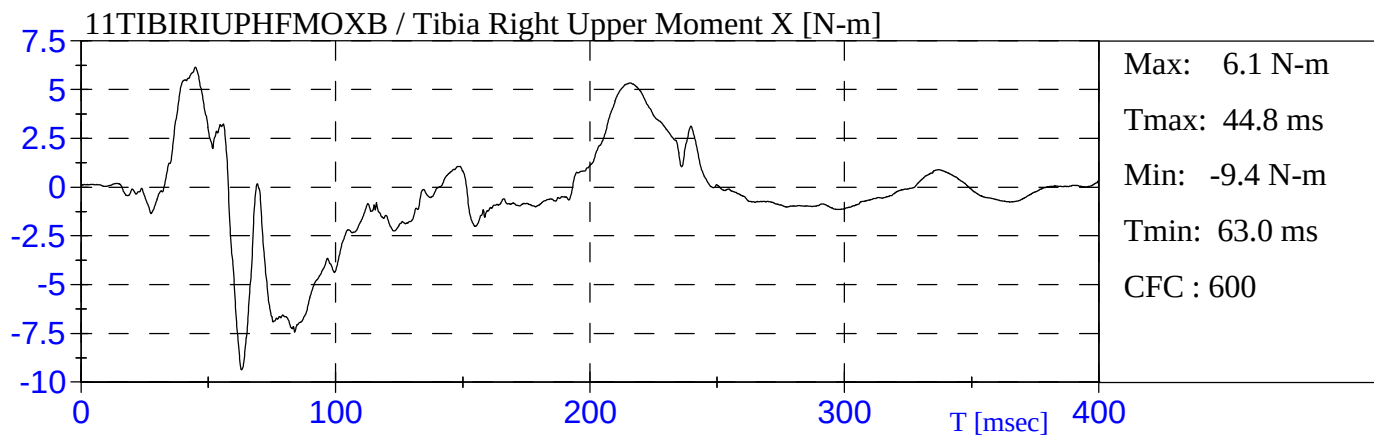


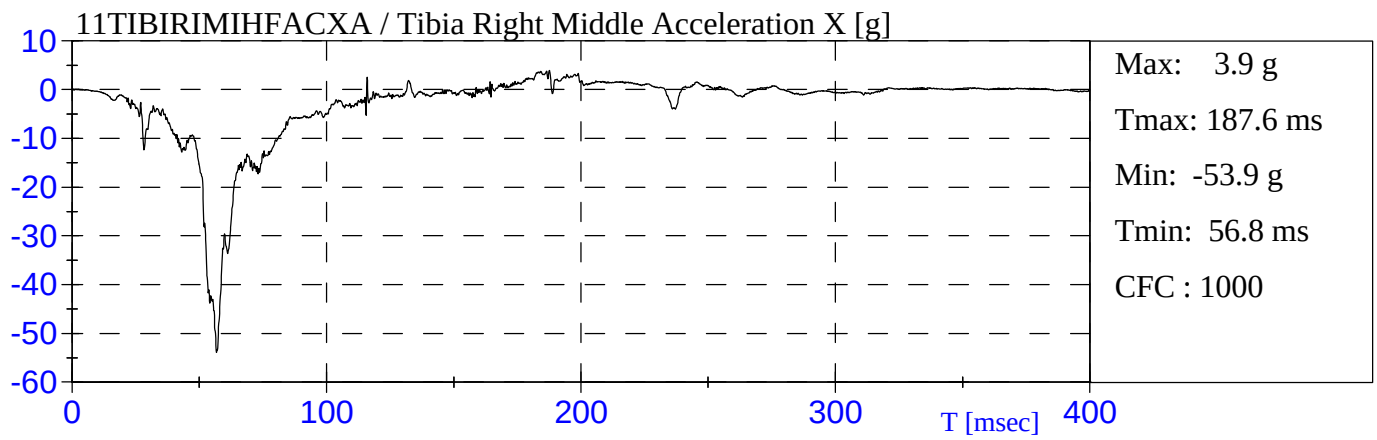


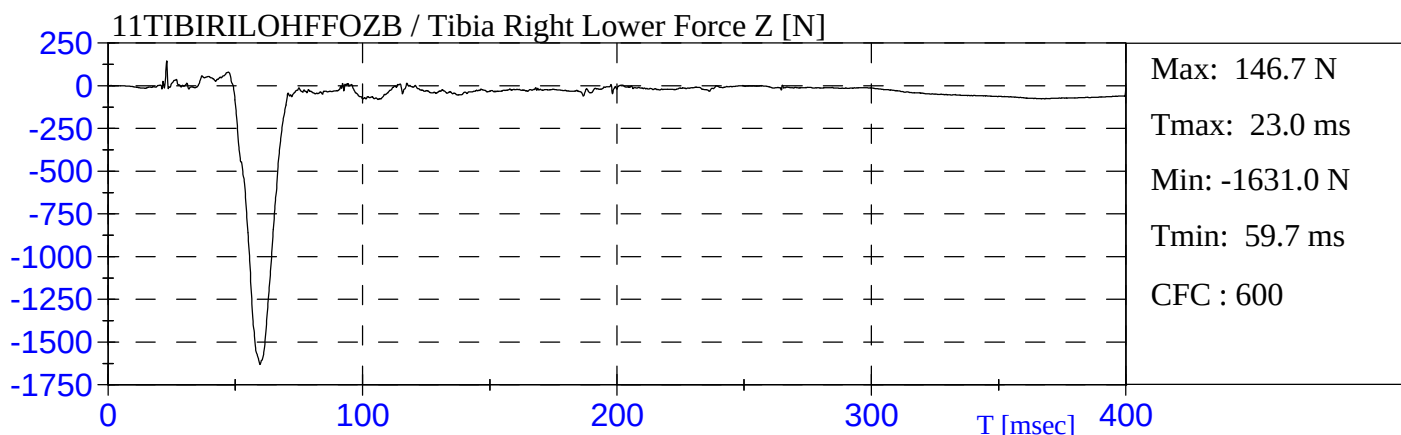
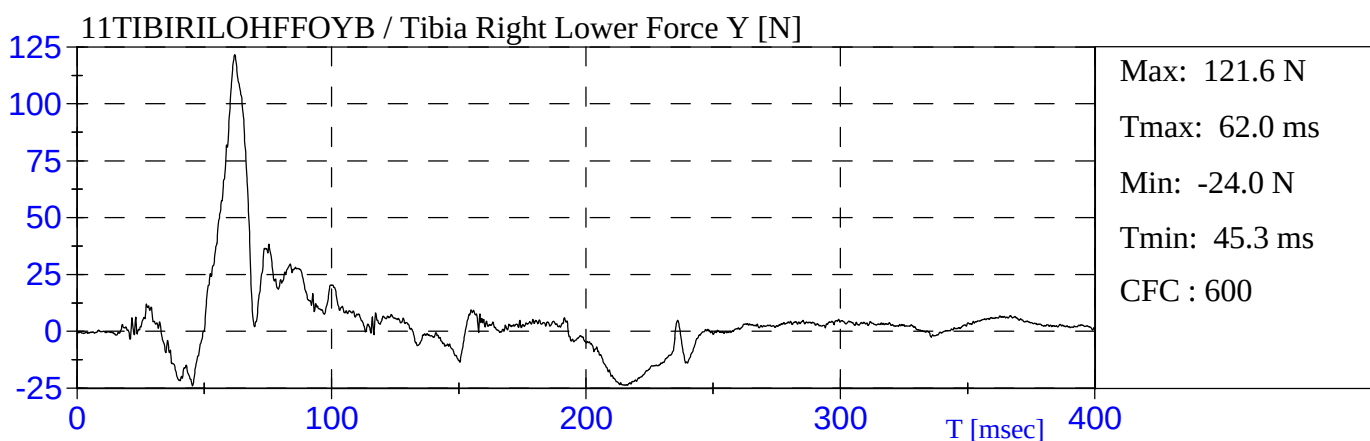
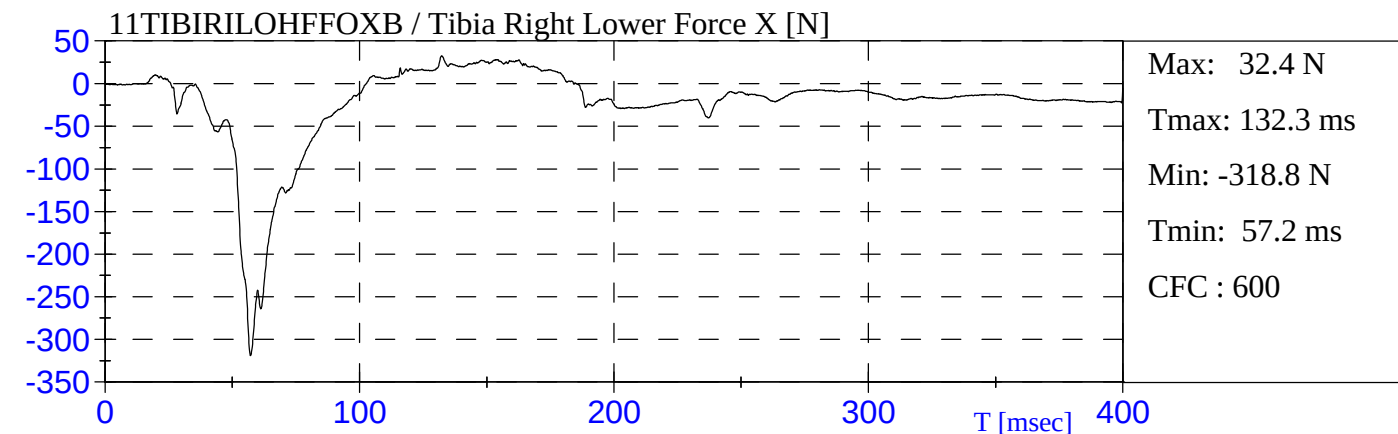


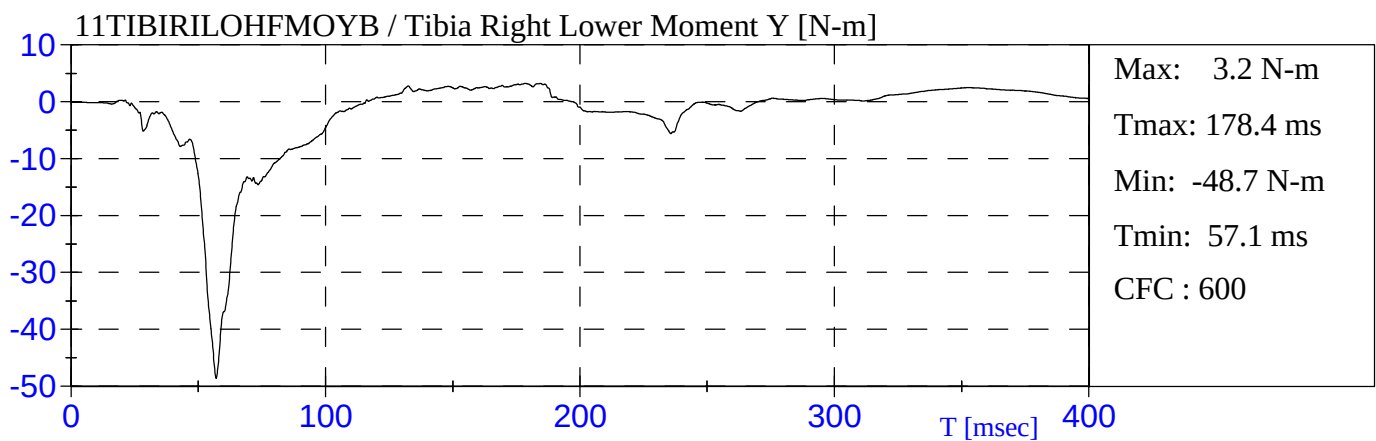
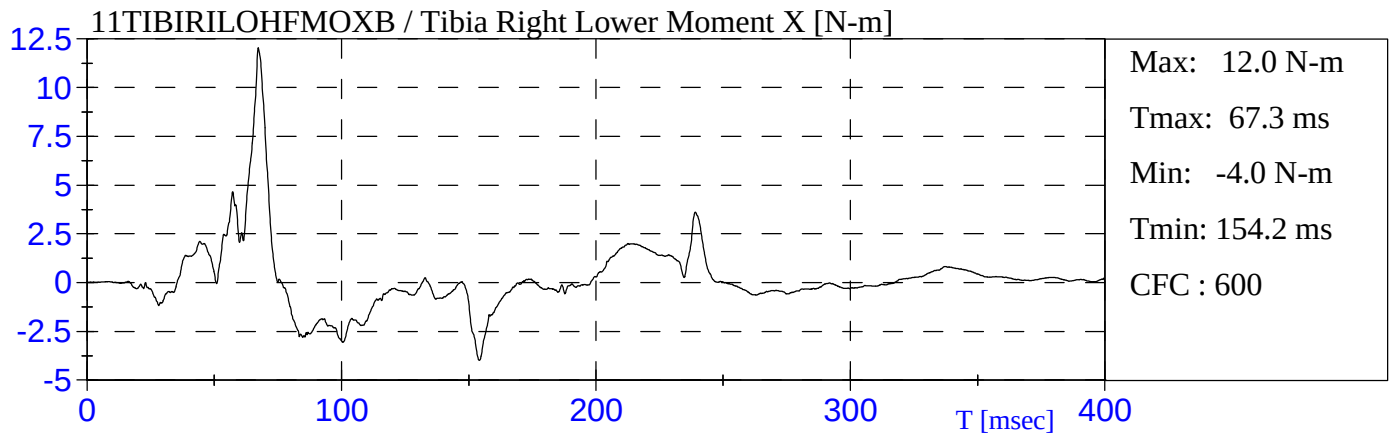


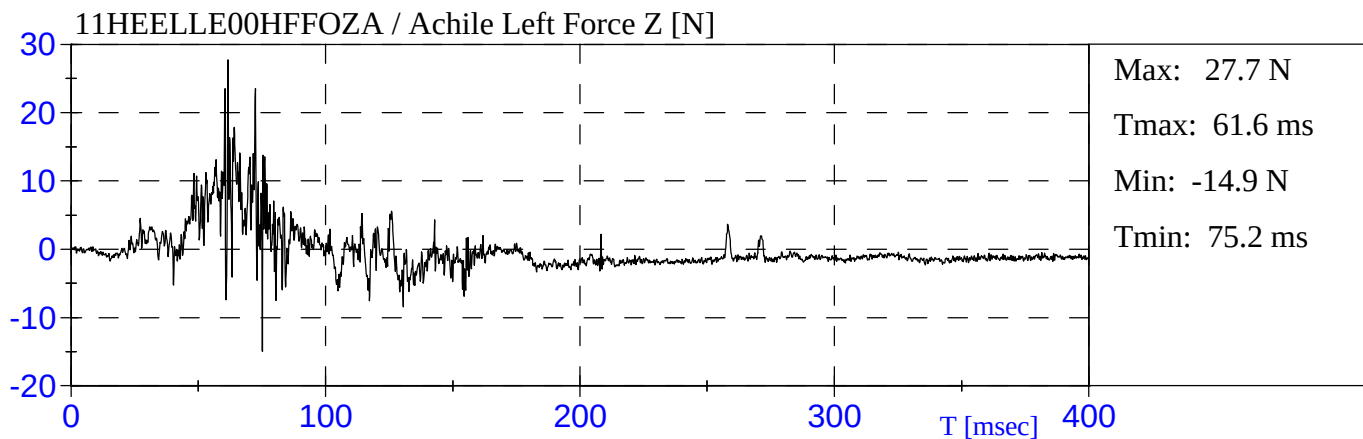
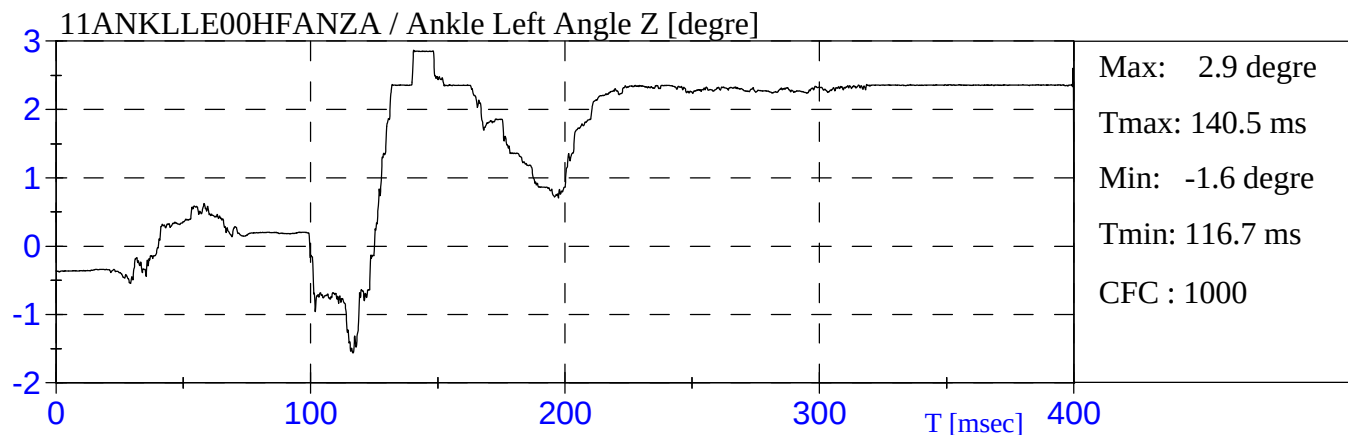
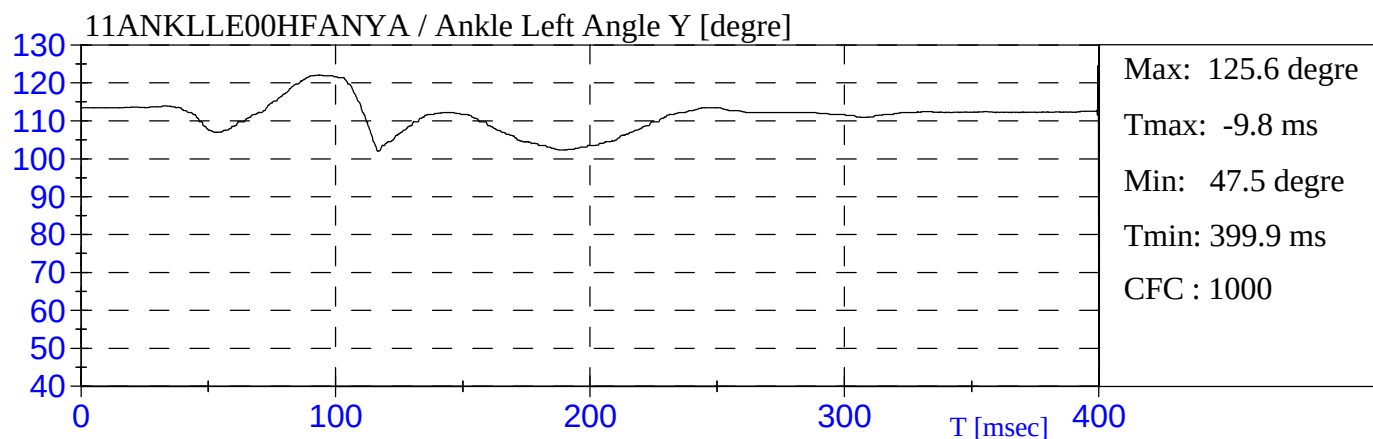
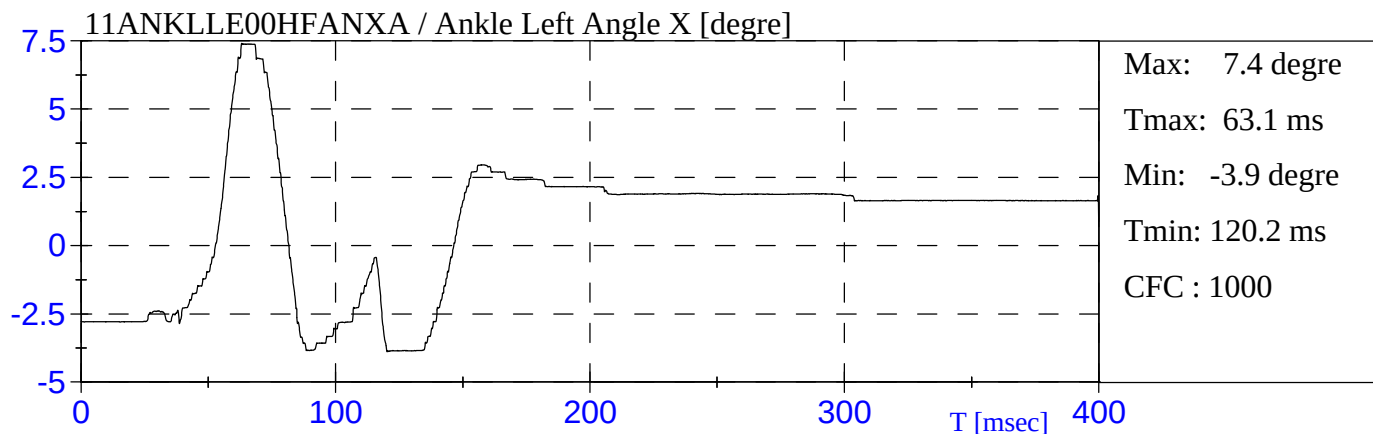


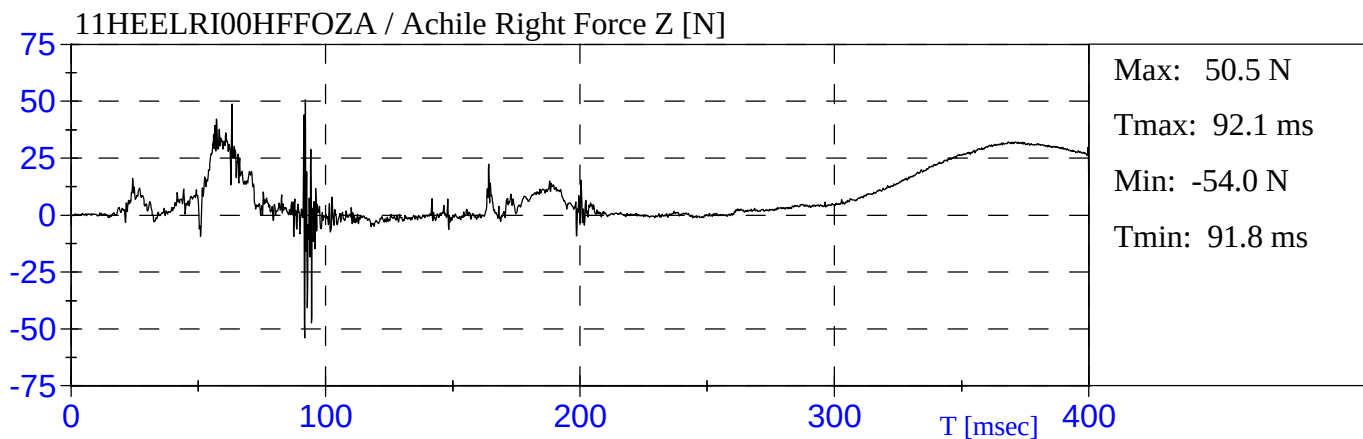
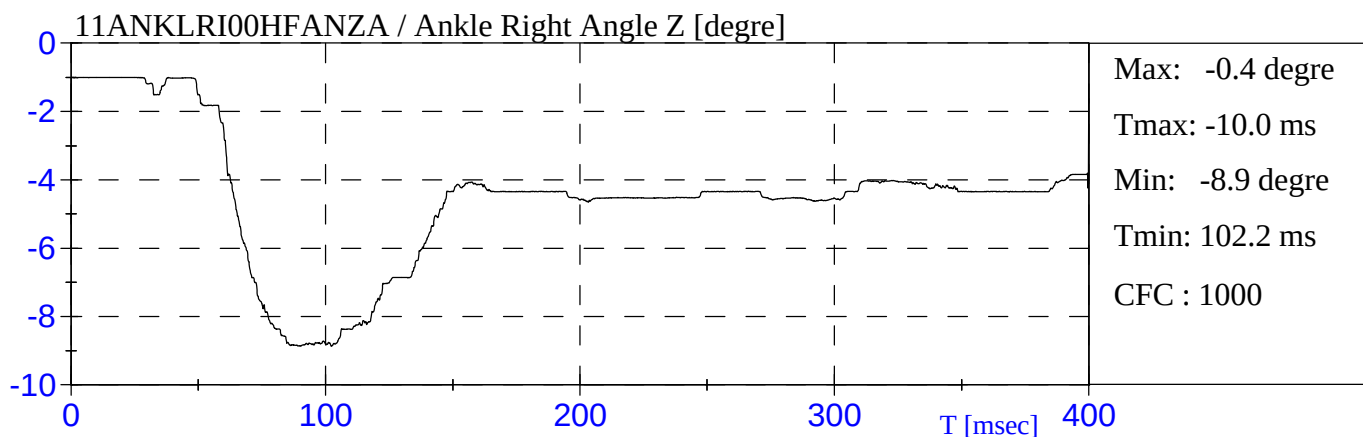
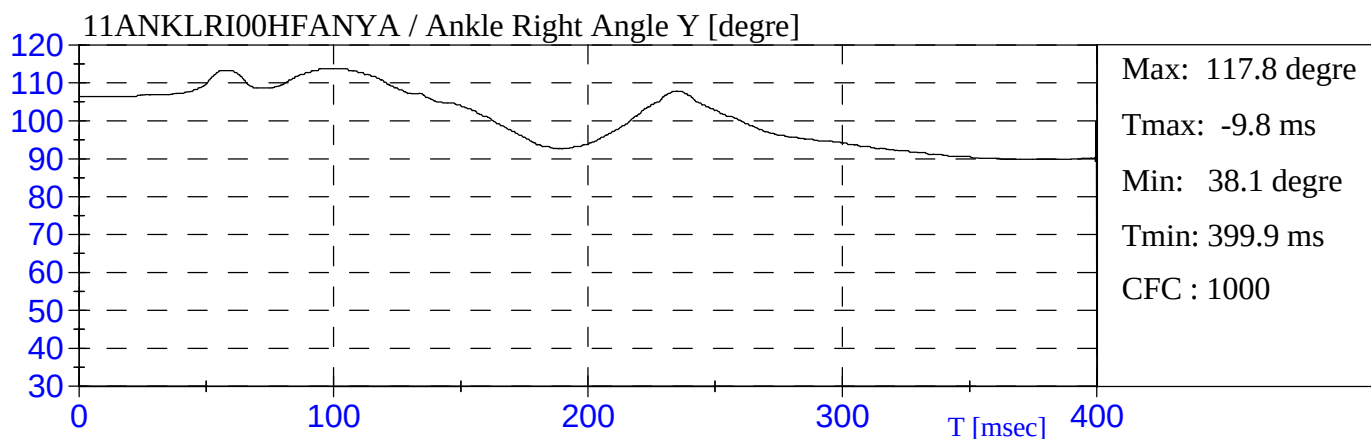
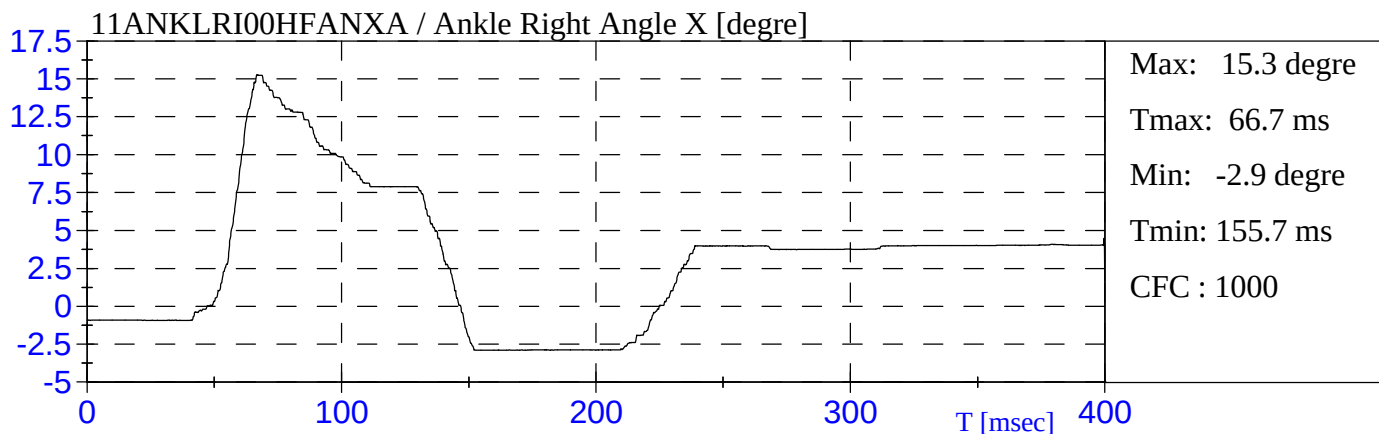


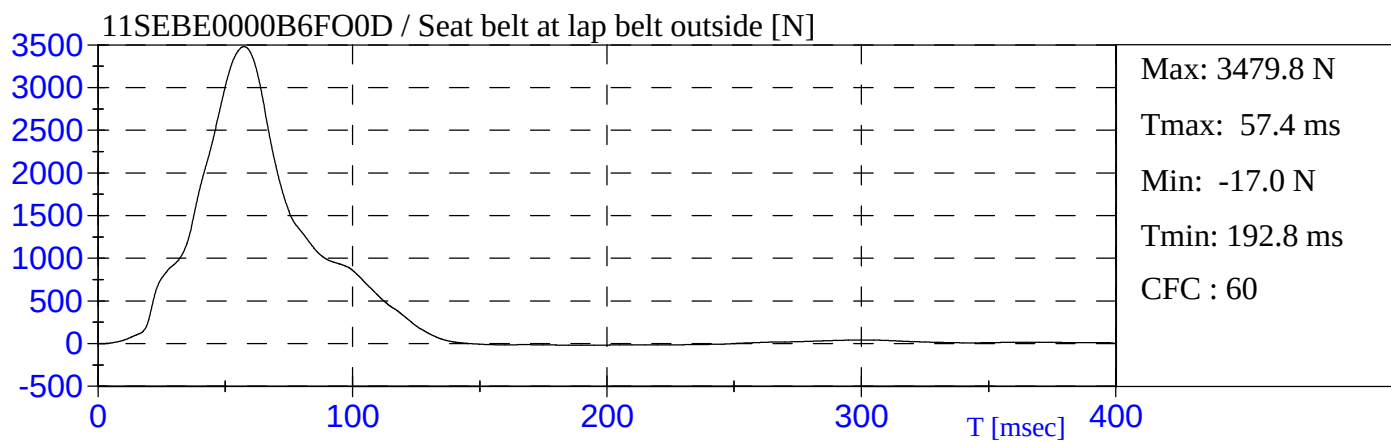
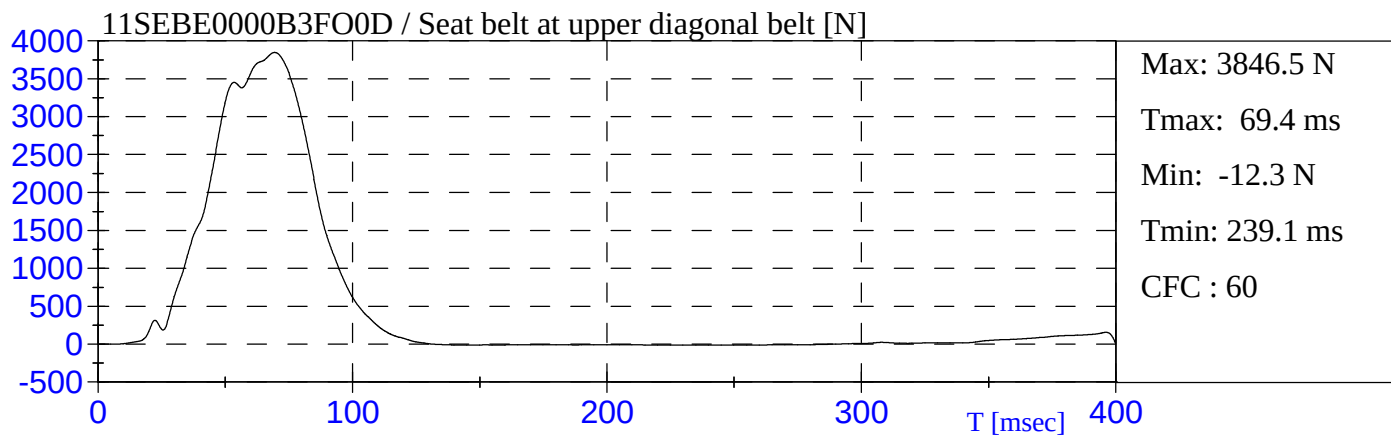


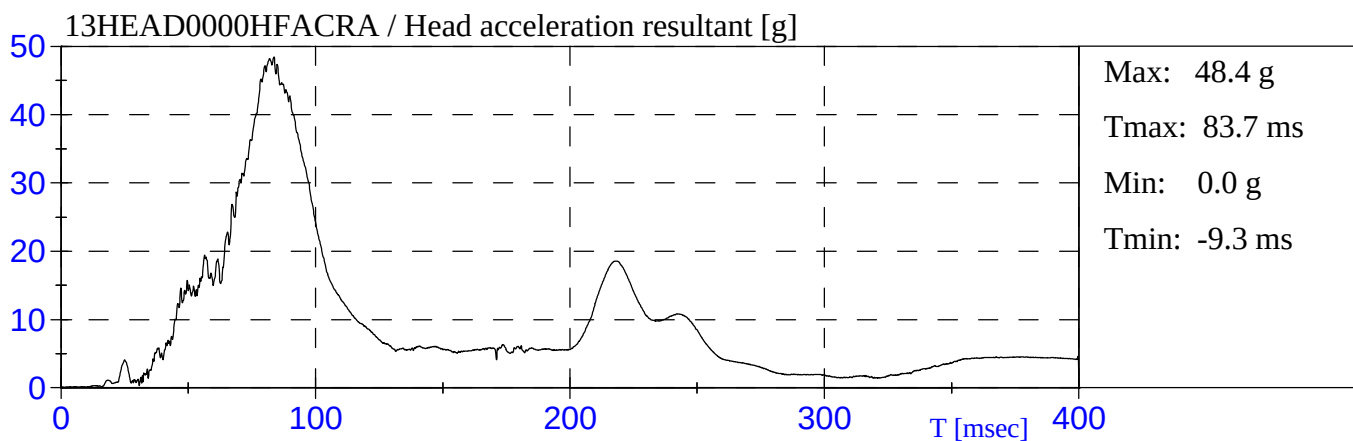
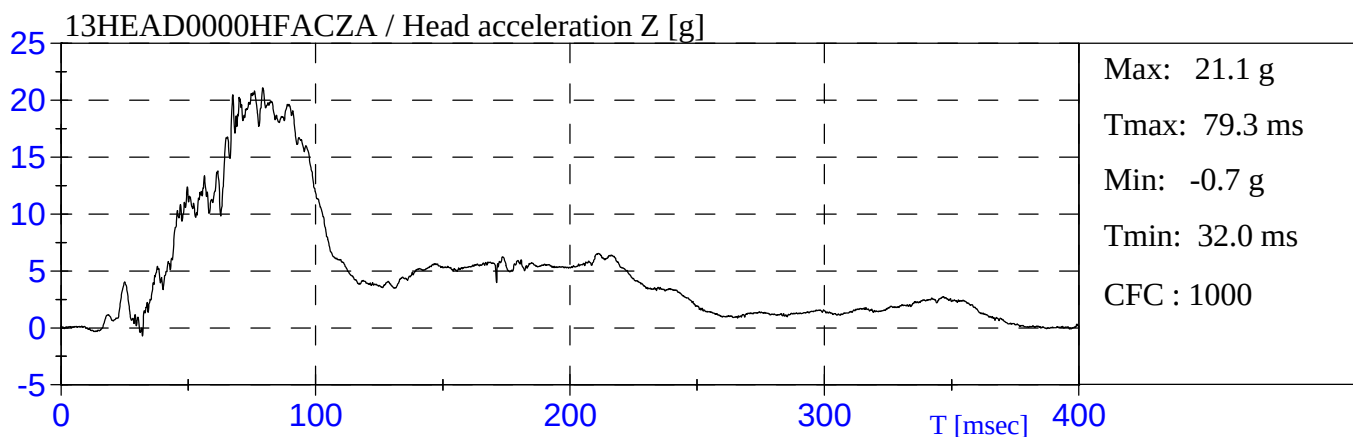
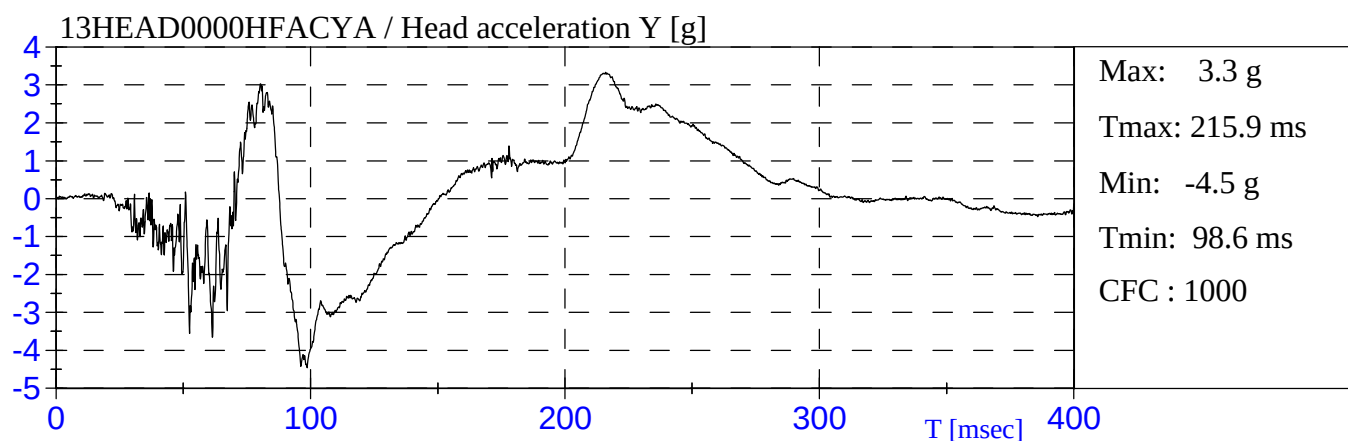
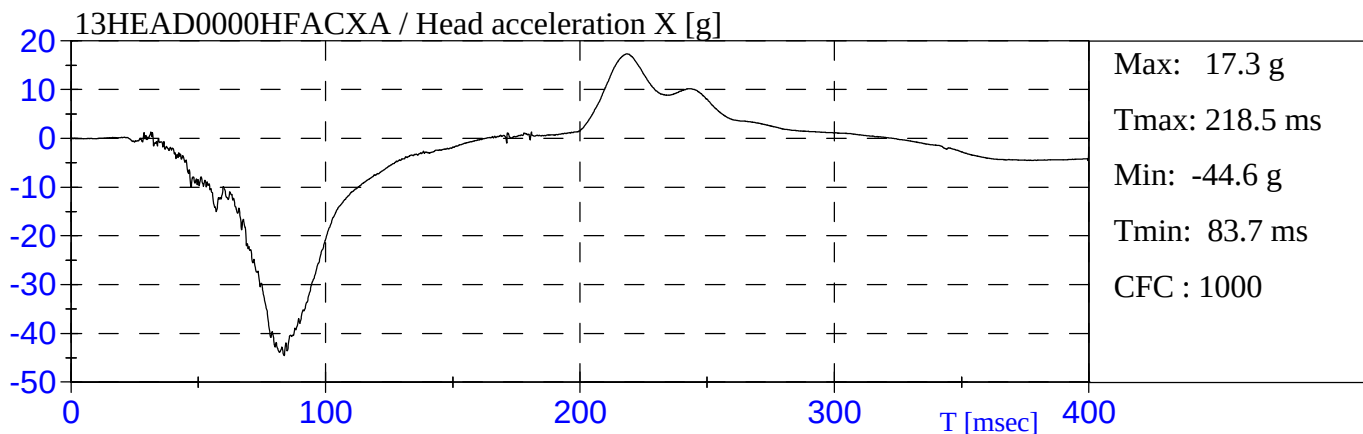


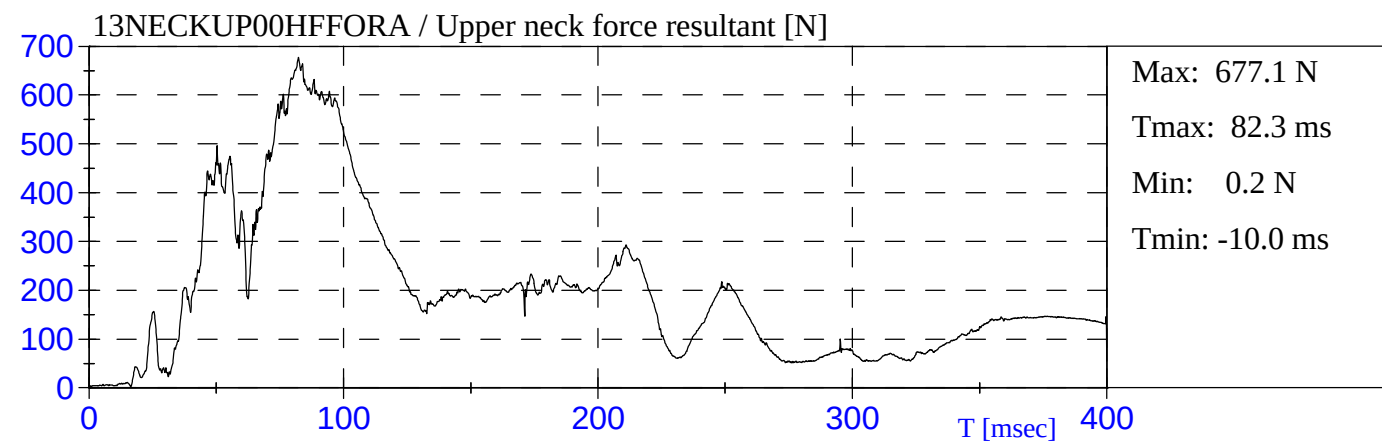
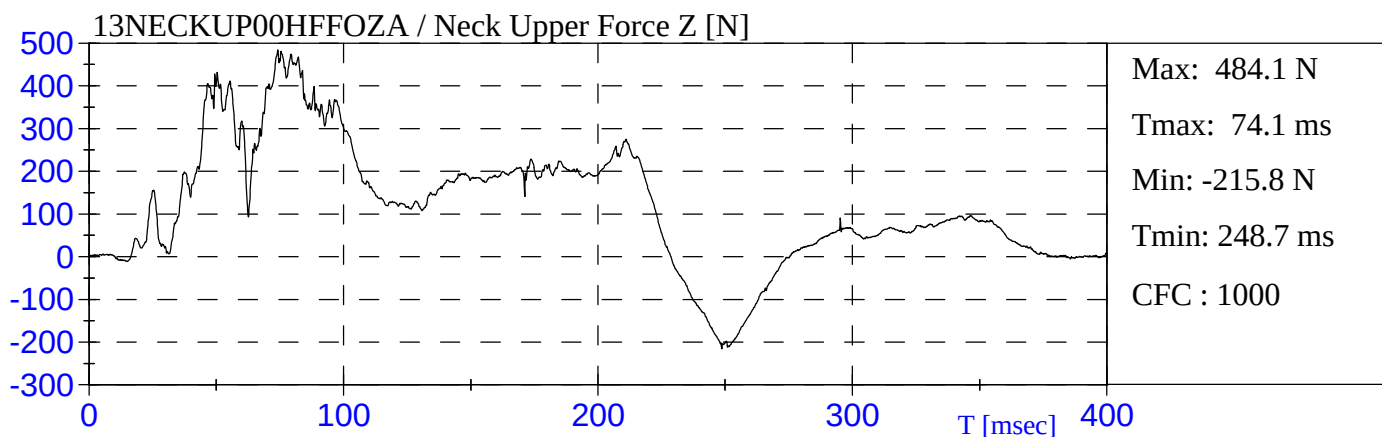
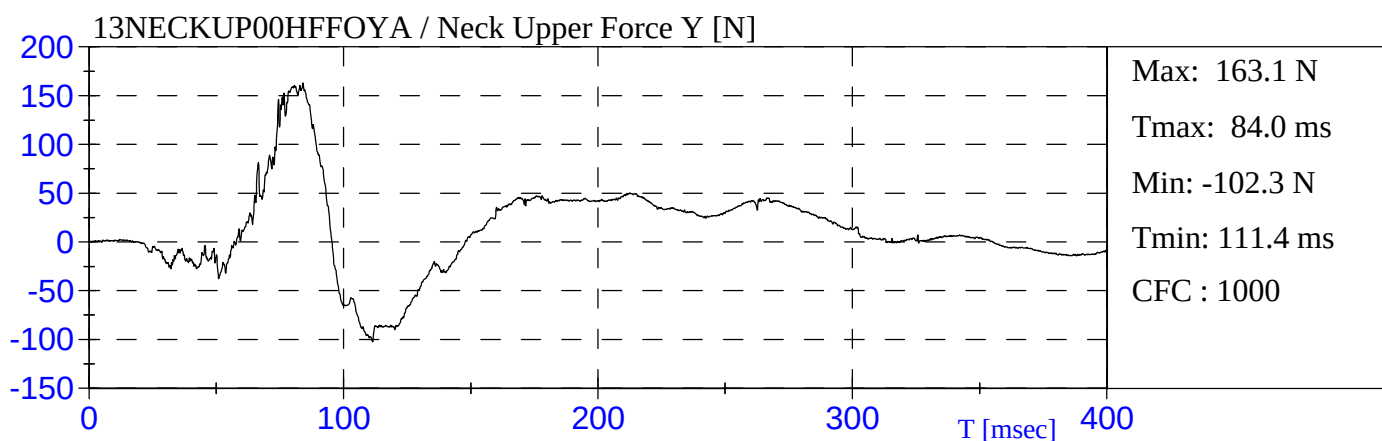
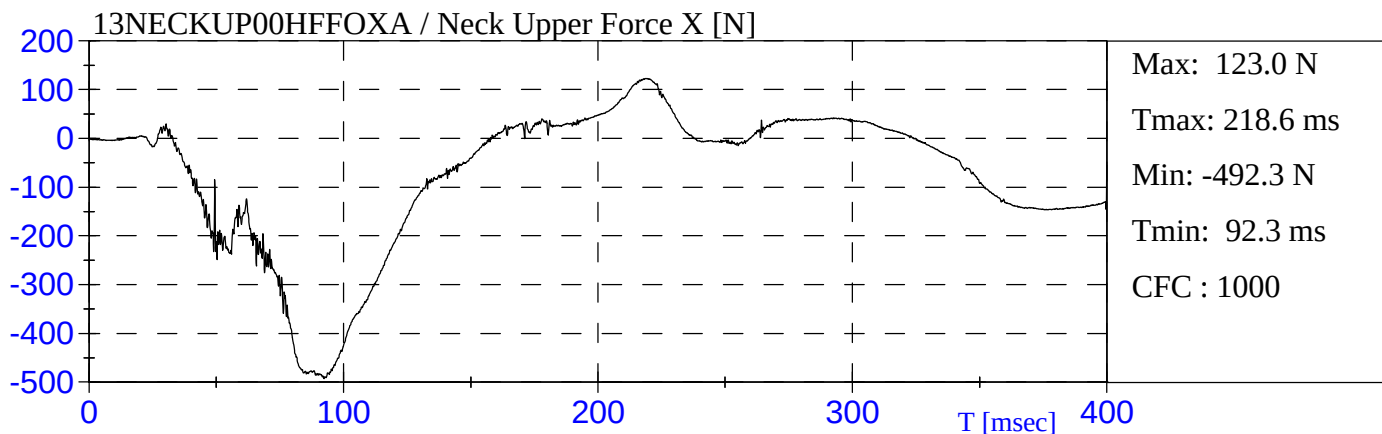


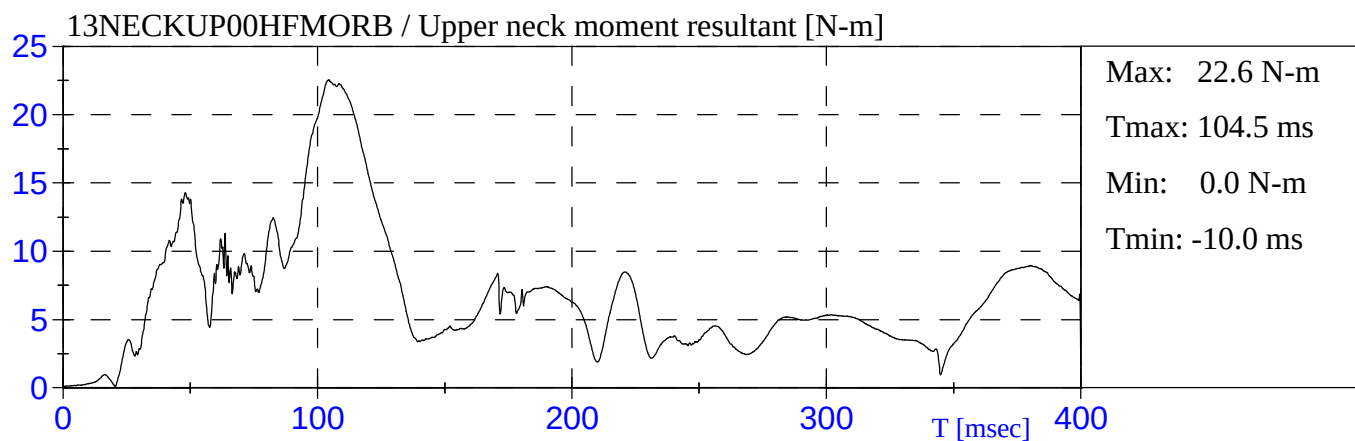
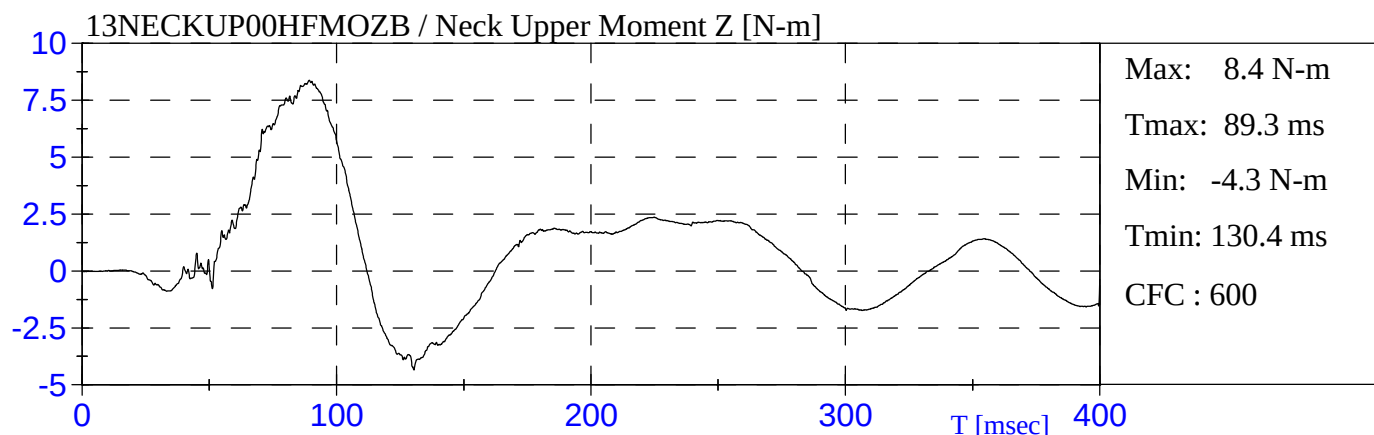
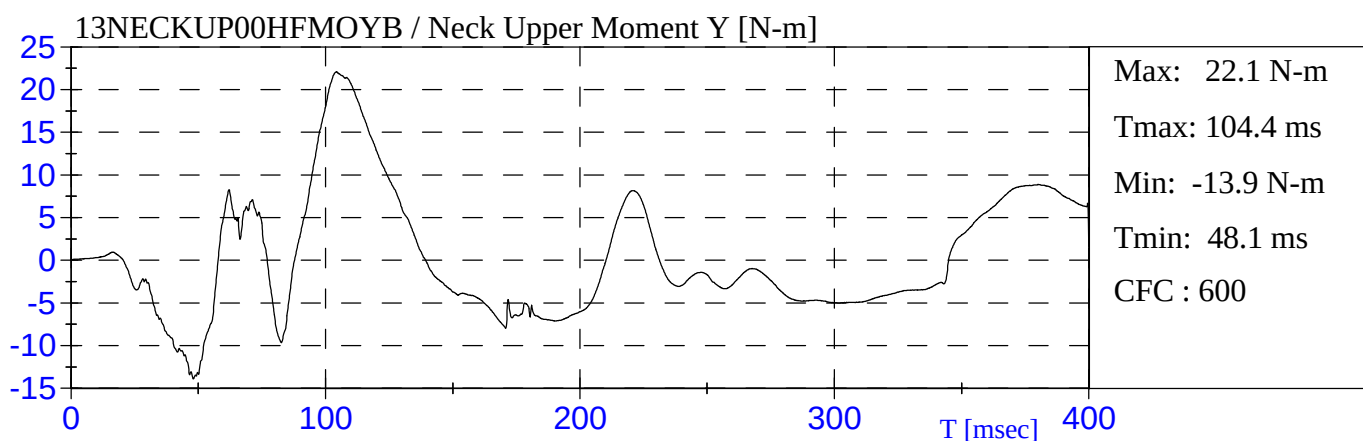
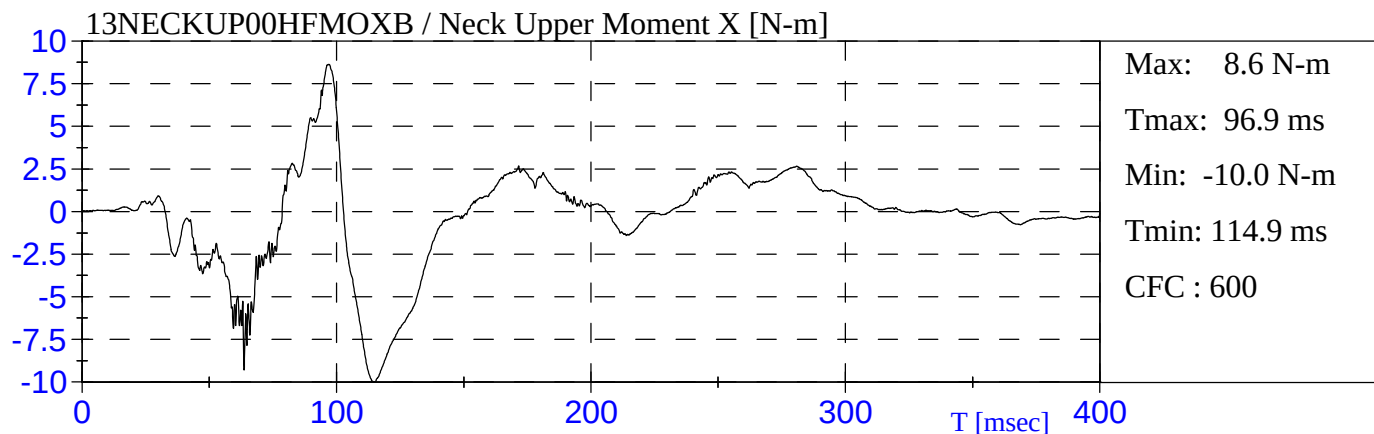


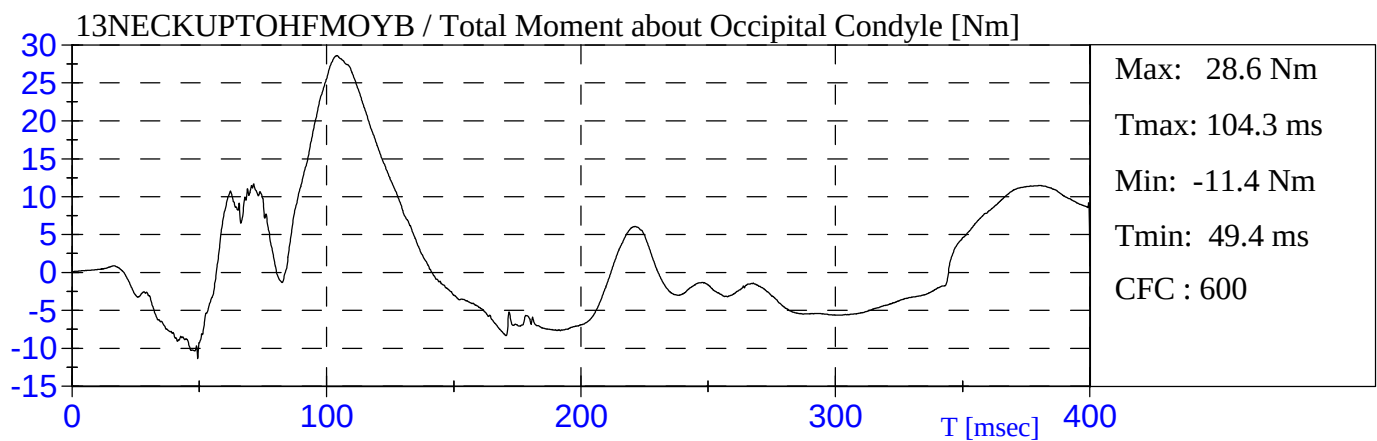
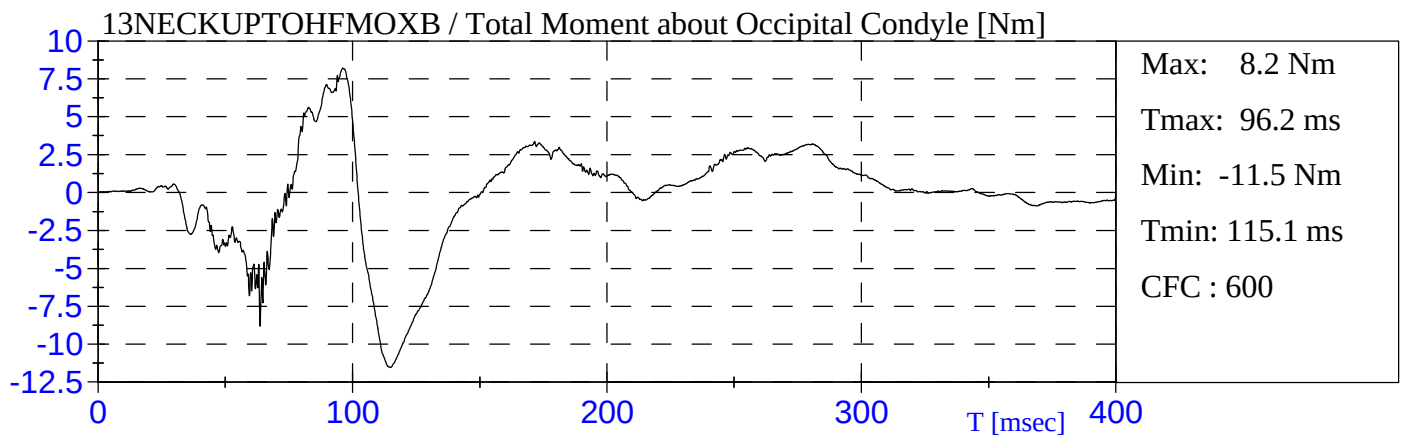


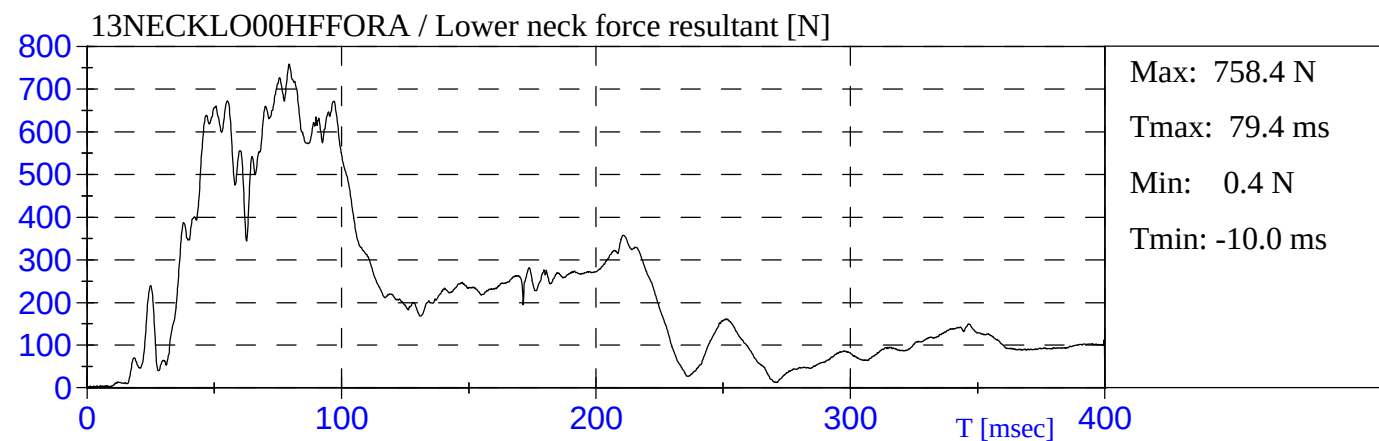
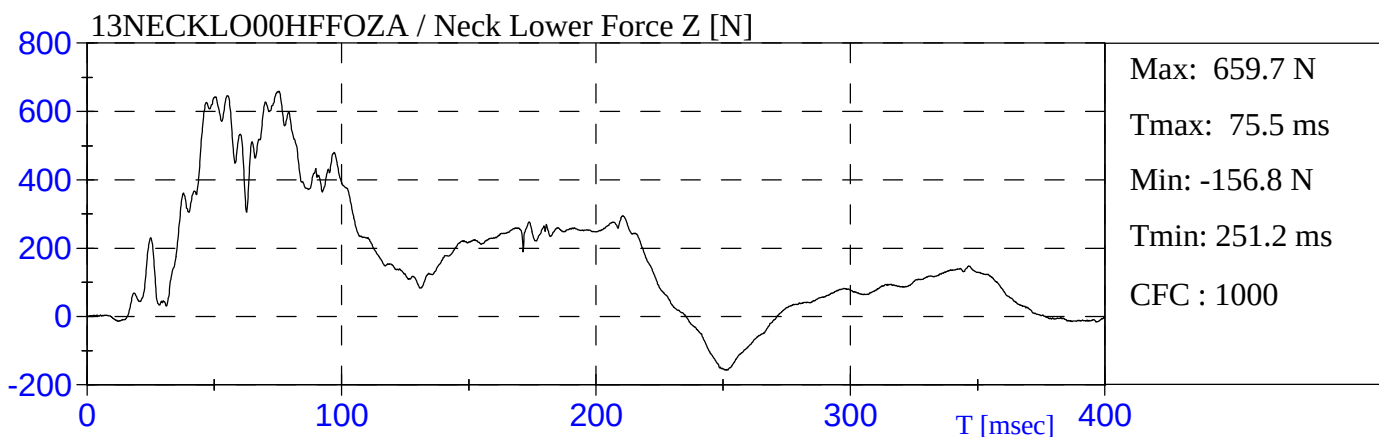
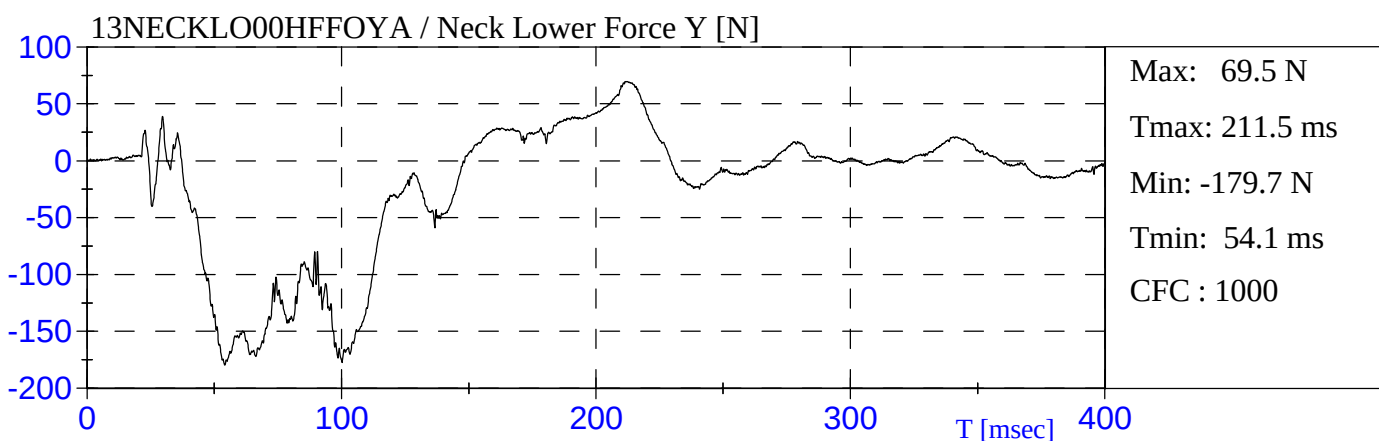
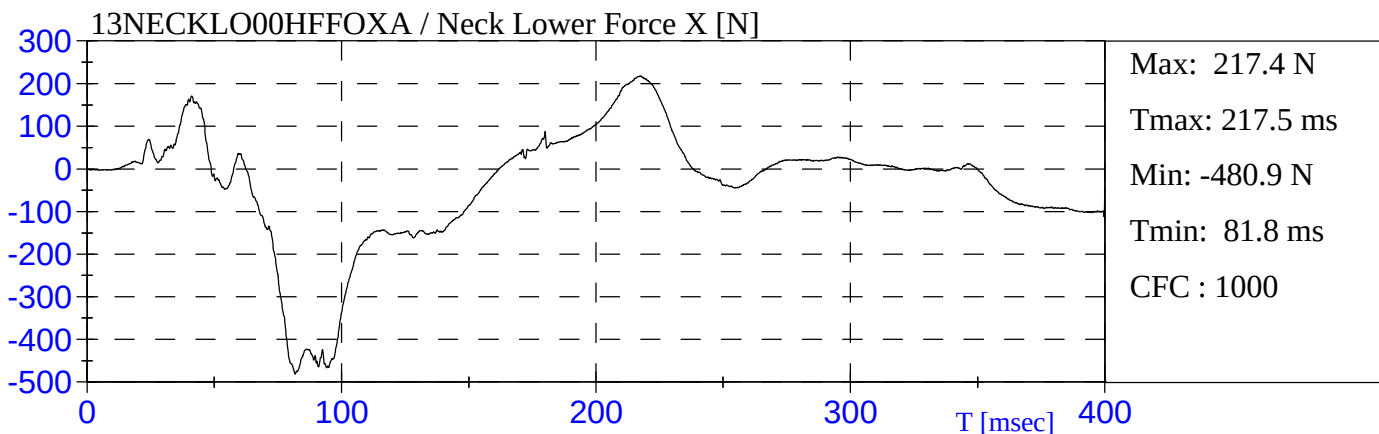


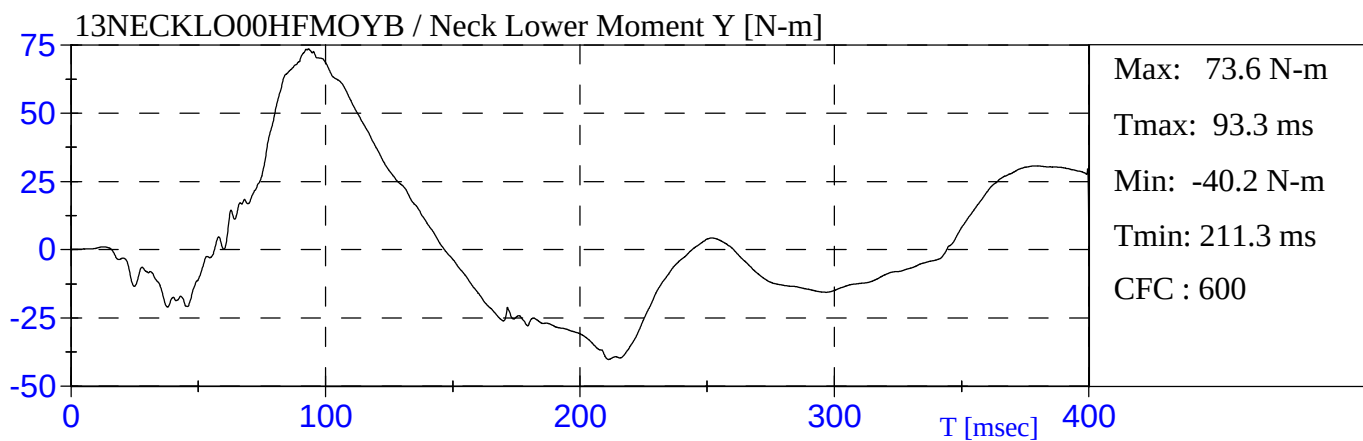
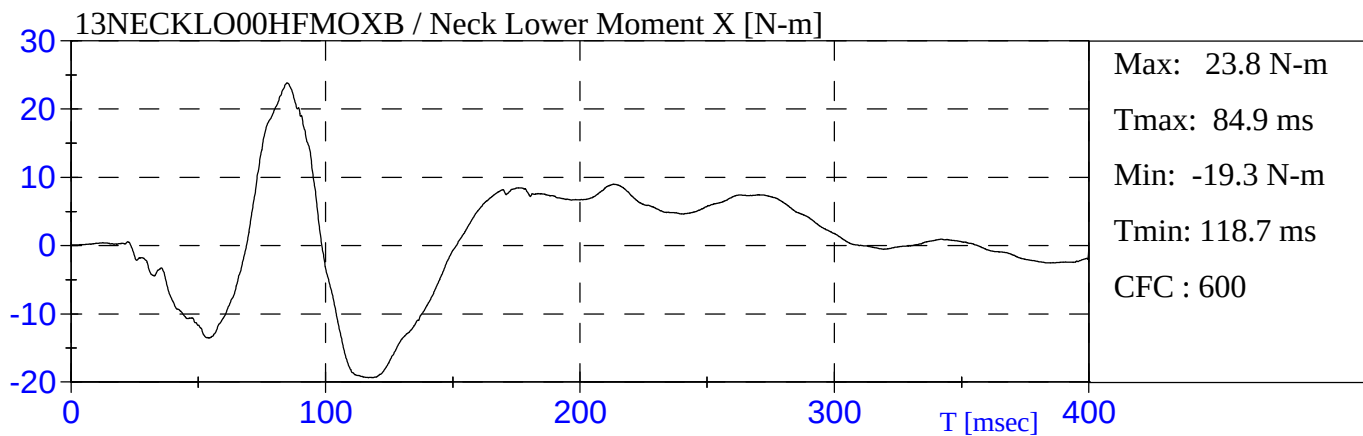


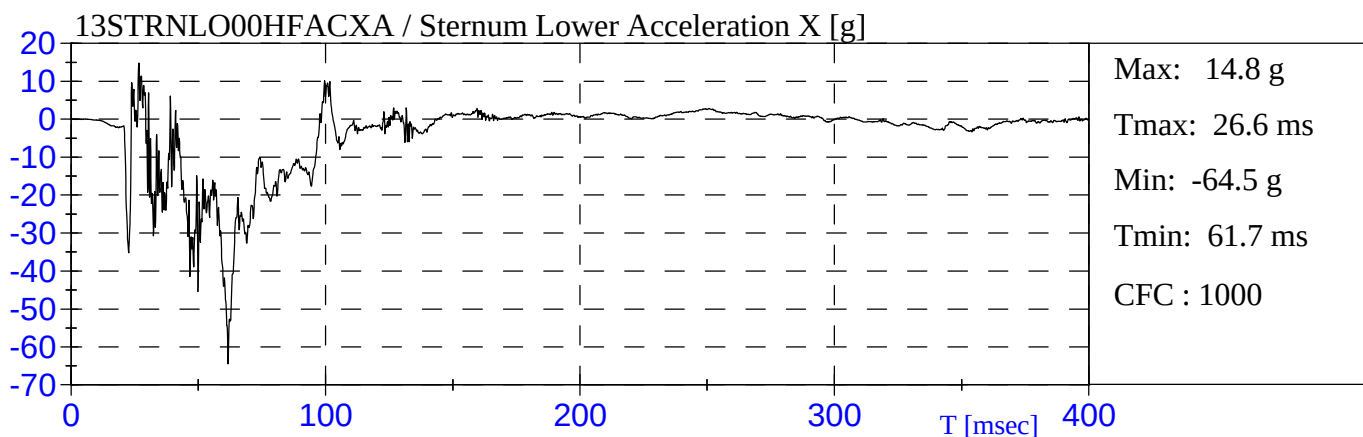
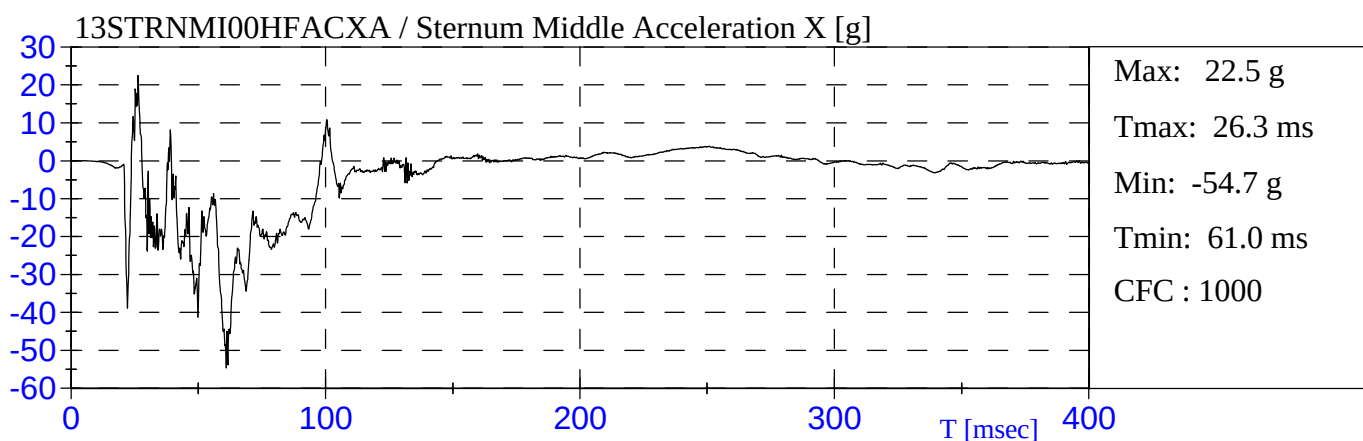
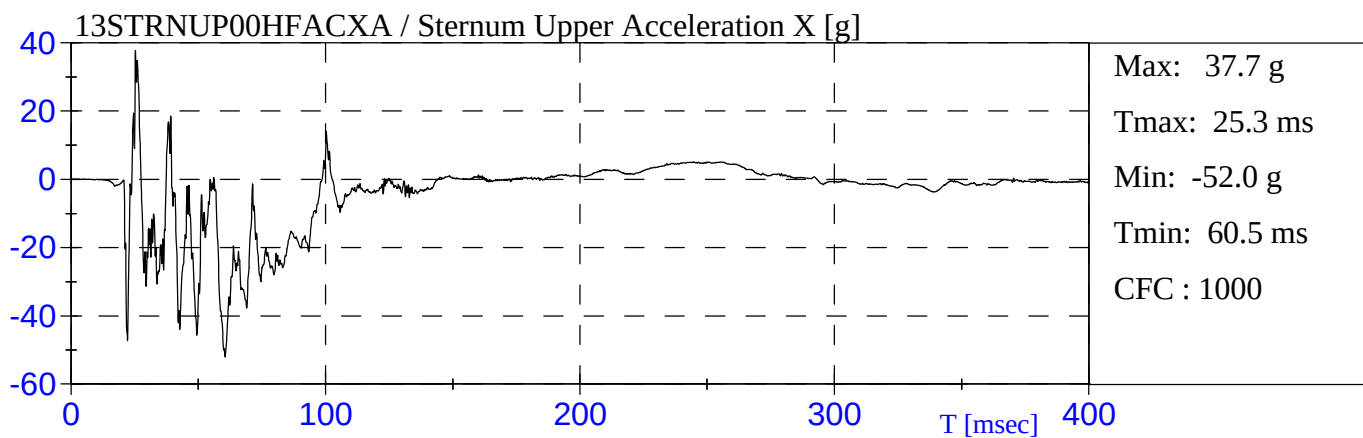


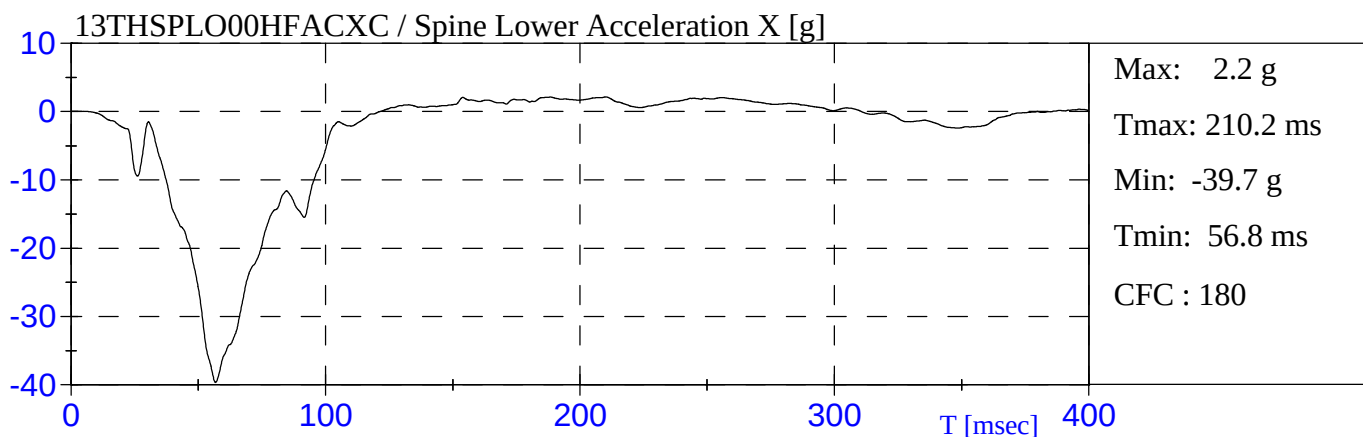
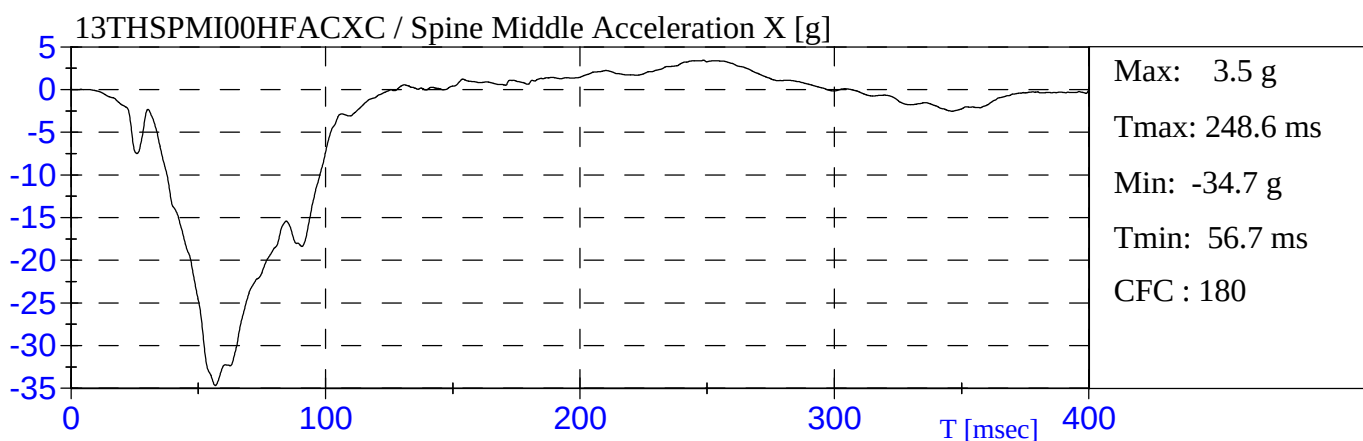
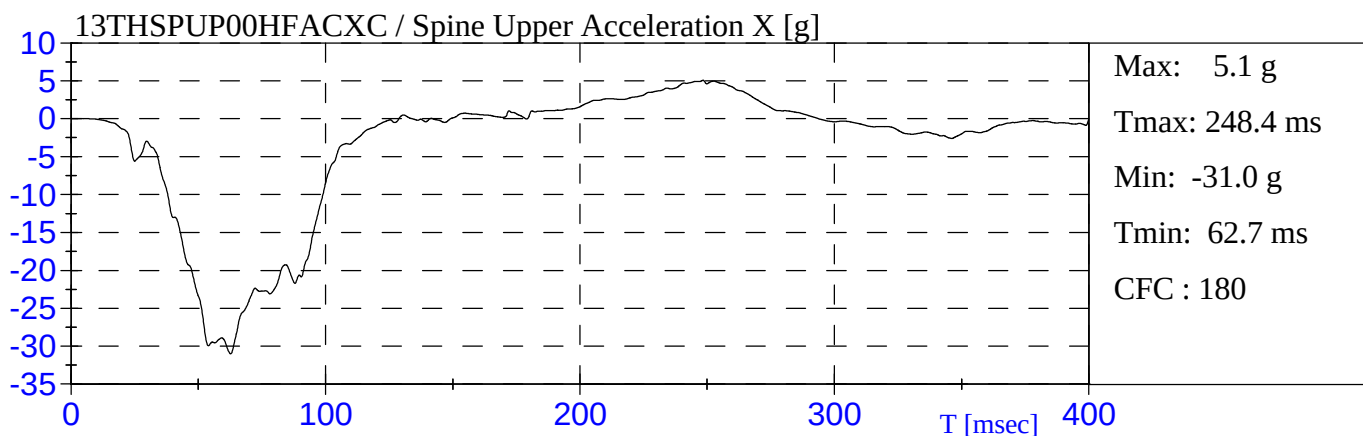


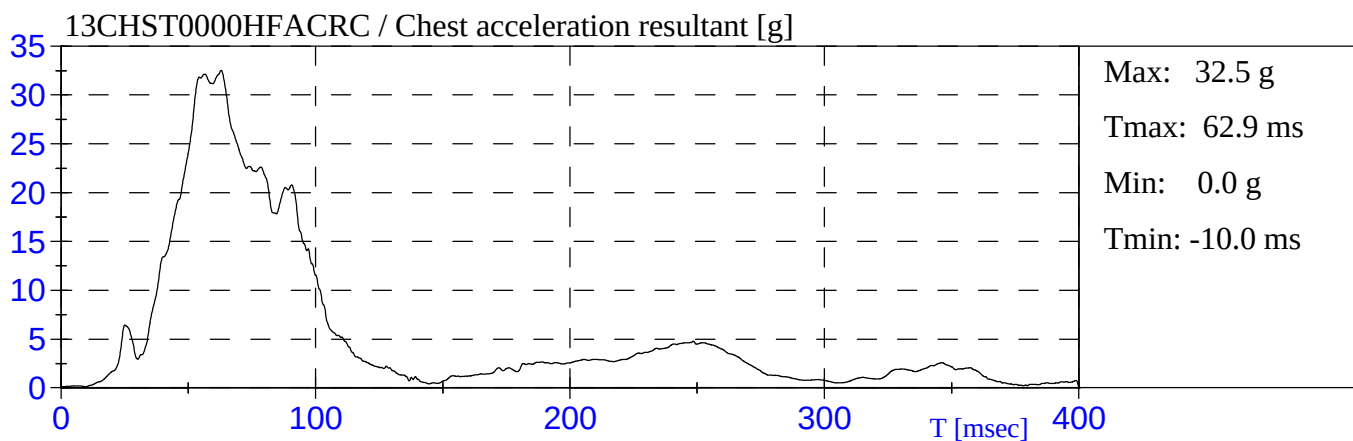
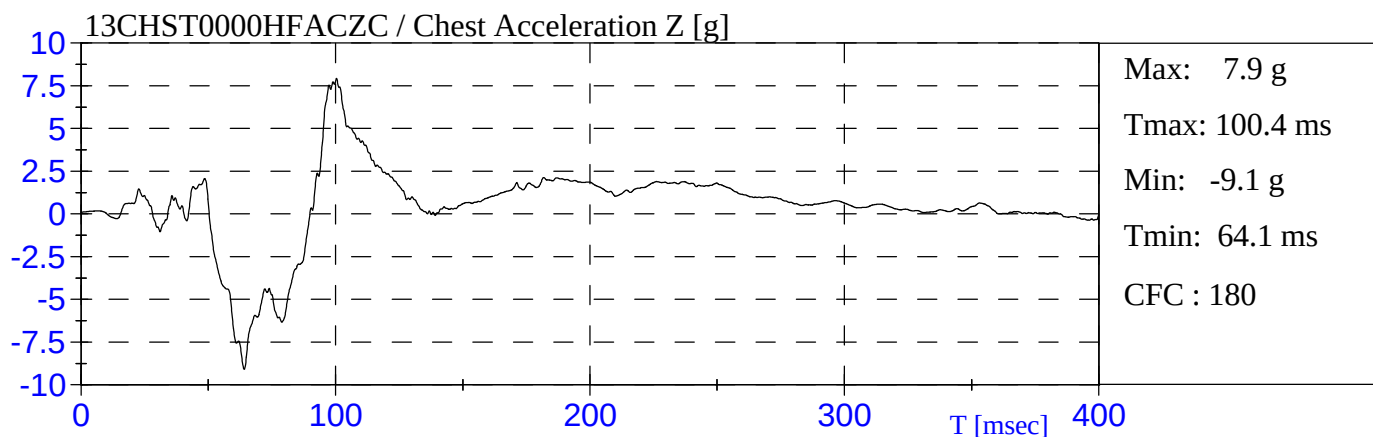
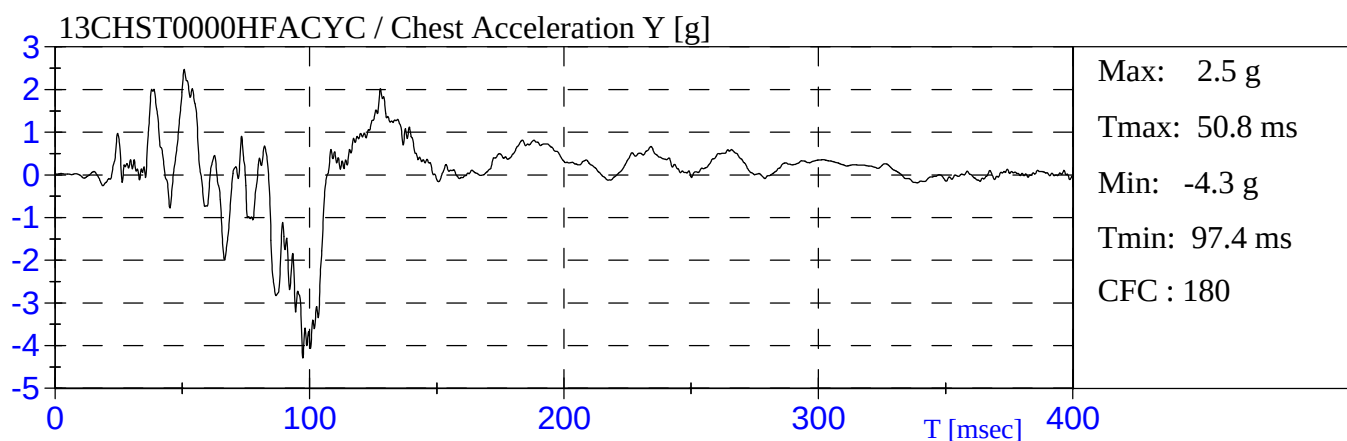
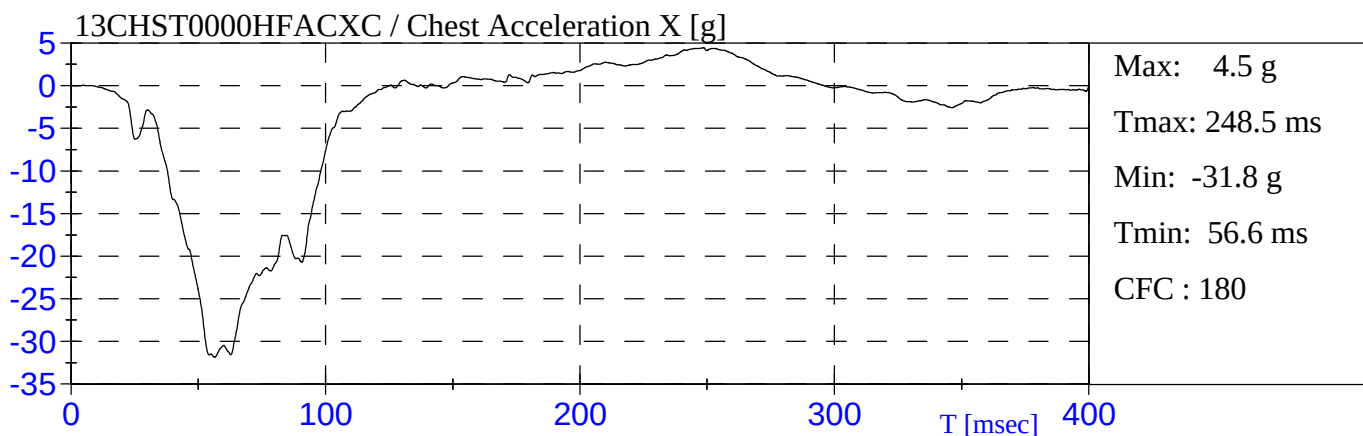


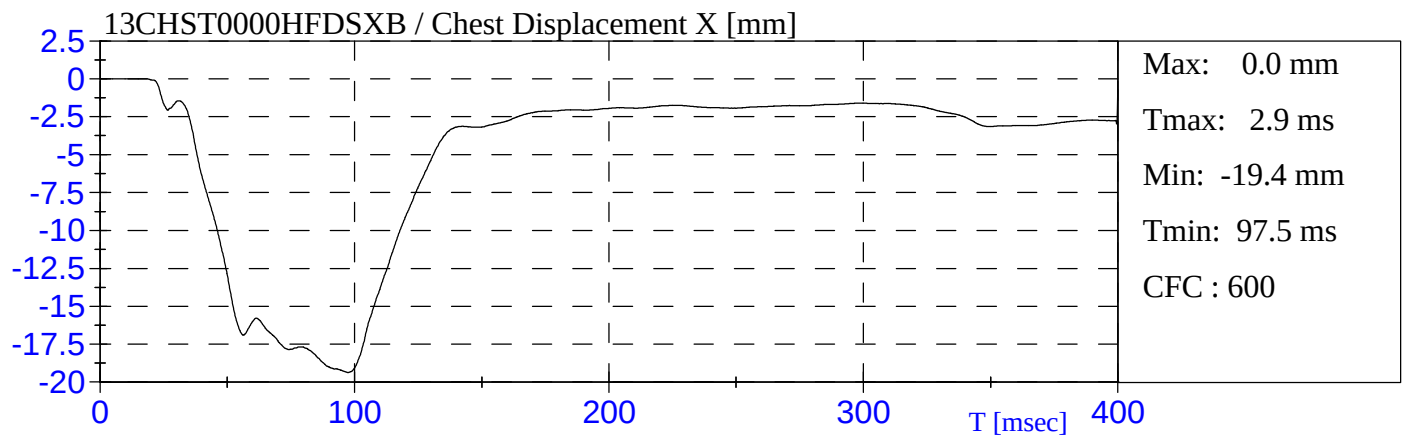


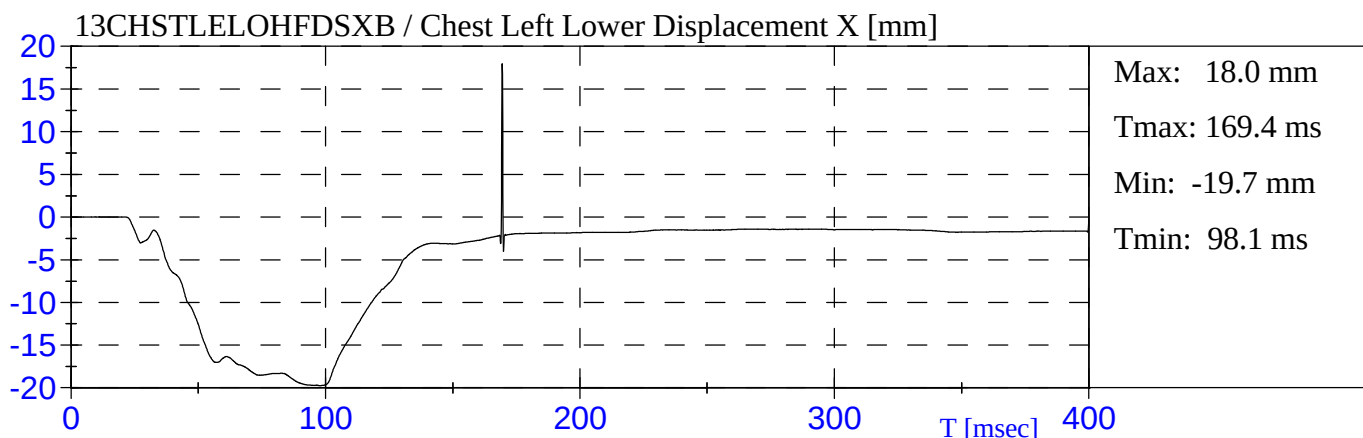
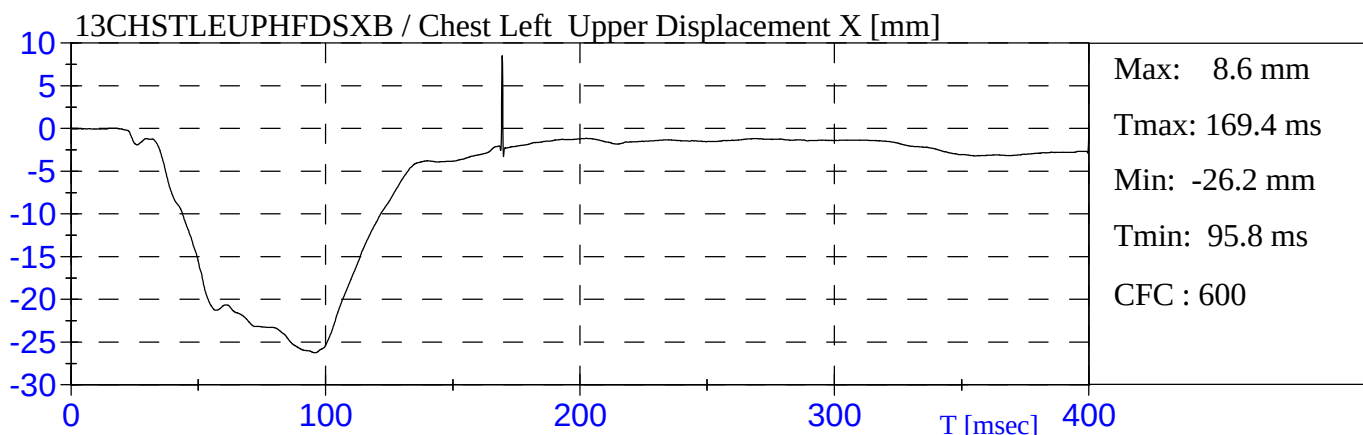
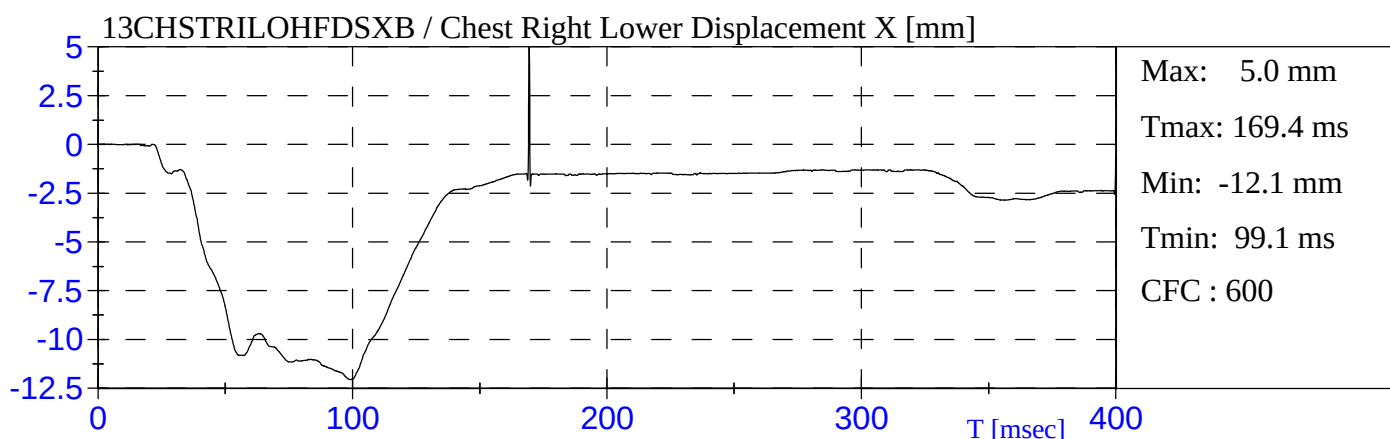
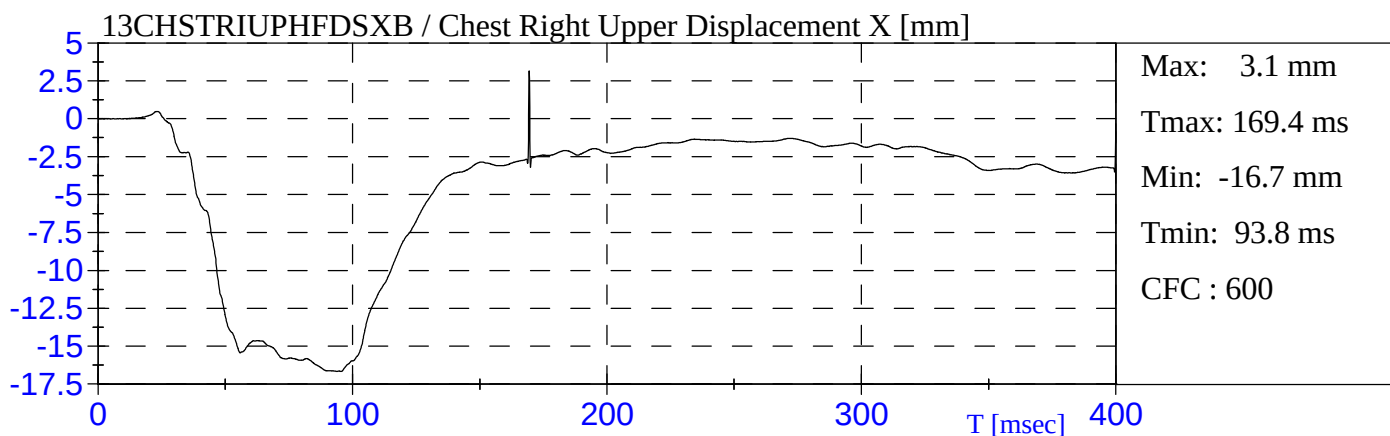


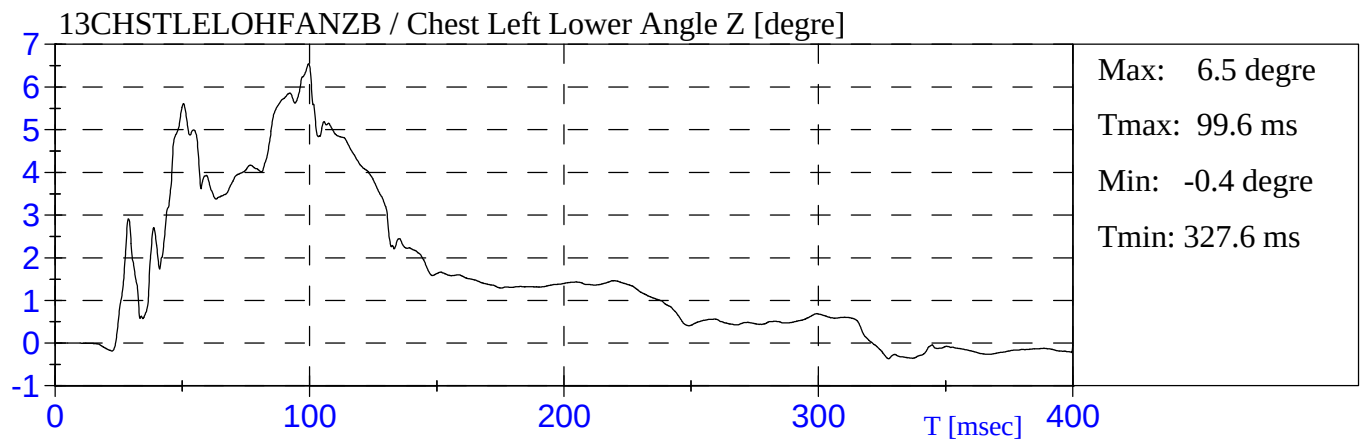
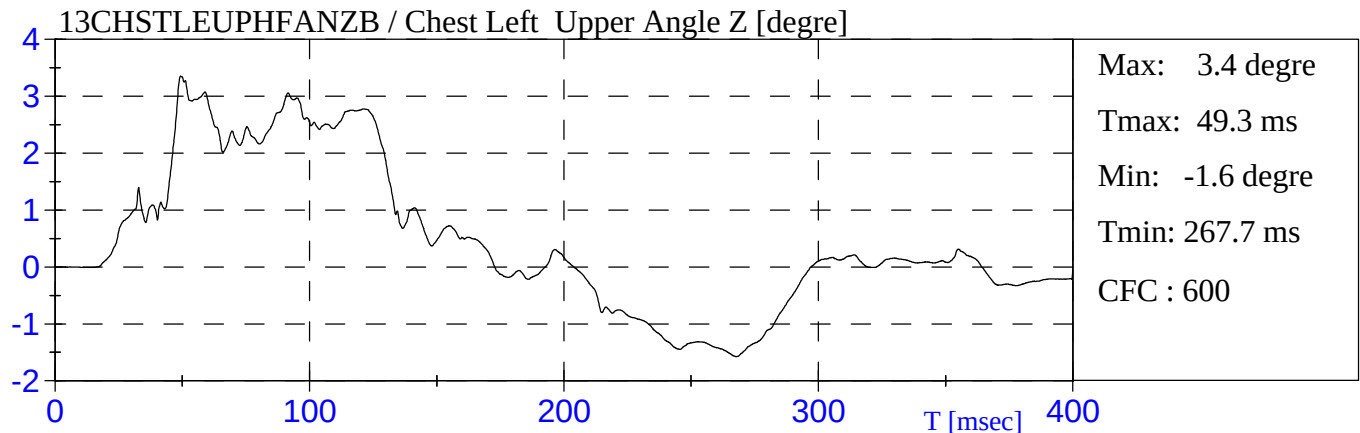
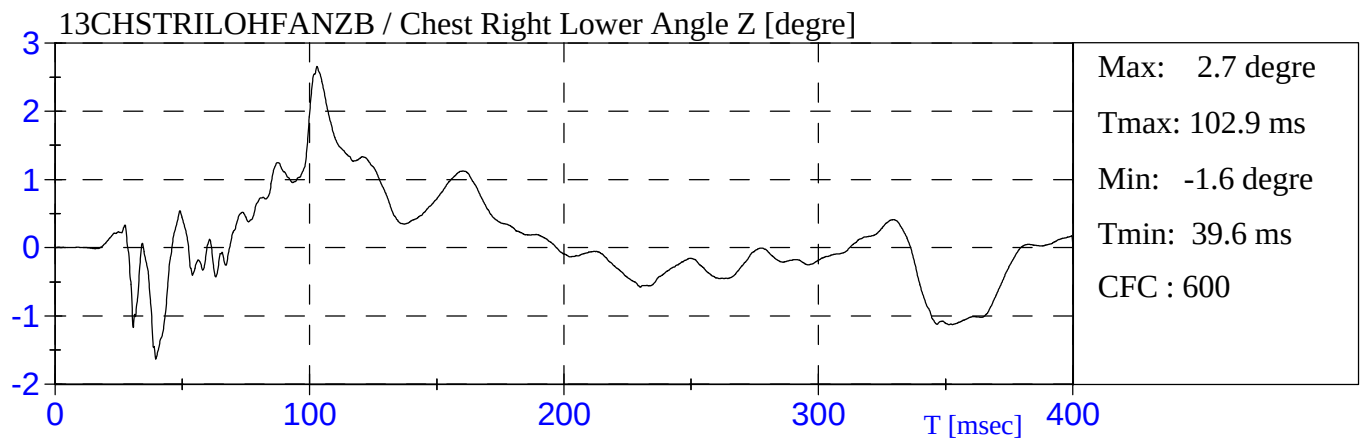
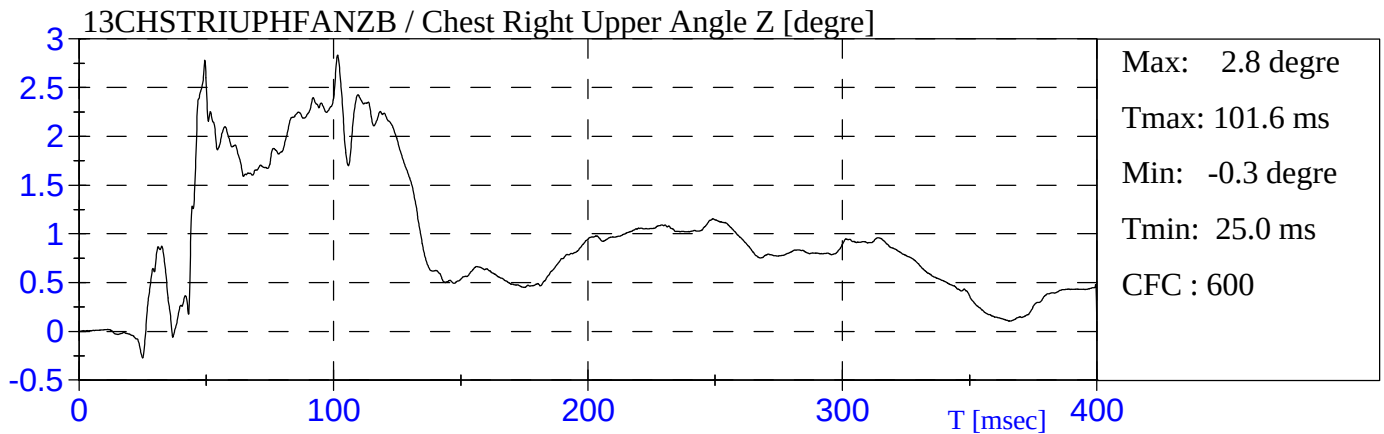


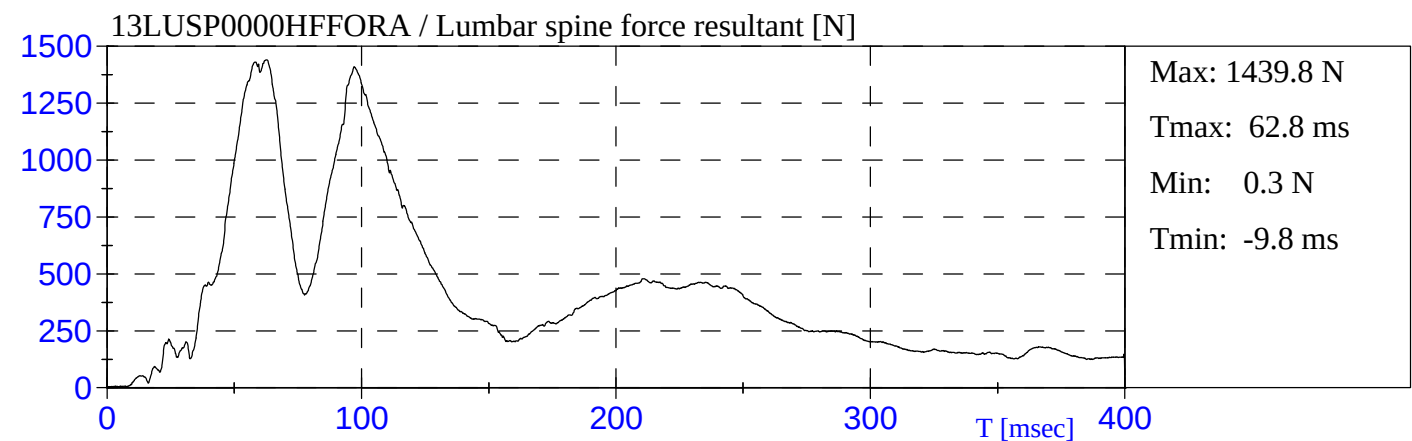
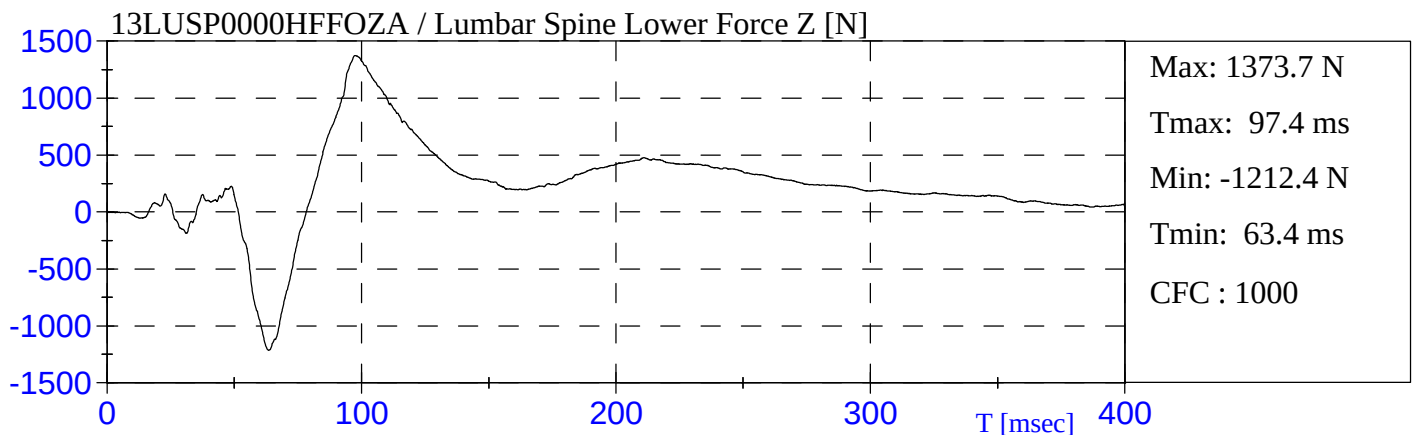
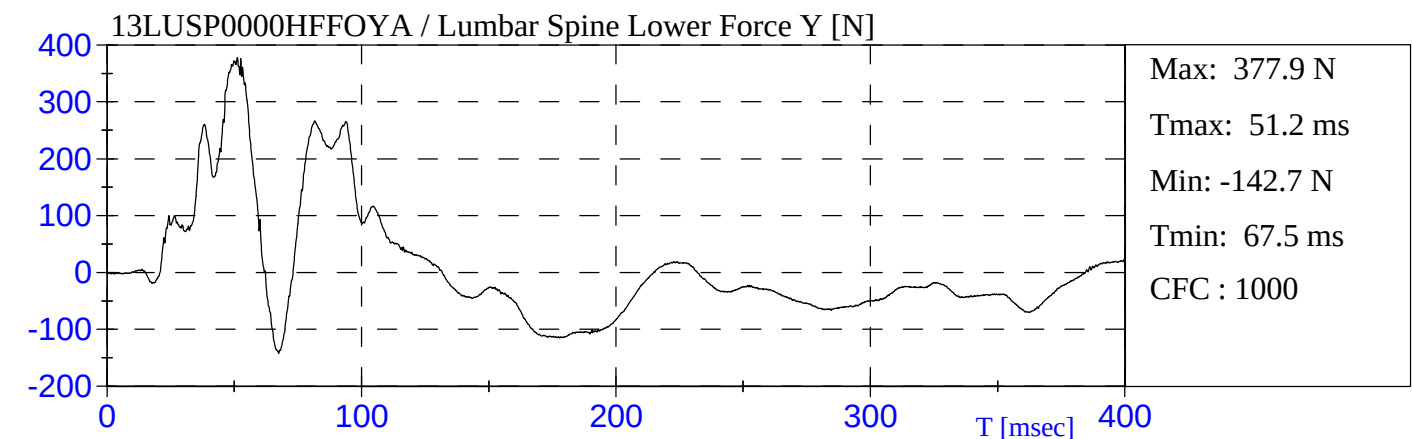
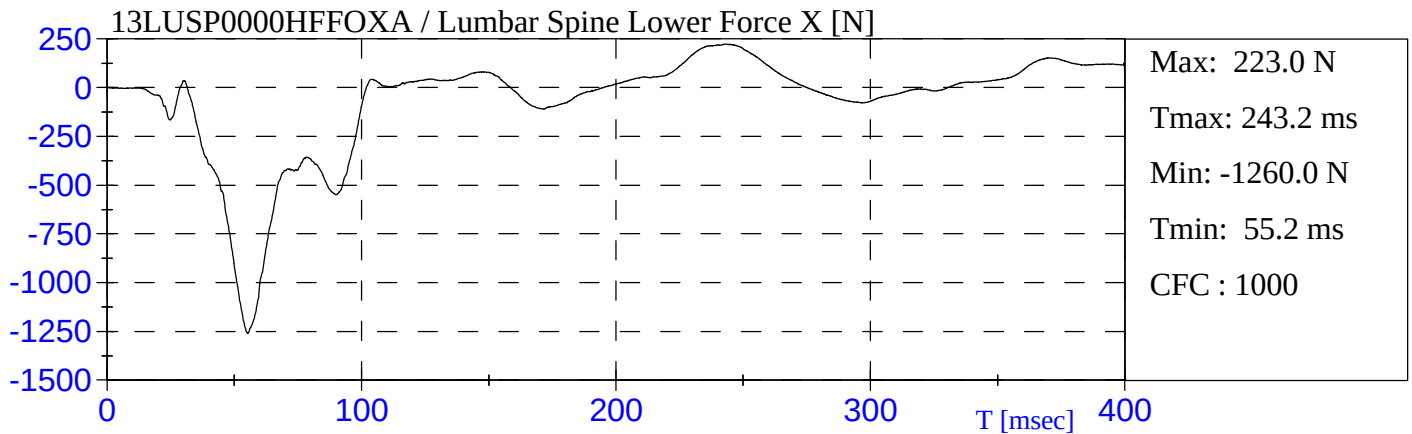


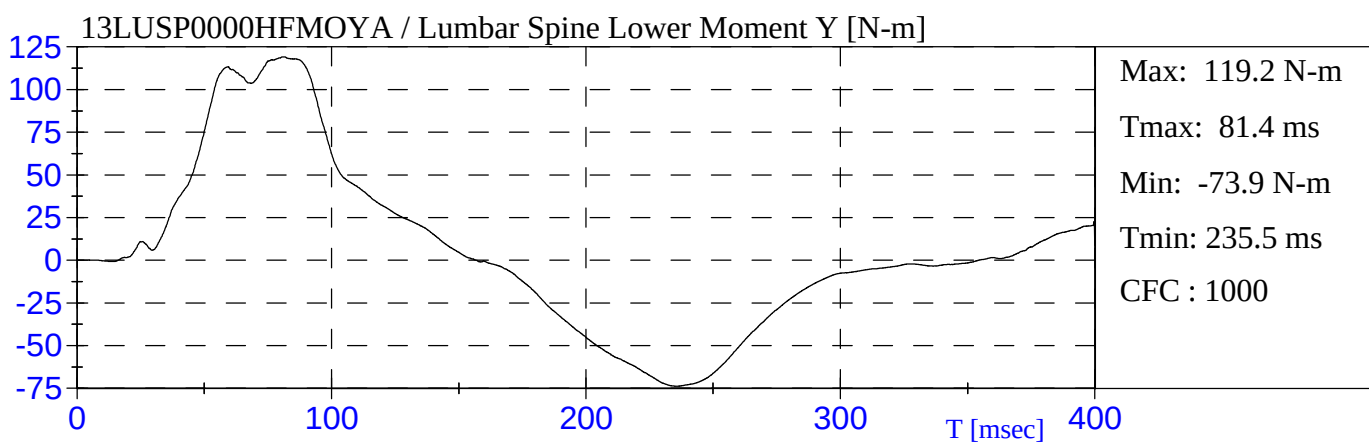
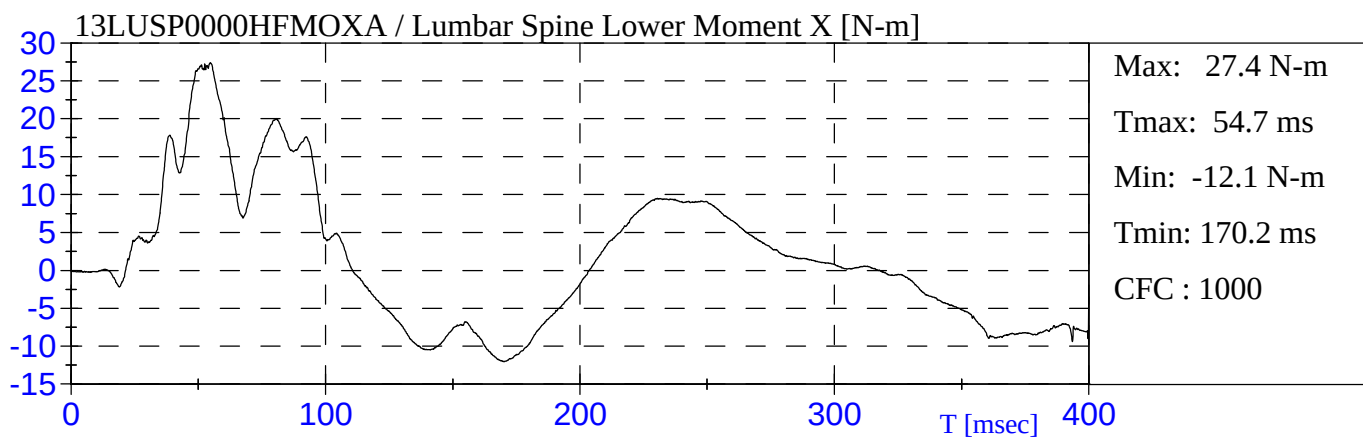


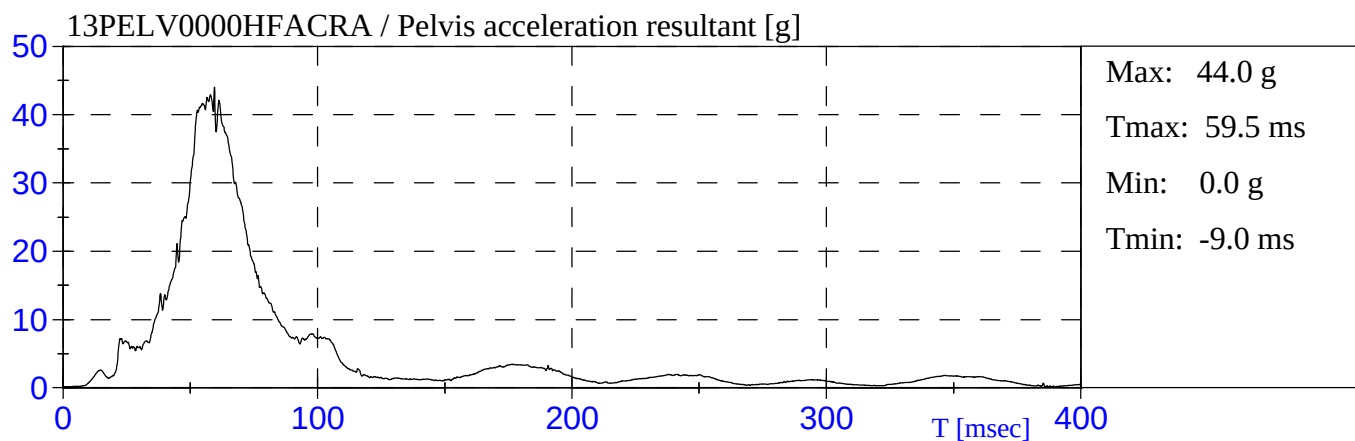
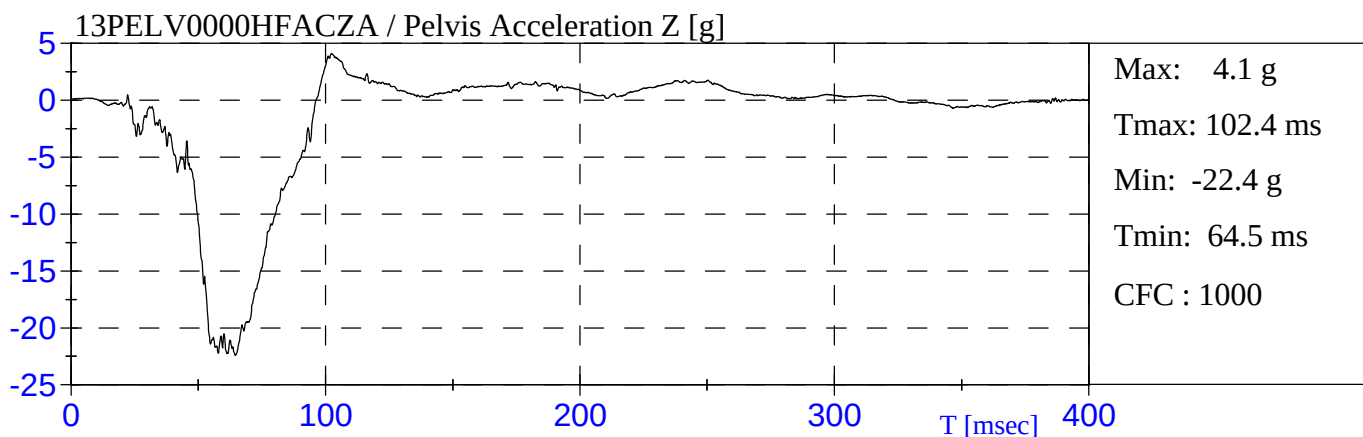
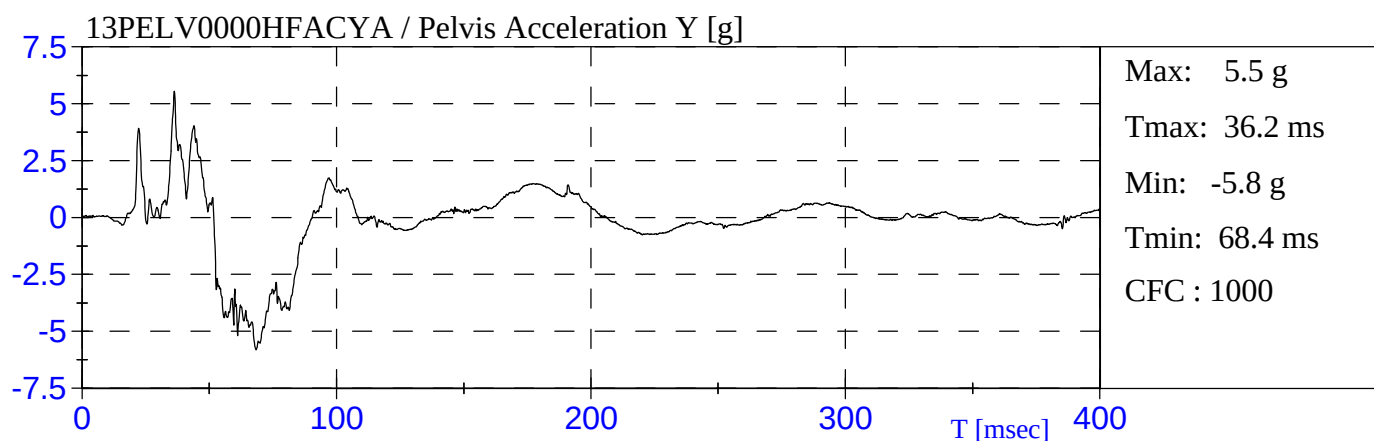
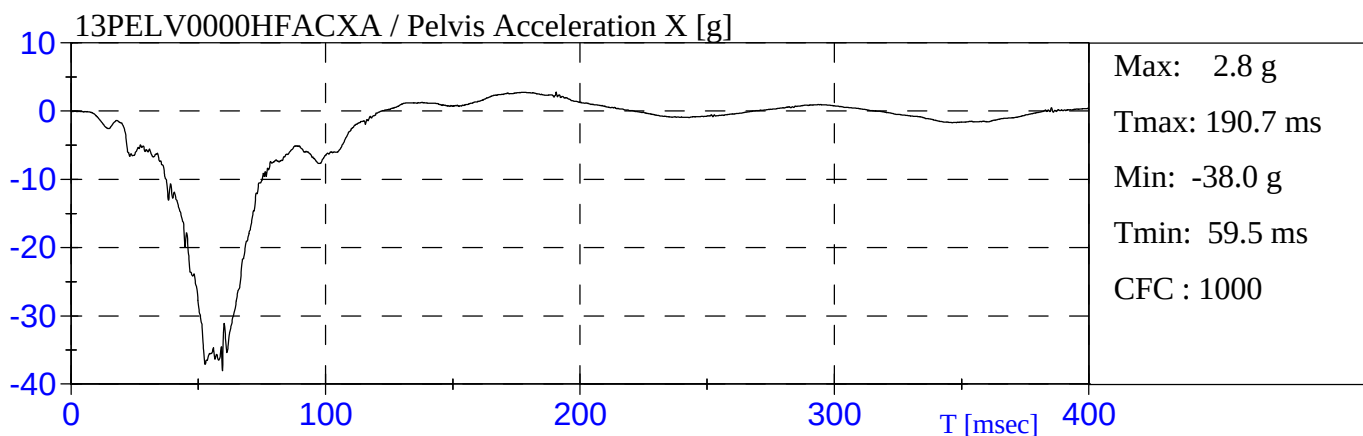


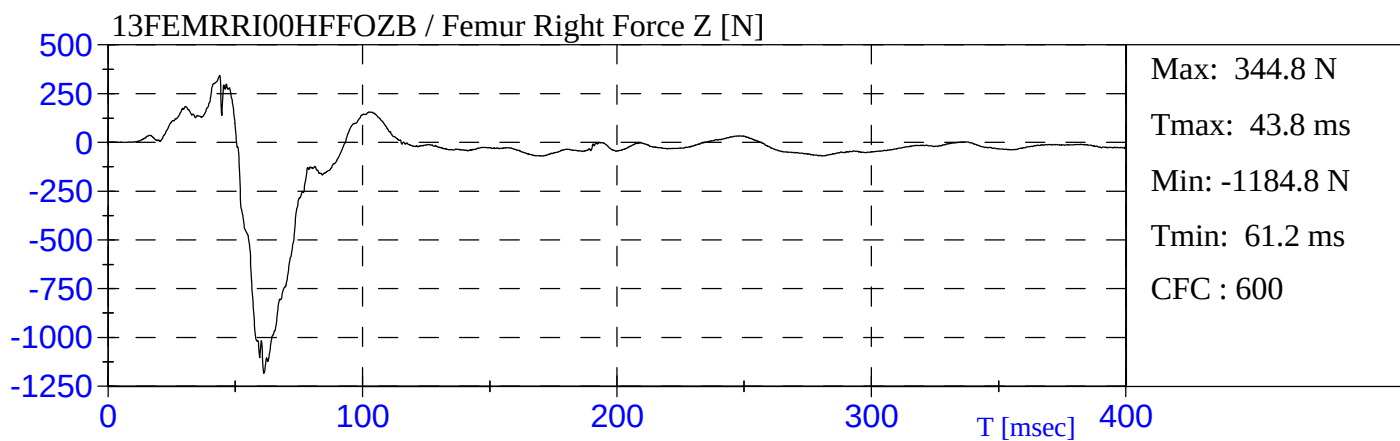
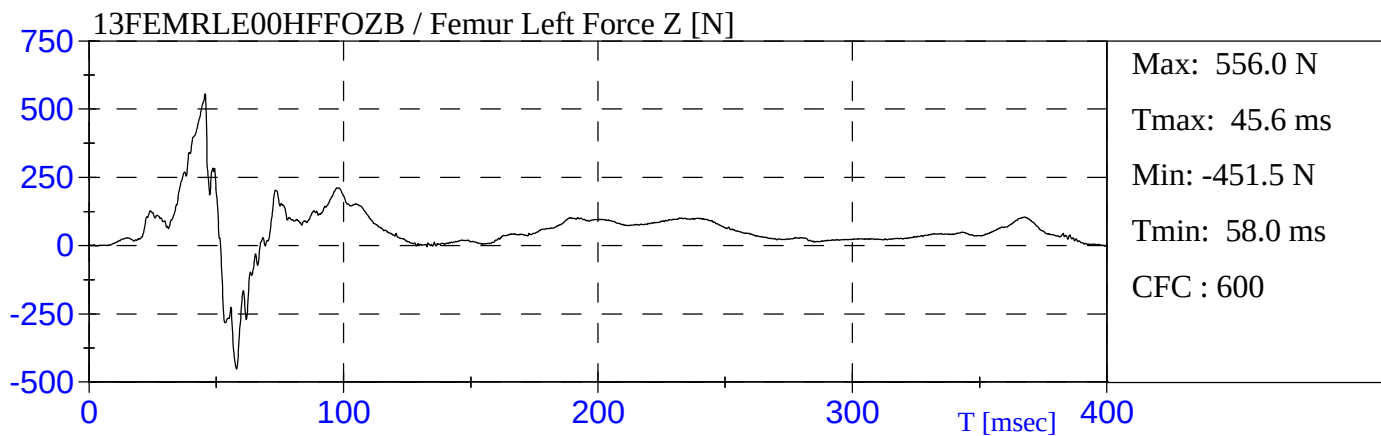


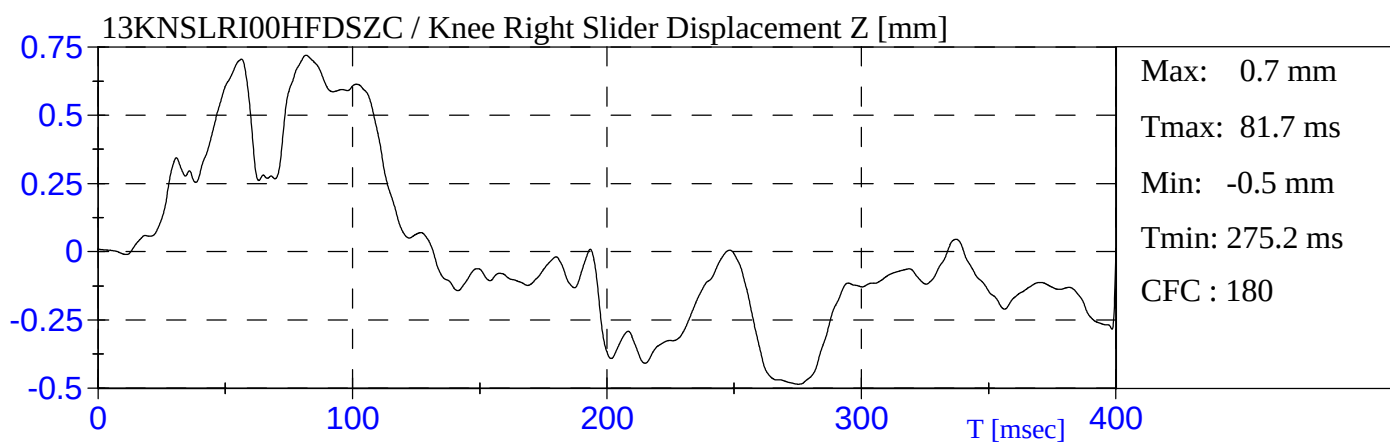


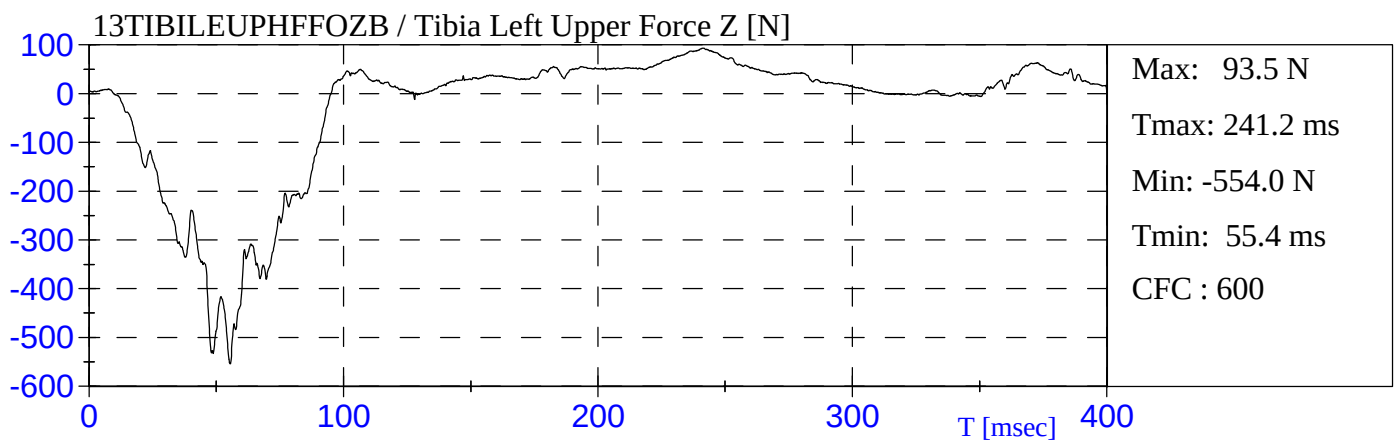
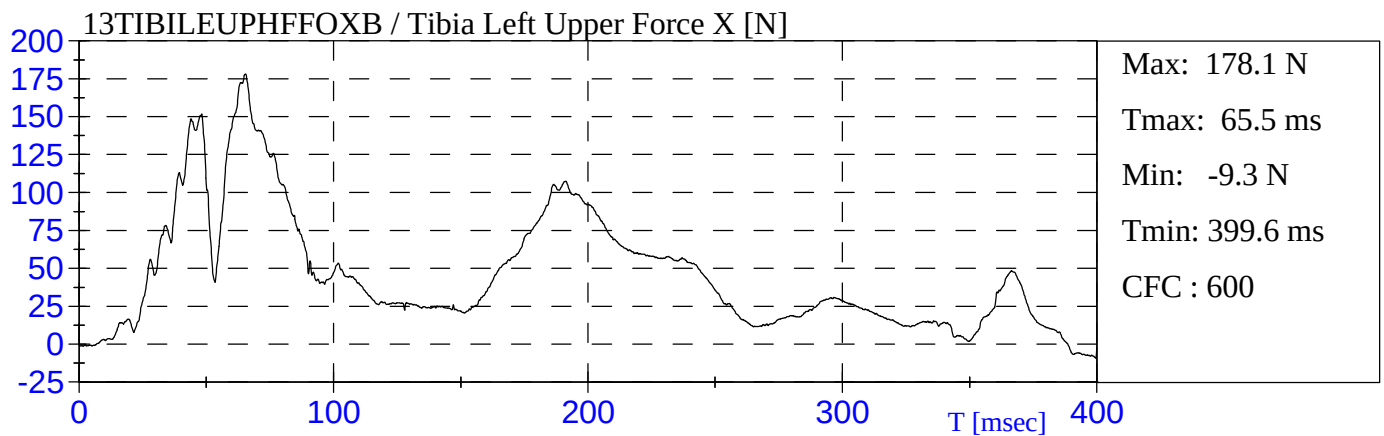


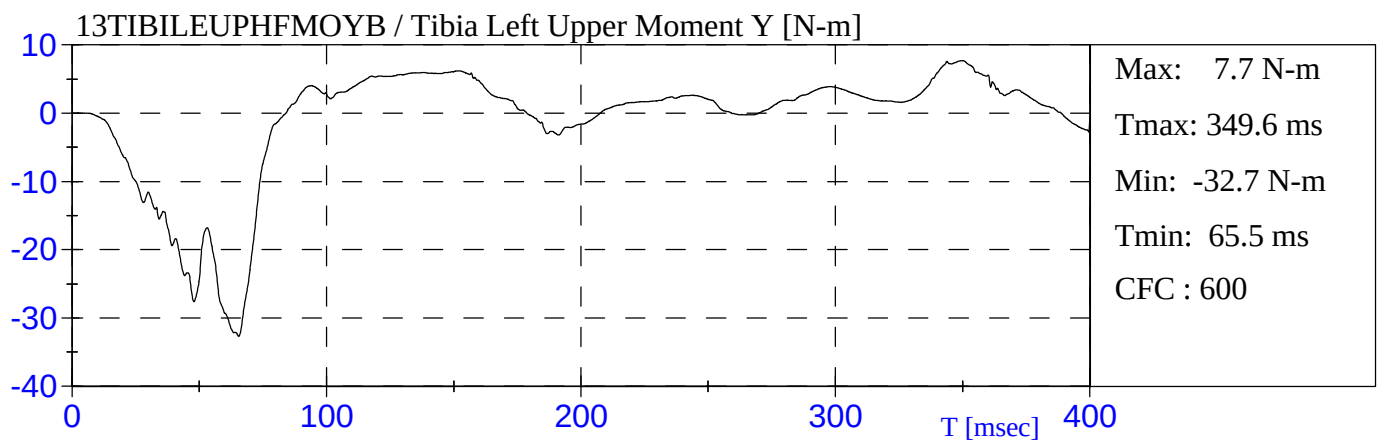
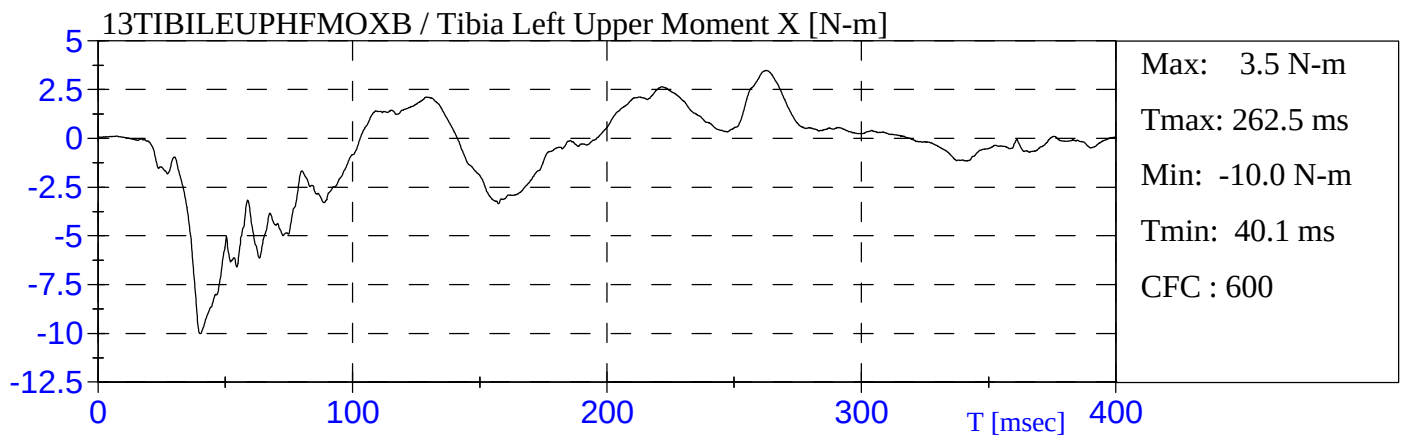


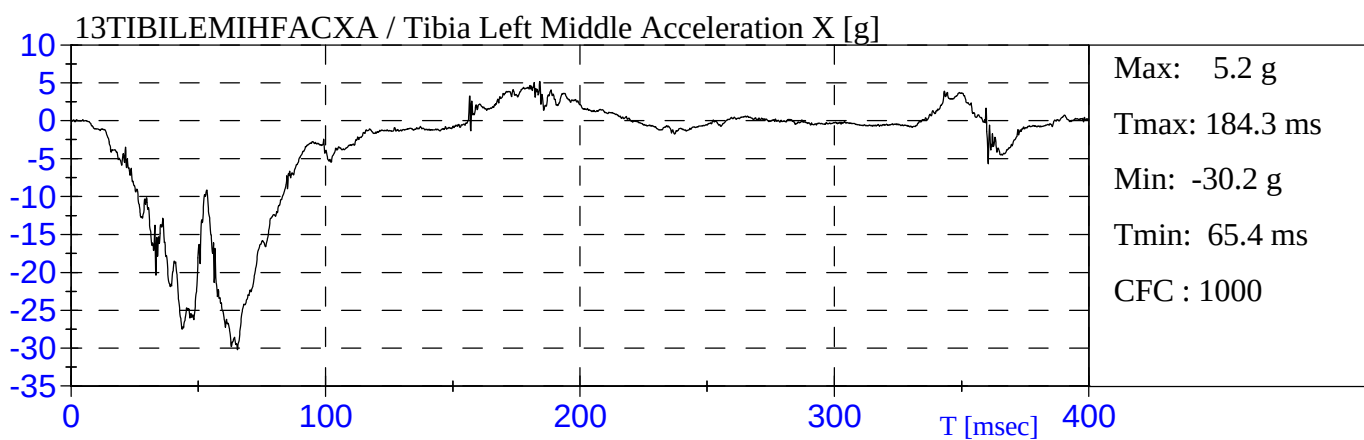


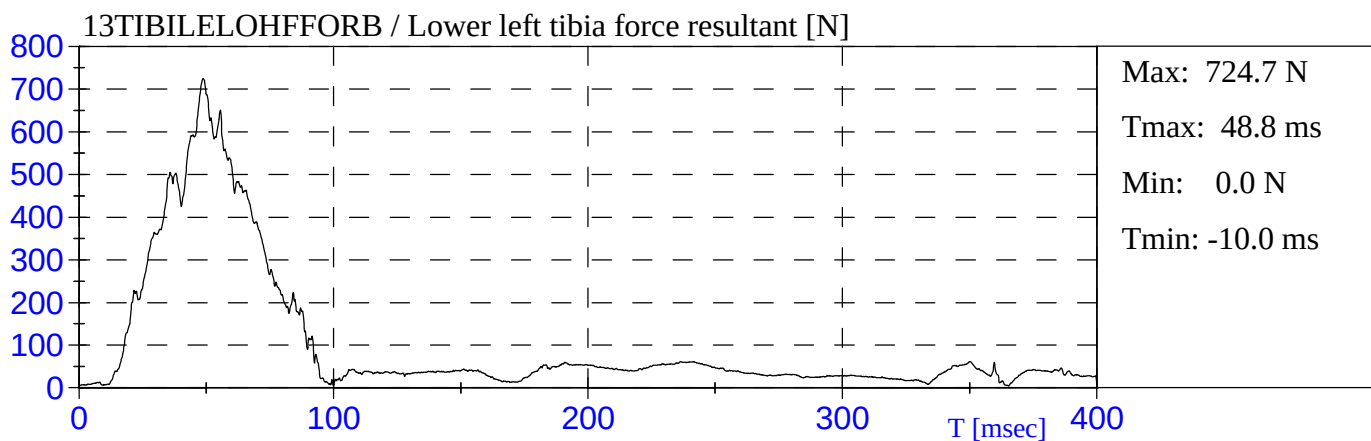
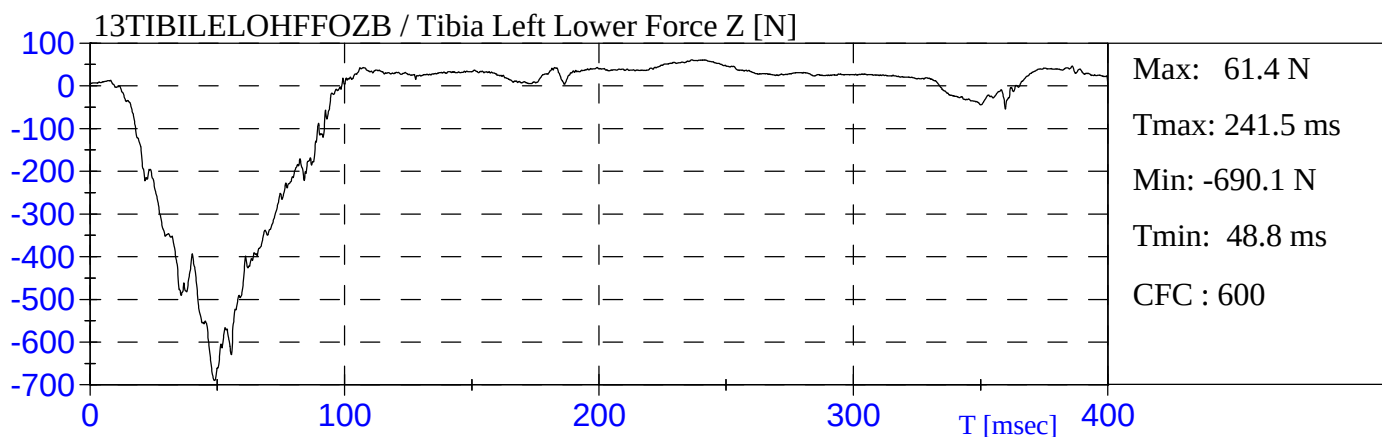
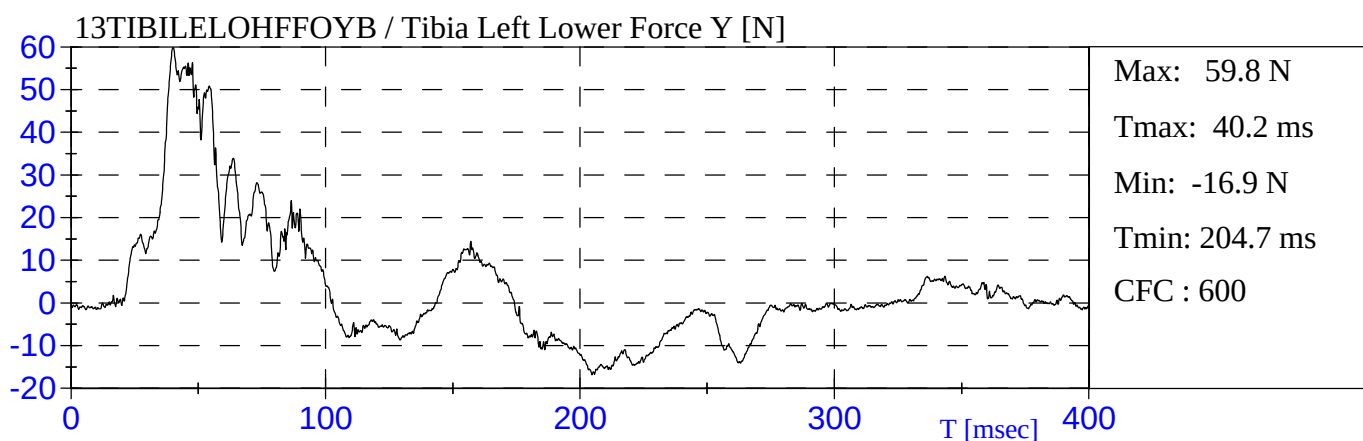
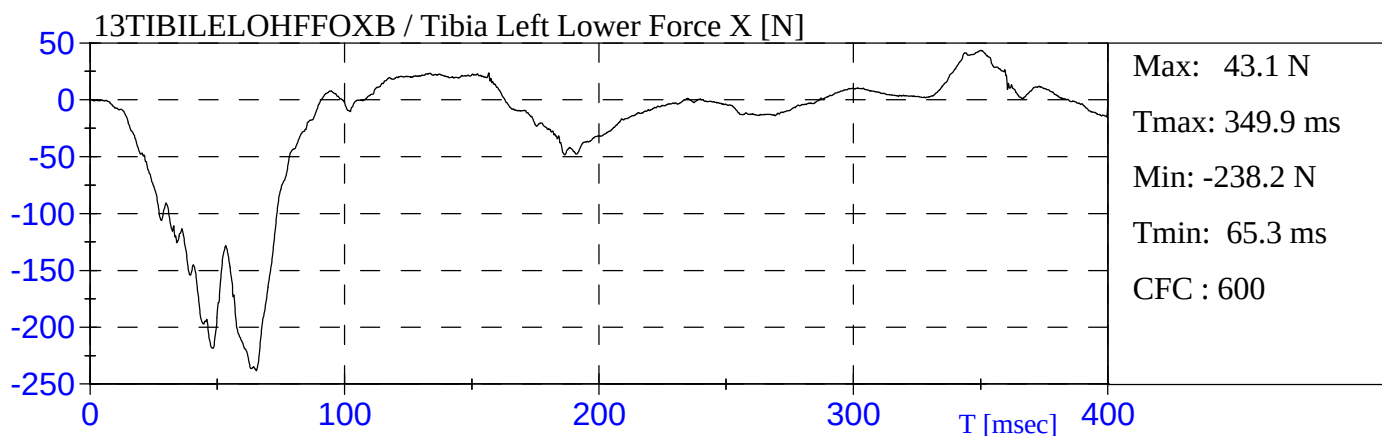


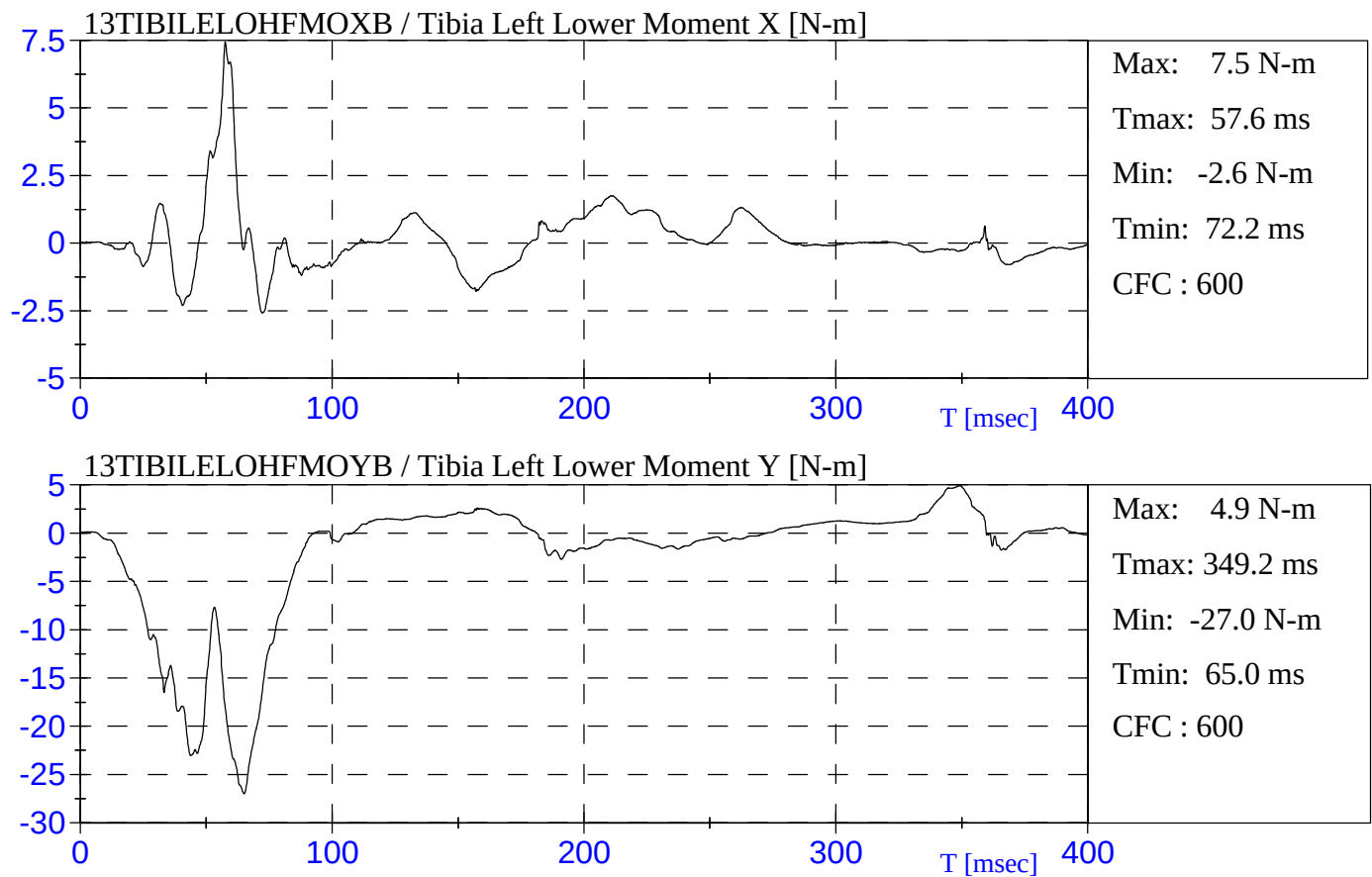


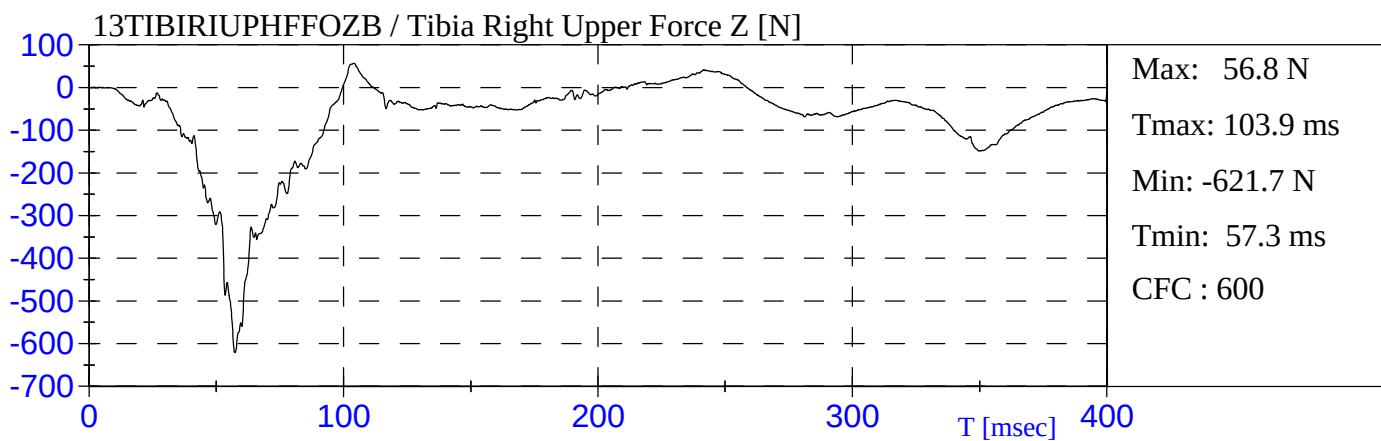
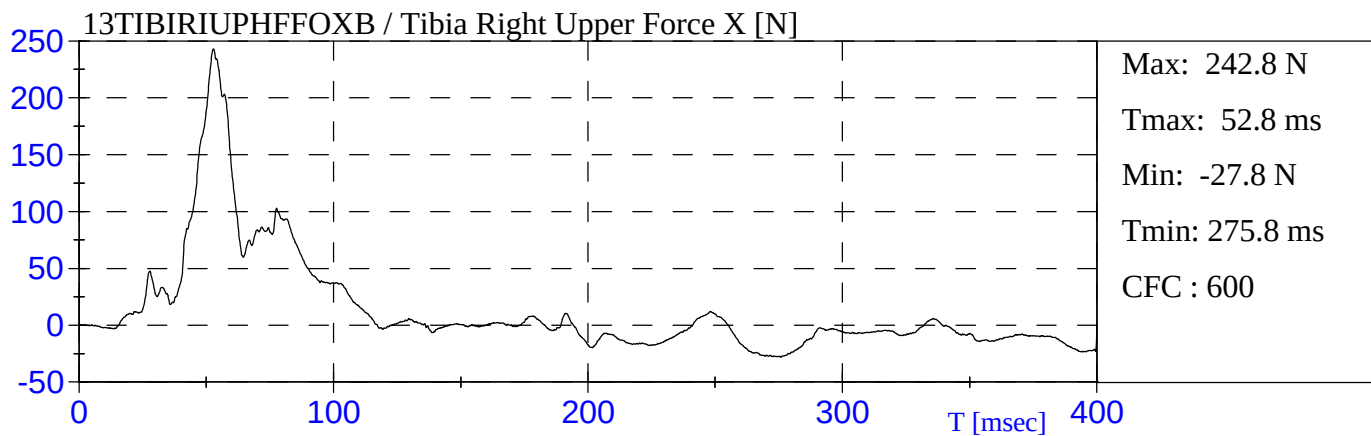


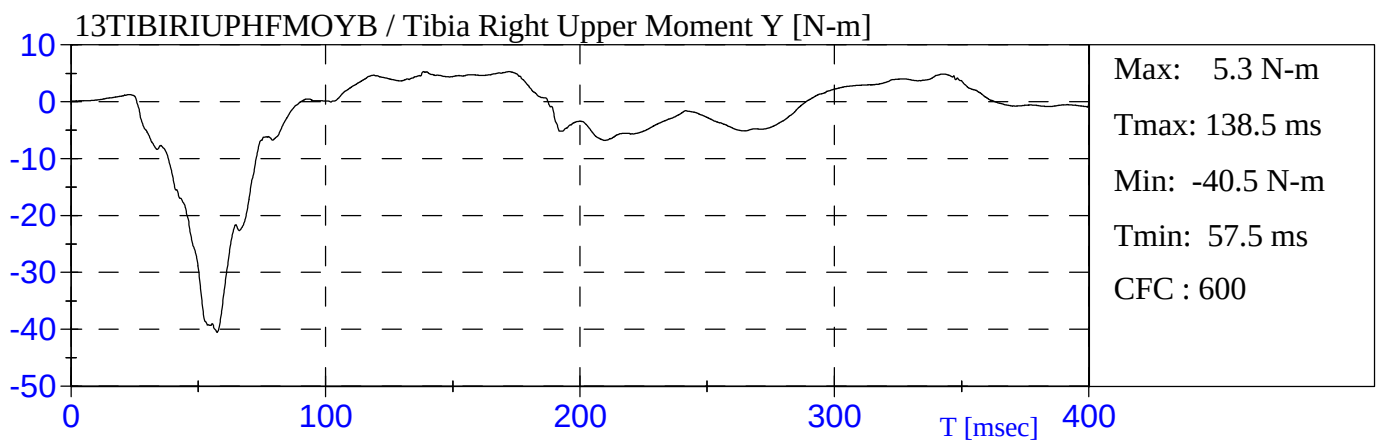
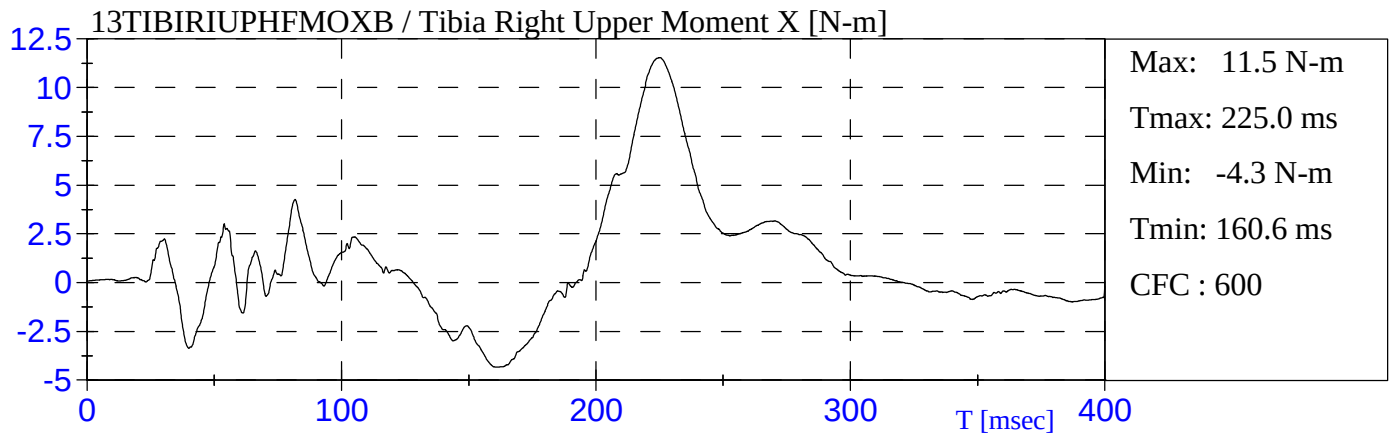


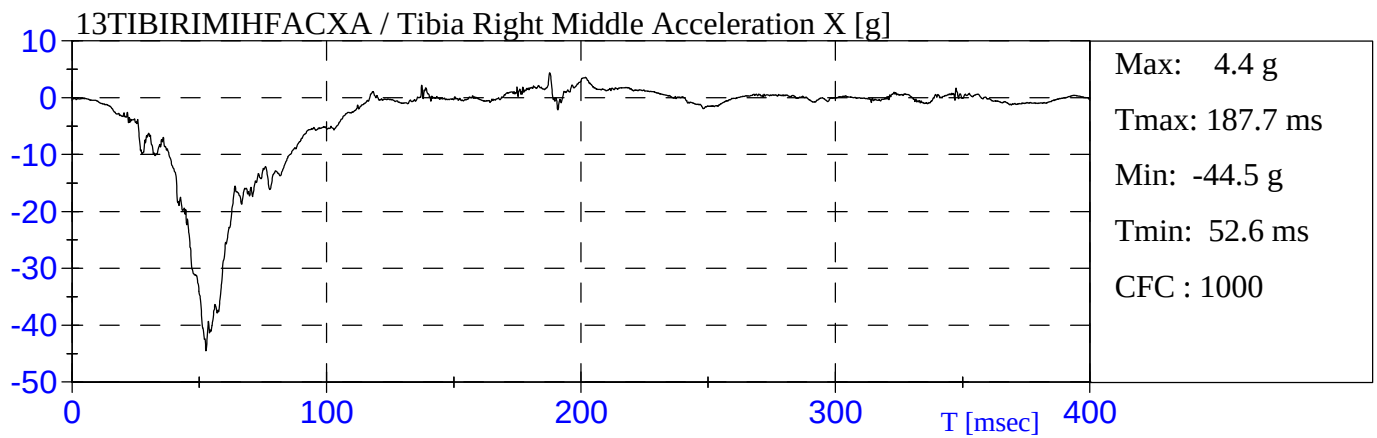


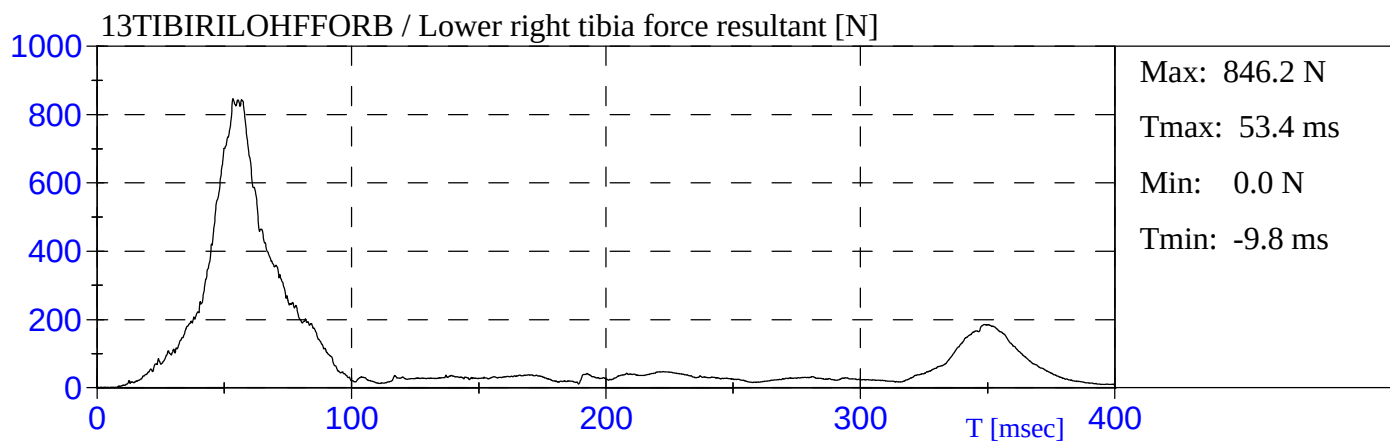
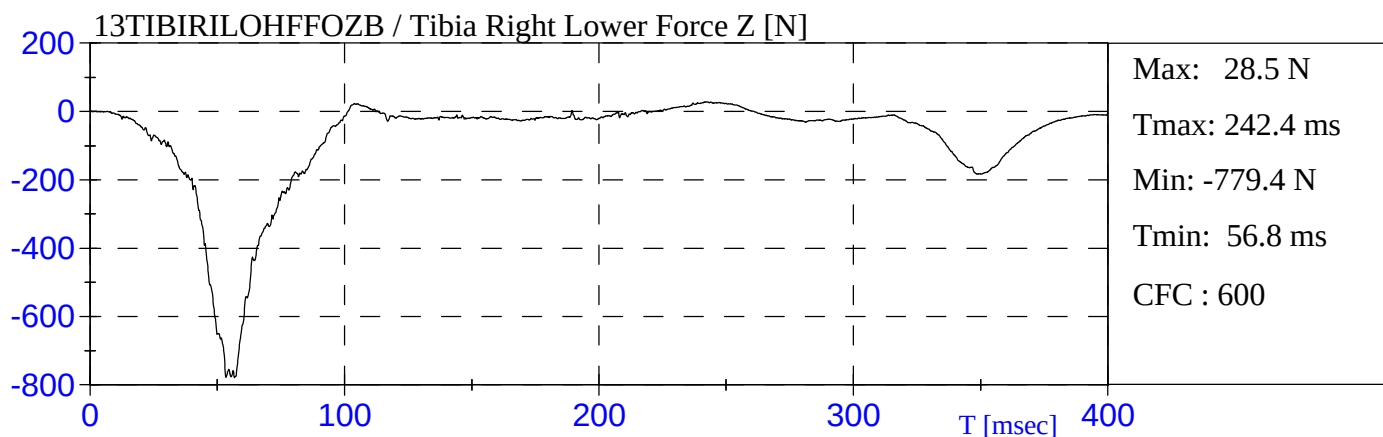
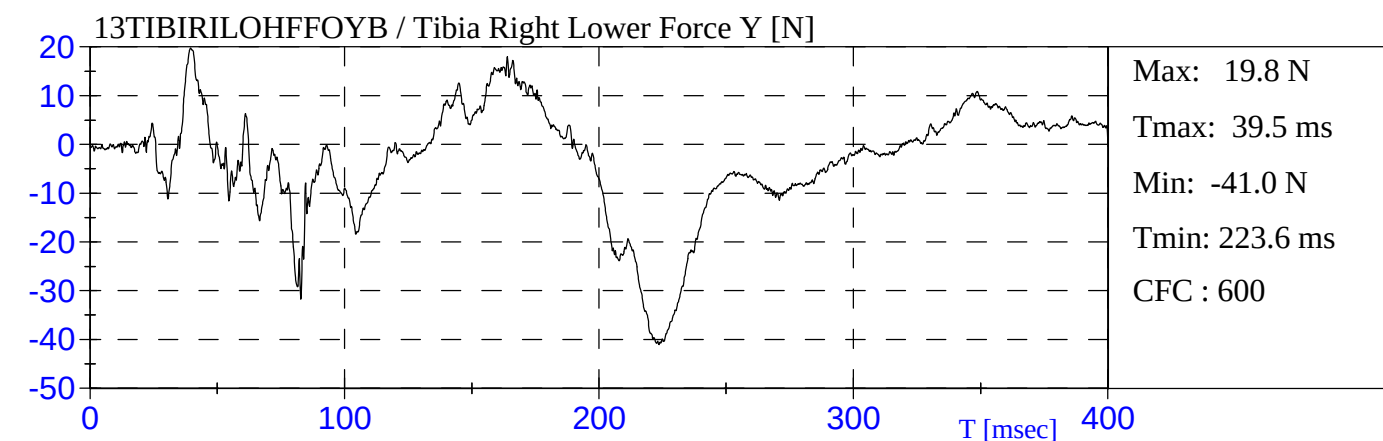
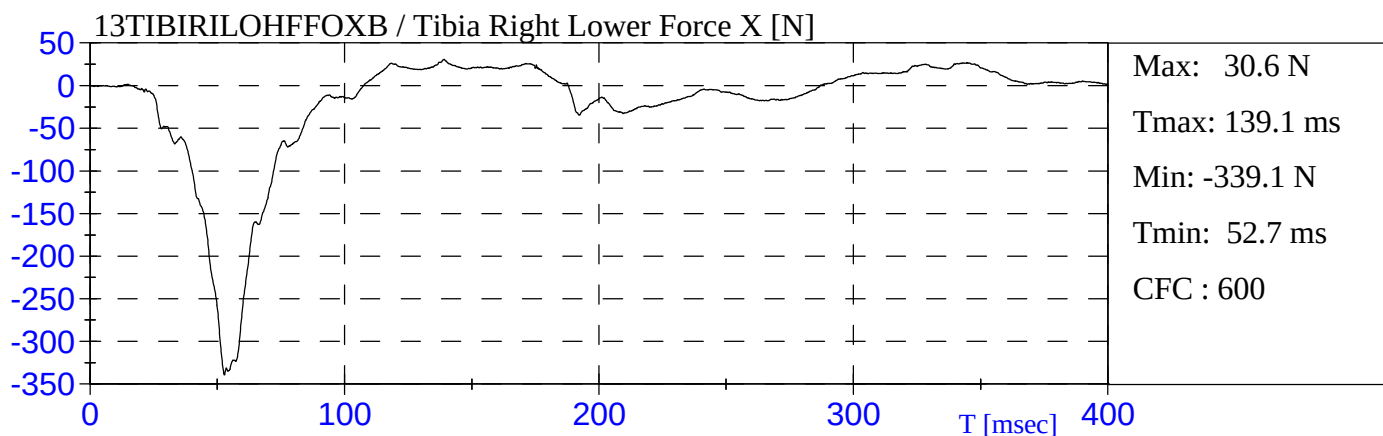


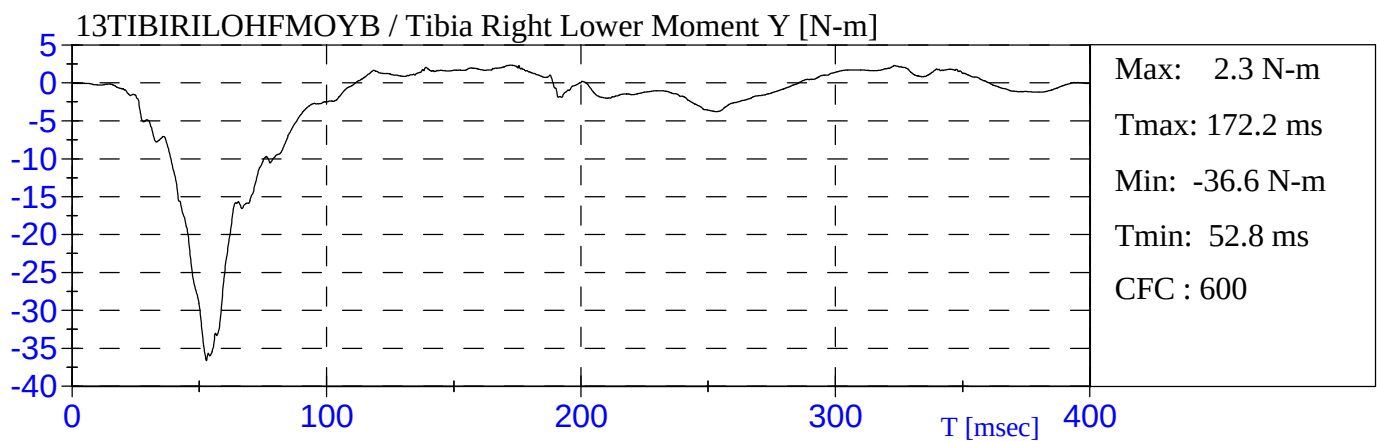
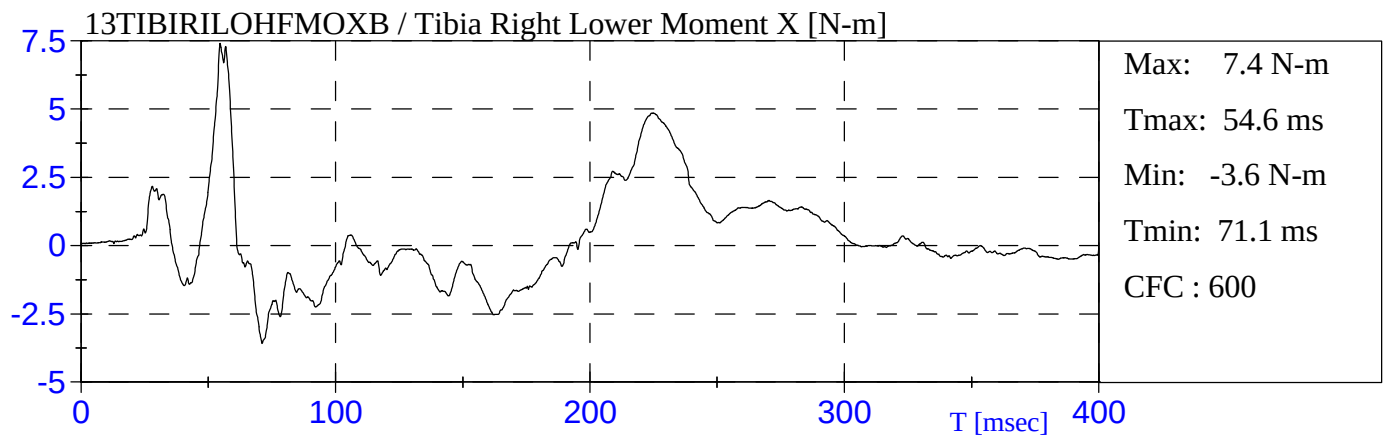




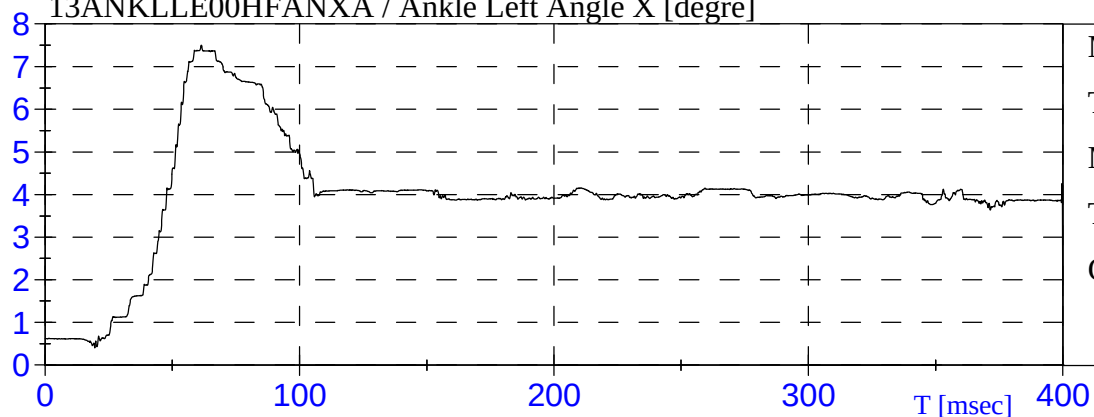






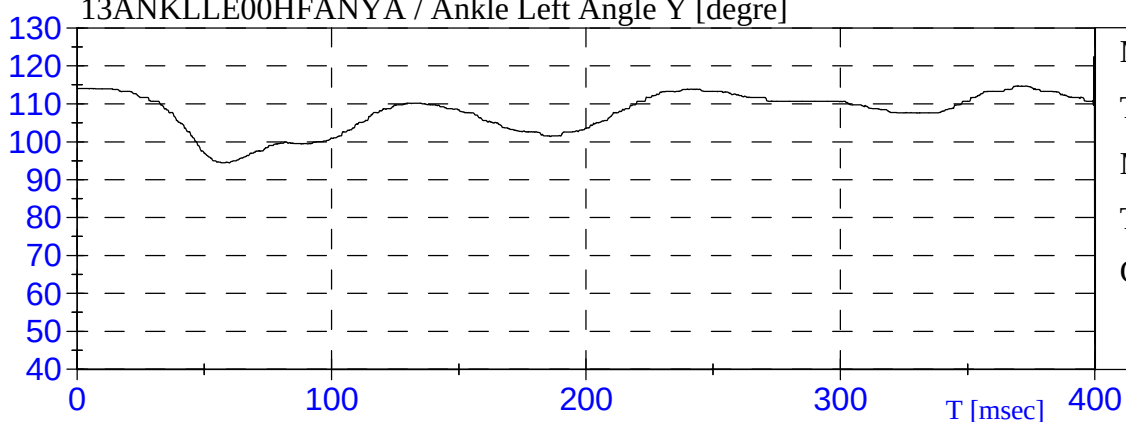


13ANKLLE00HFANXA / Ankle Left Angle X [degree]



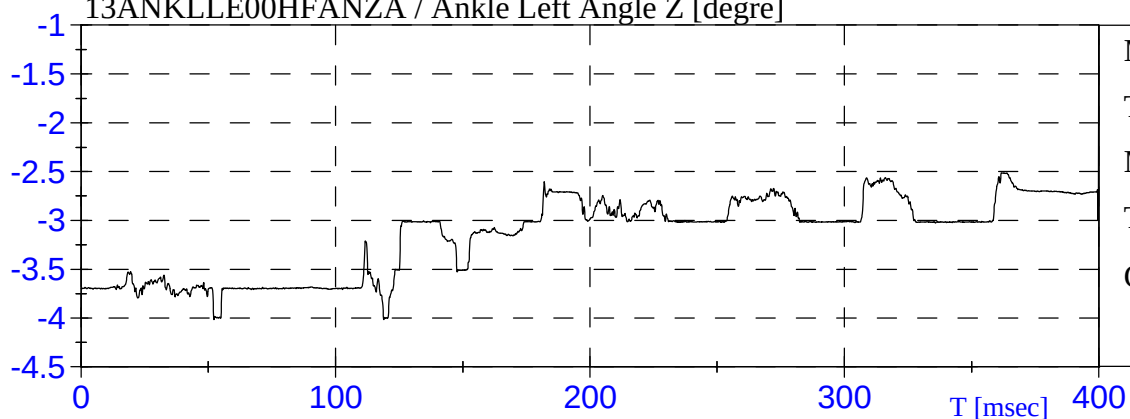
Max: 7.5 degree
Tmax: 61.4 ms
Min: 0.3 degree
Tmin: -10.0 ms
CFC : 1000

13ANKLLE00HFANYA / Ankle Left Angle Y [degree]



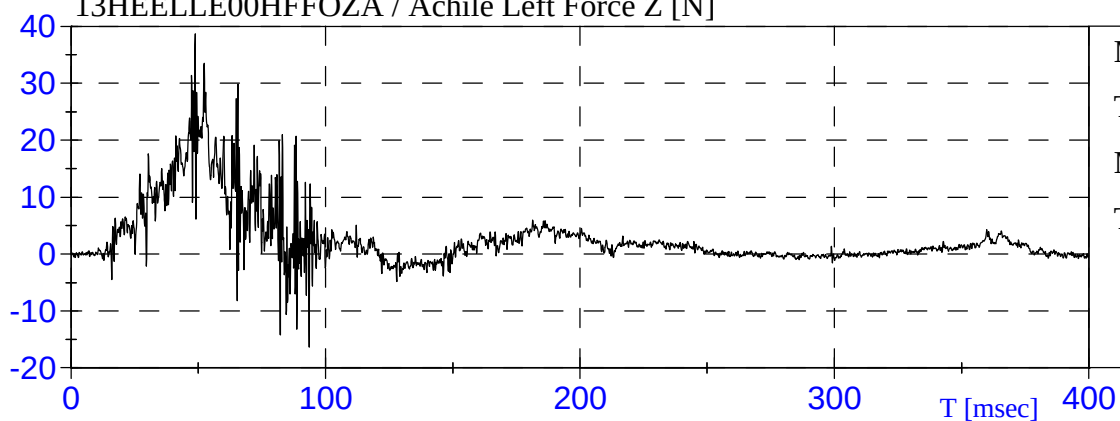
Max: 126.1 degree
Tmax: -9.8 ms
Min: 46.7 degree
Tmin: 399.9 ms
CFC : 1000

13ANKLLE00HFANZA / Ankle Left Angle Z [degree]

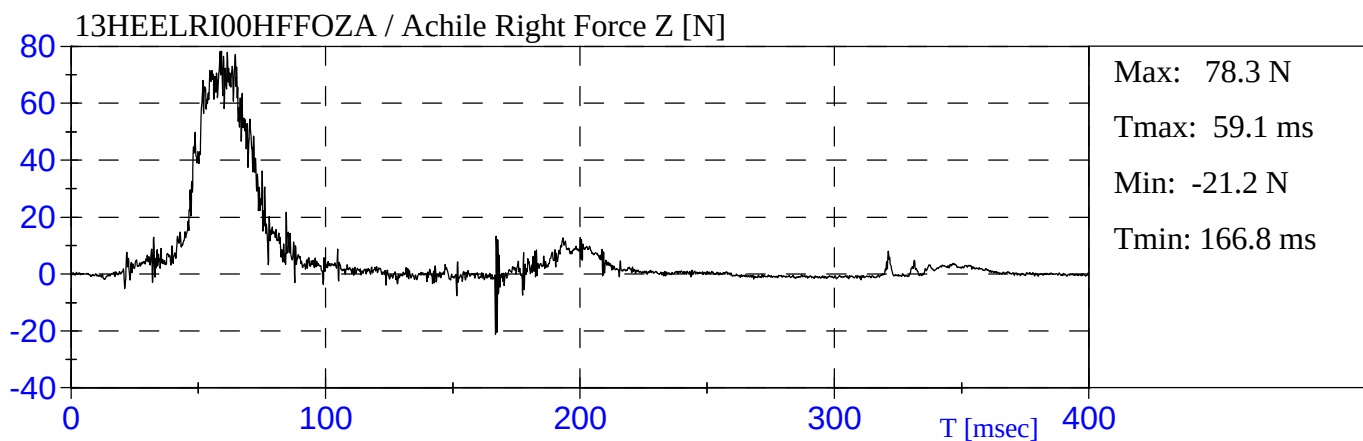
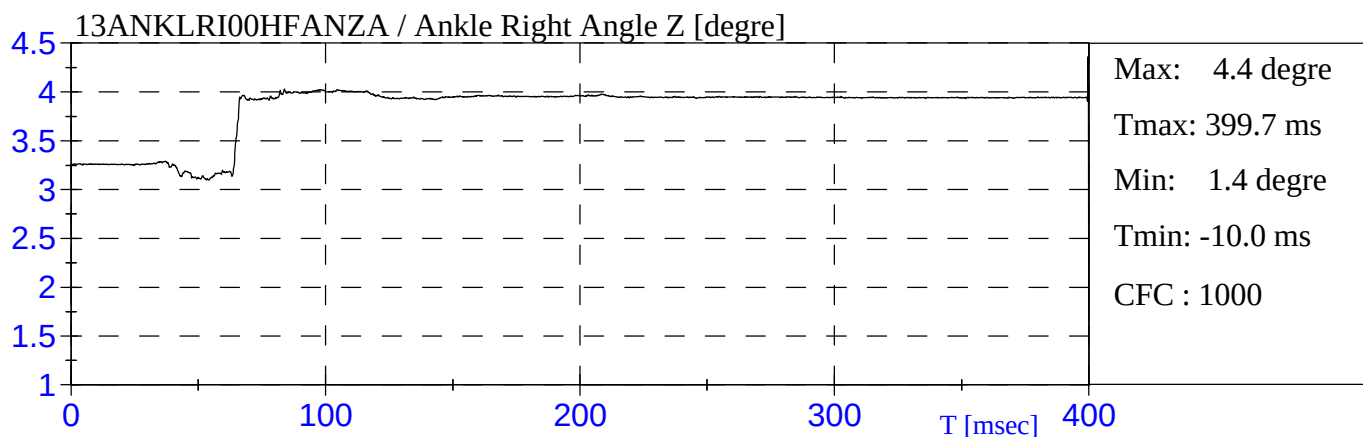
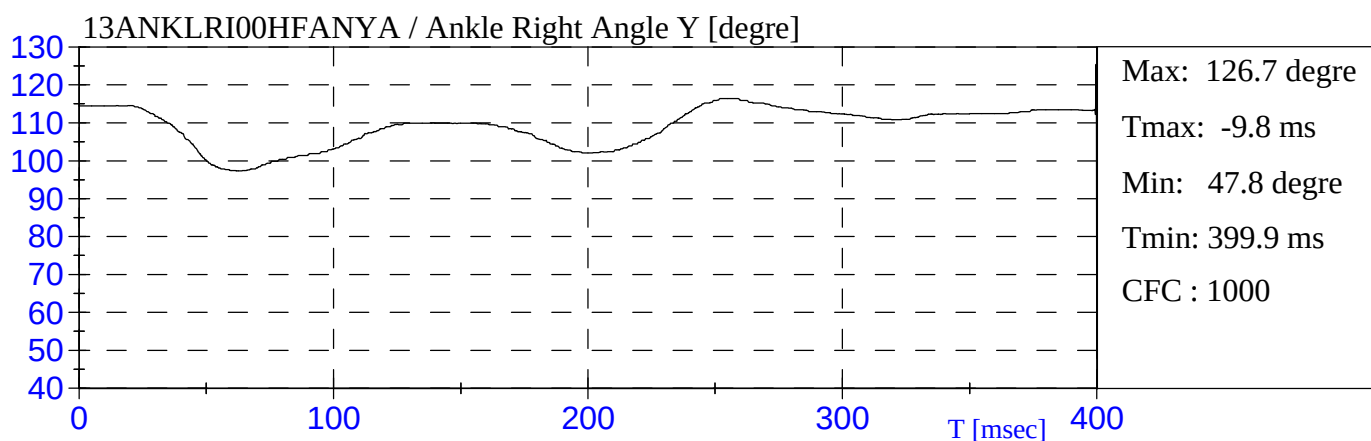
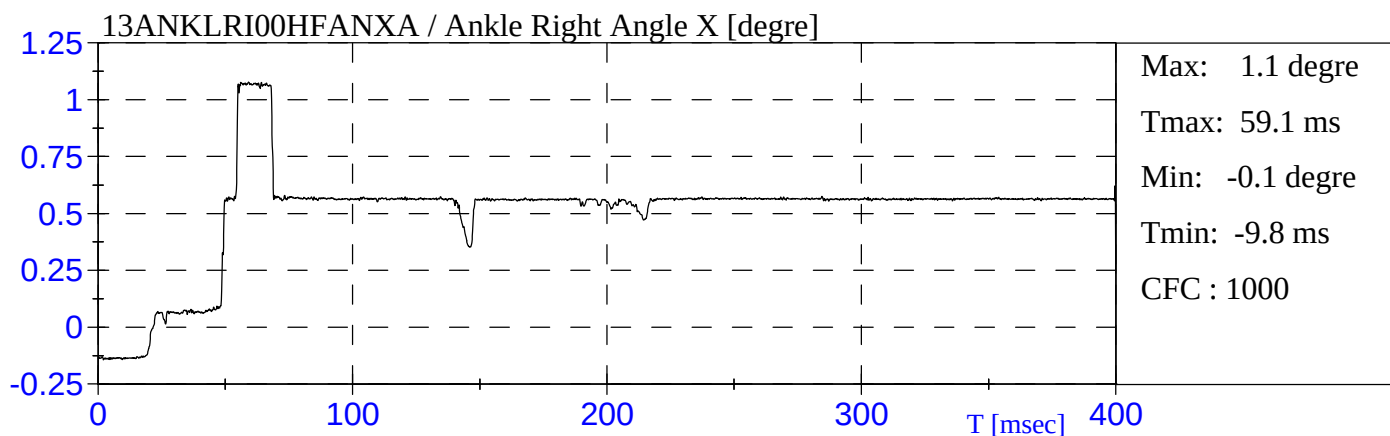


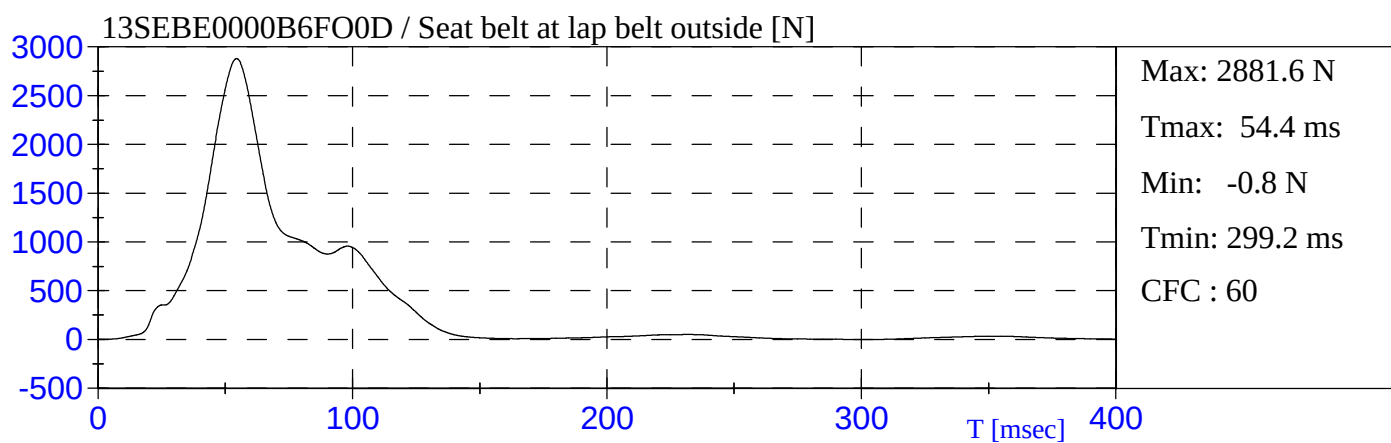
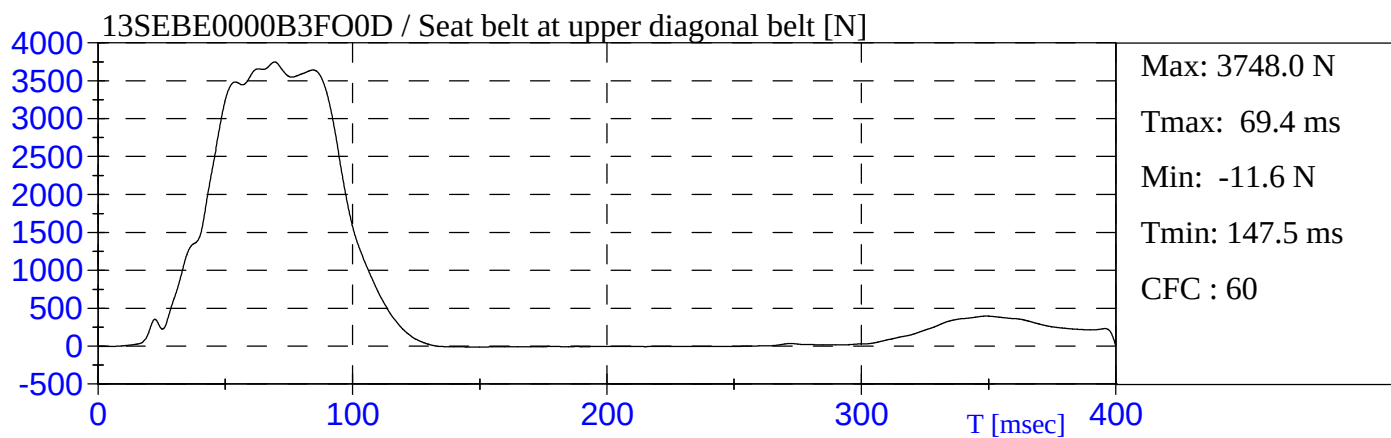
Max: -1.1 degree
Tmax: 399.9 ms
Min: -4.1 degree
Tmin: -9.8 ms
CFC : 1000

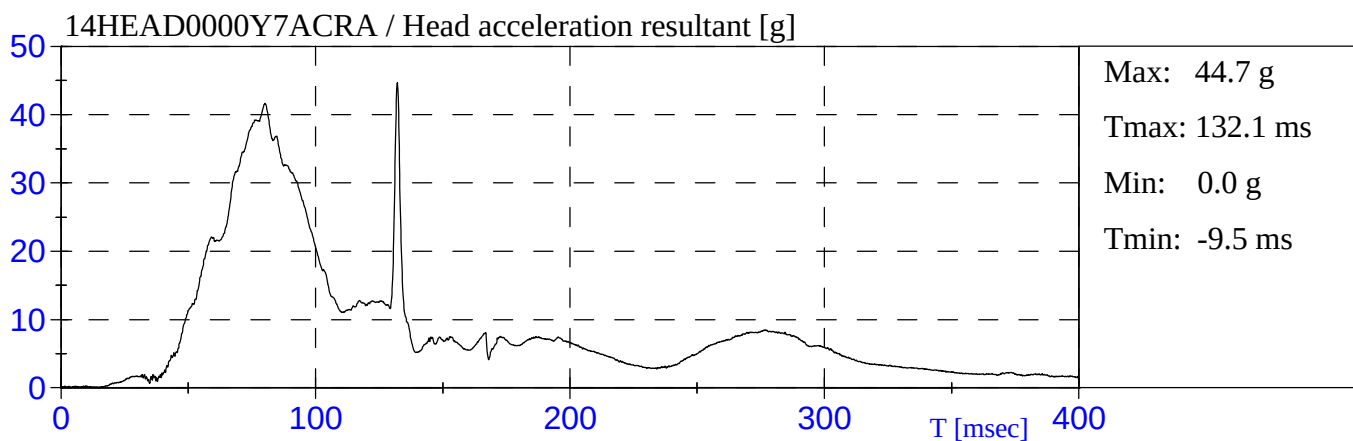
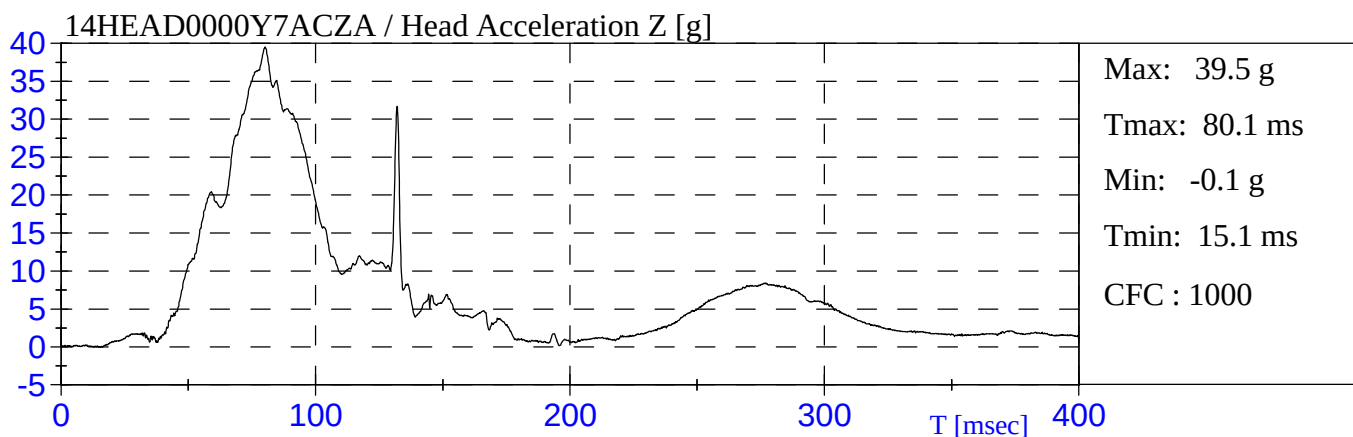
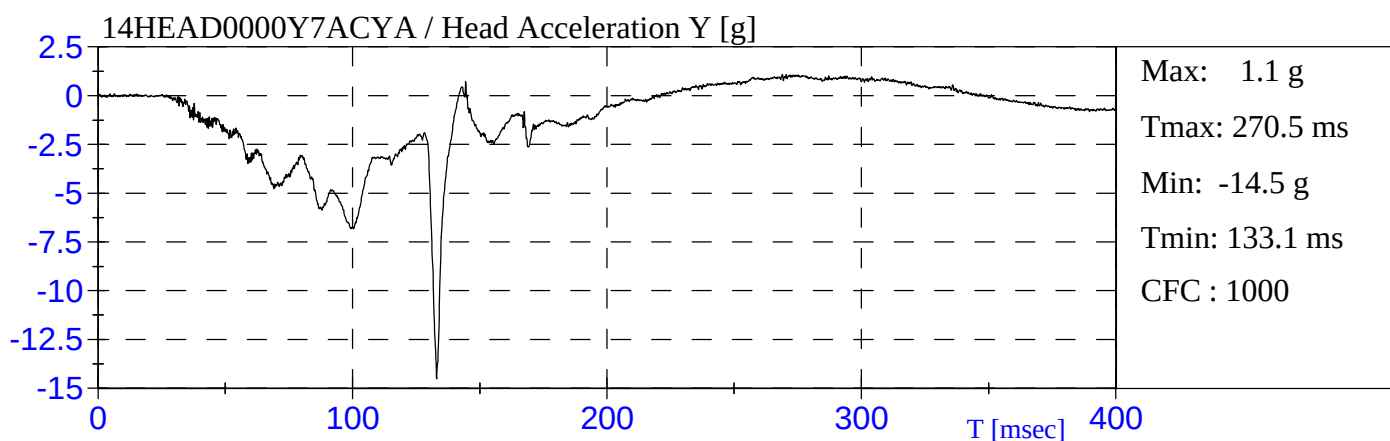
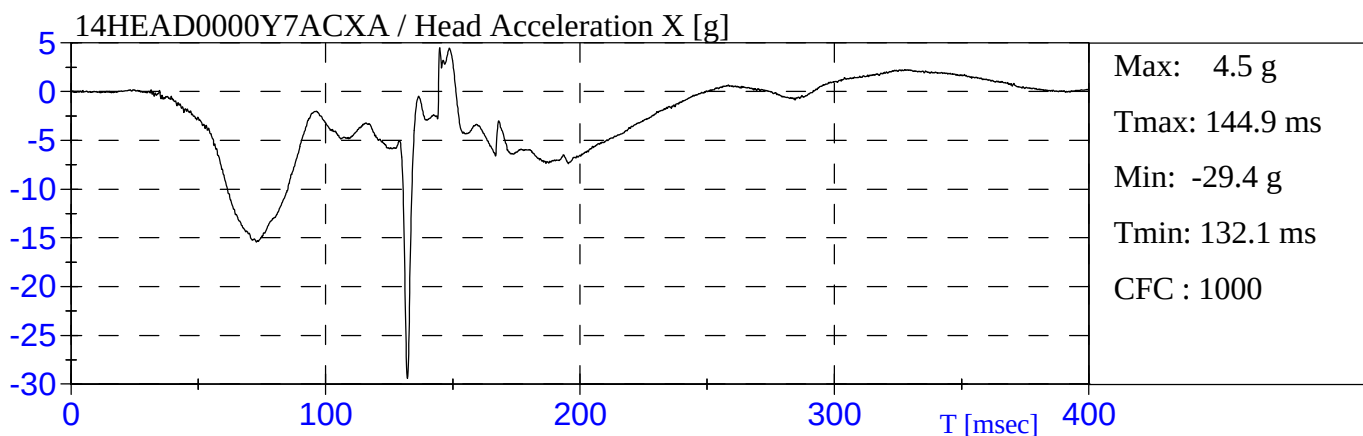
13HEELLE00HFFOZA / Achile Left Force Z [N]

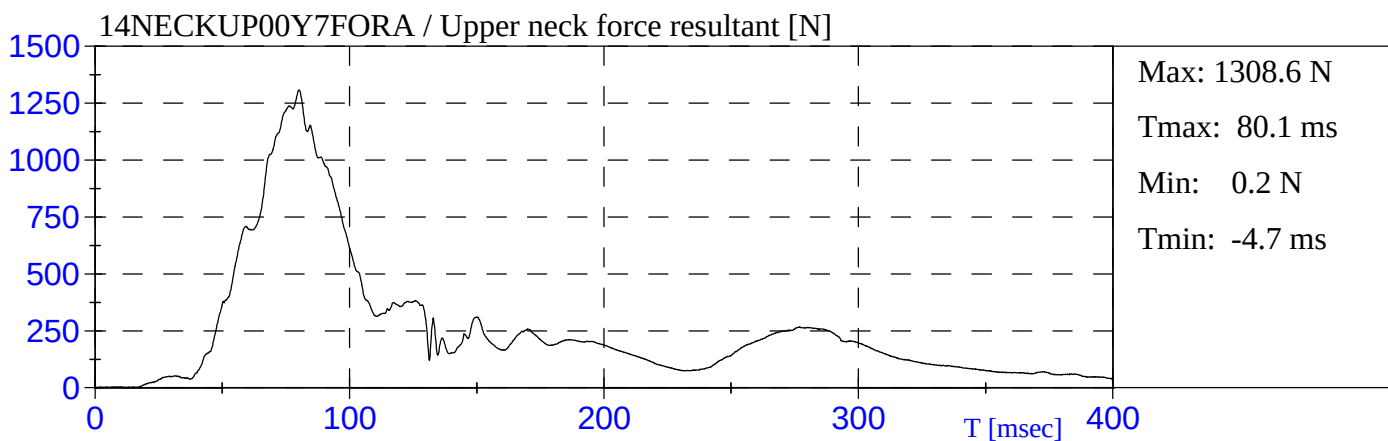
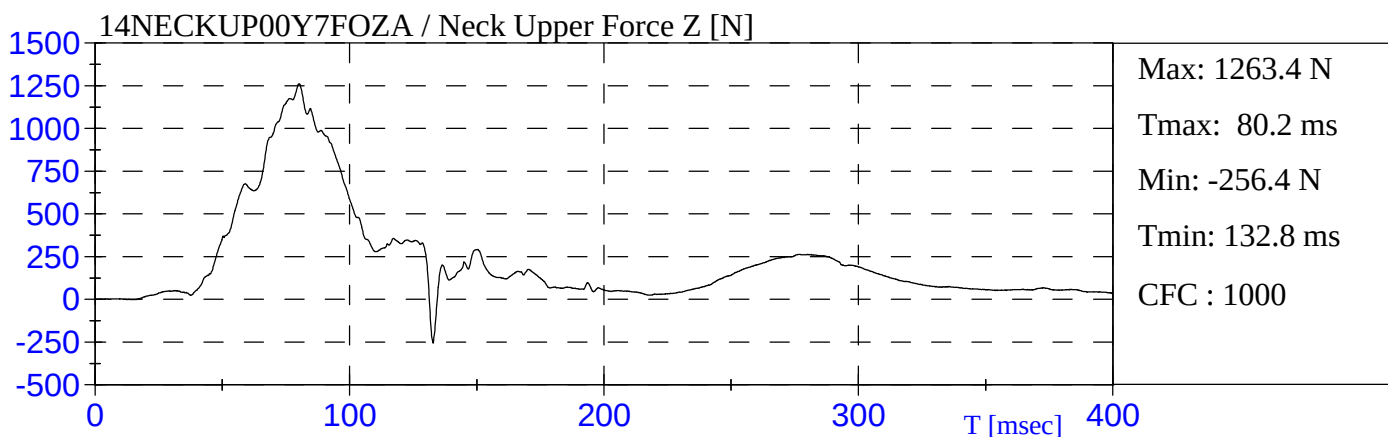
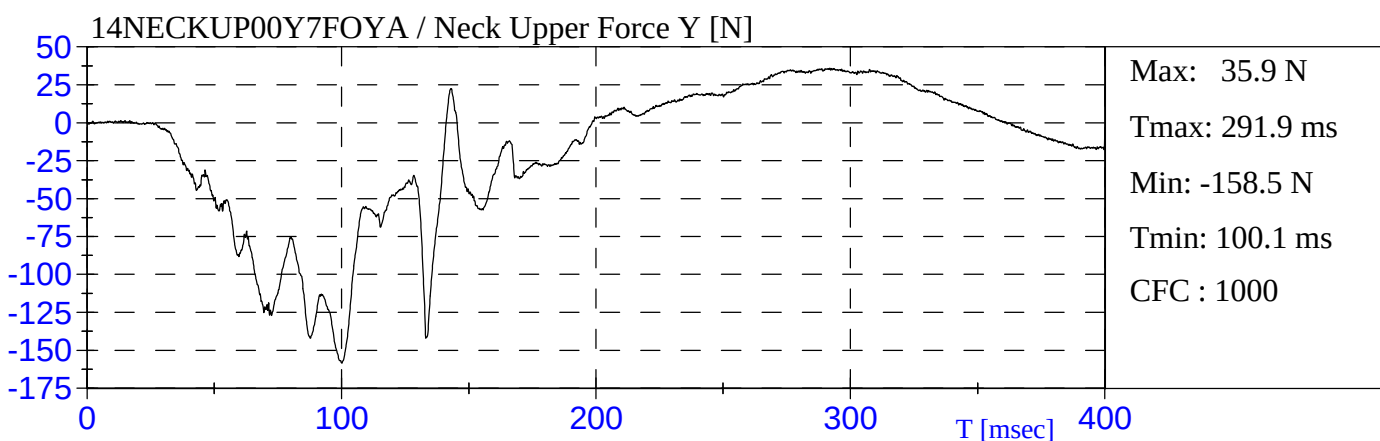
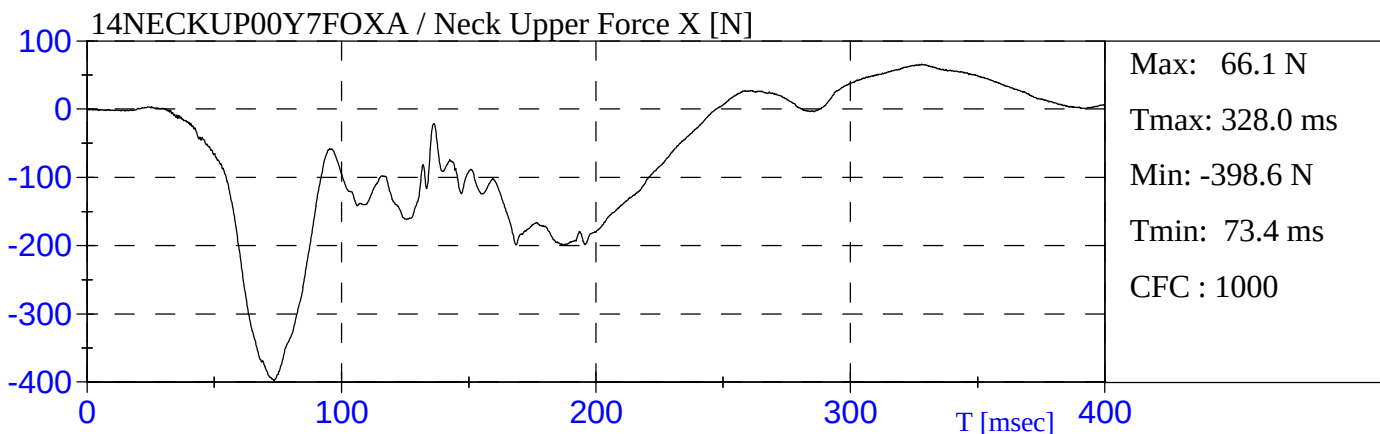


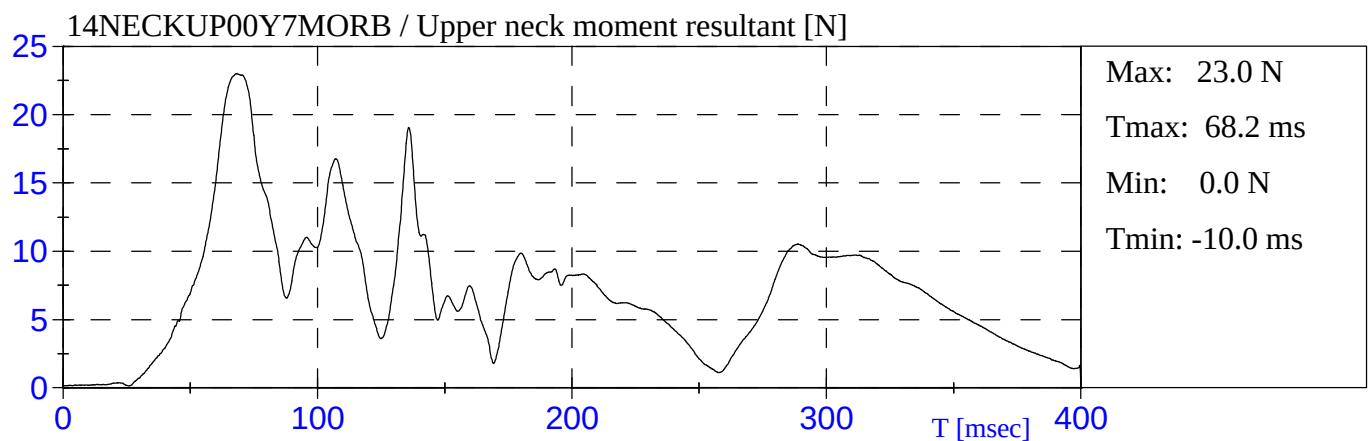
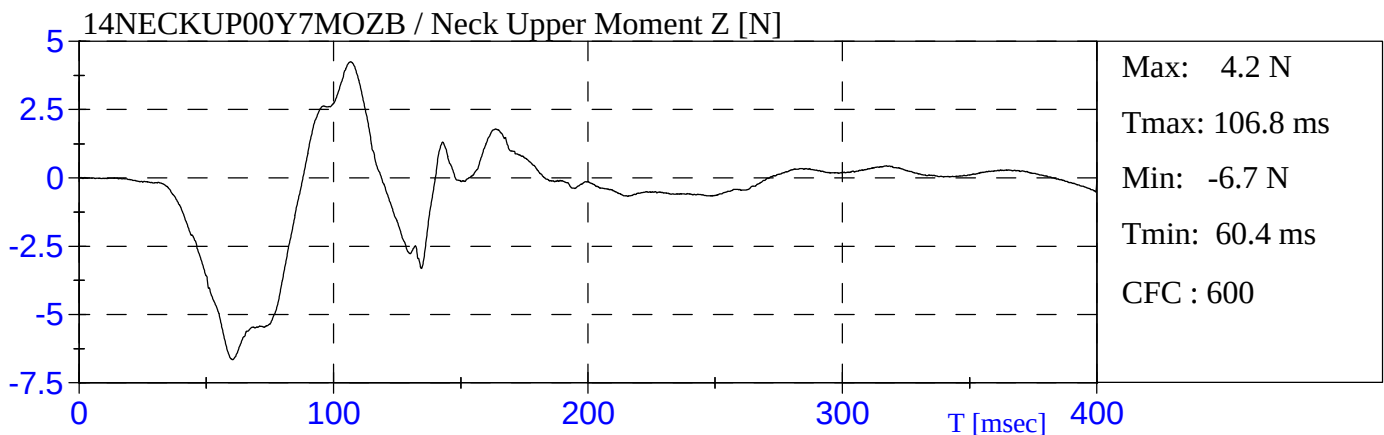
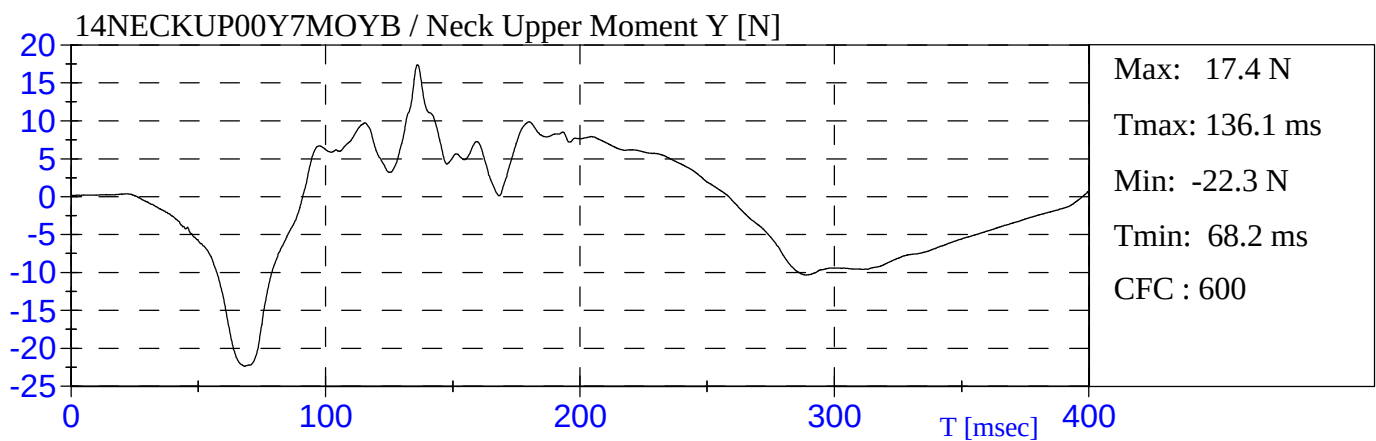
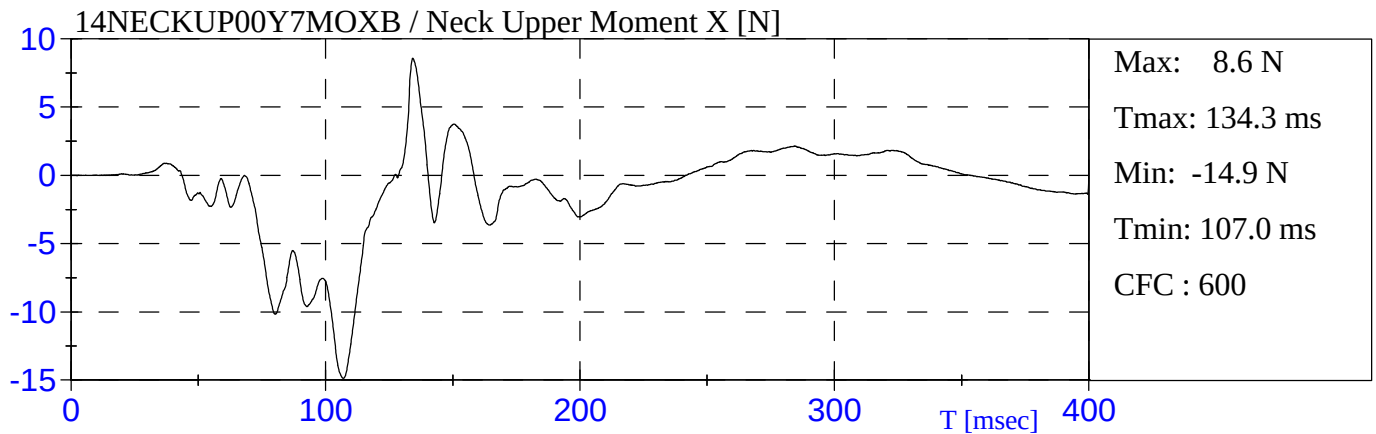
Max: 38.6 N
Tmax: 48.8 ms
Min: -16.4 N
Tmin: 93.5 ms

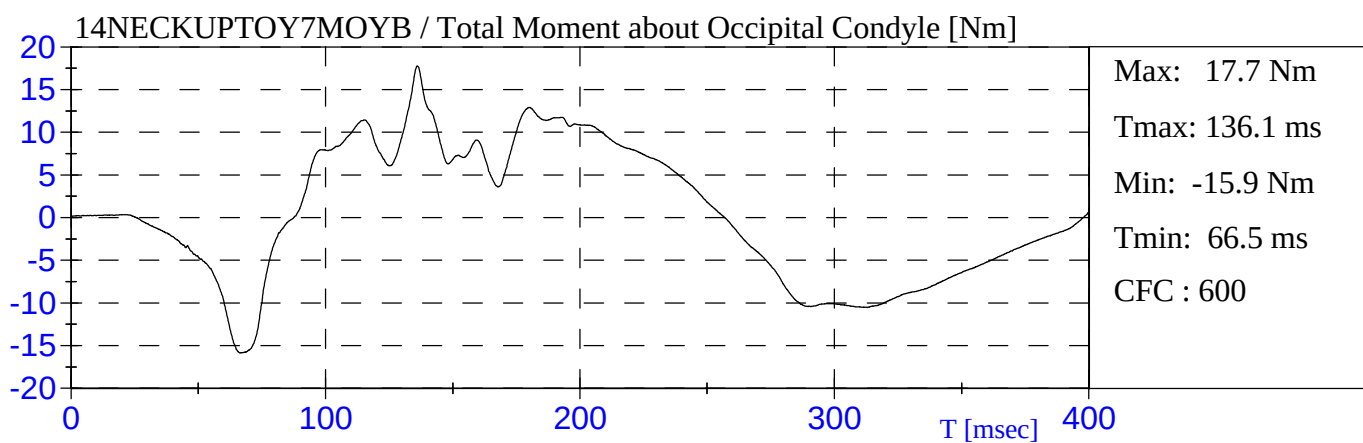
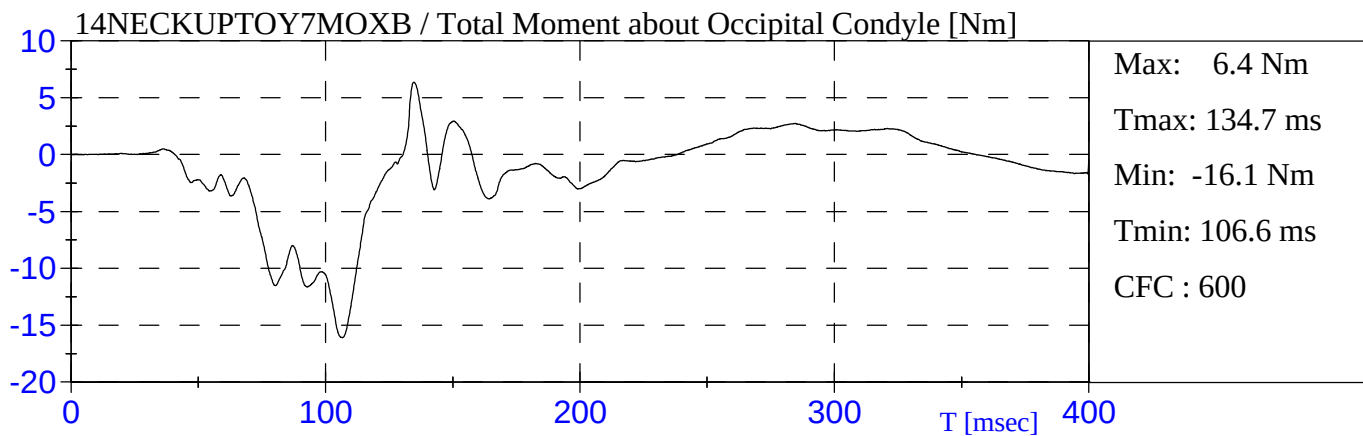


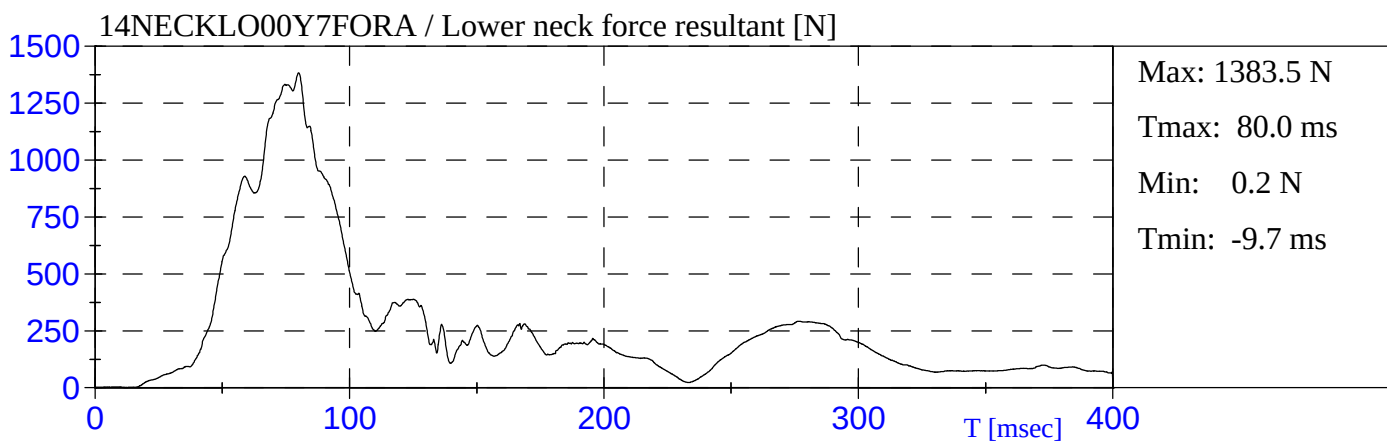
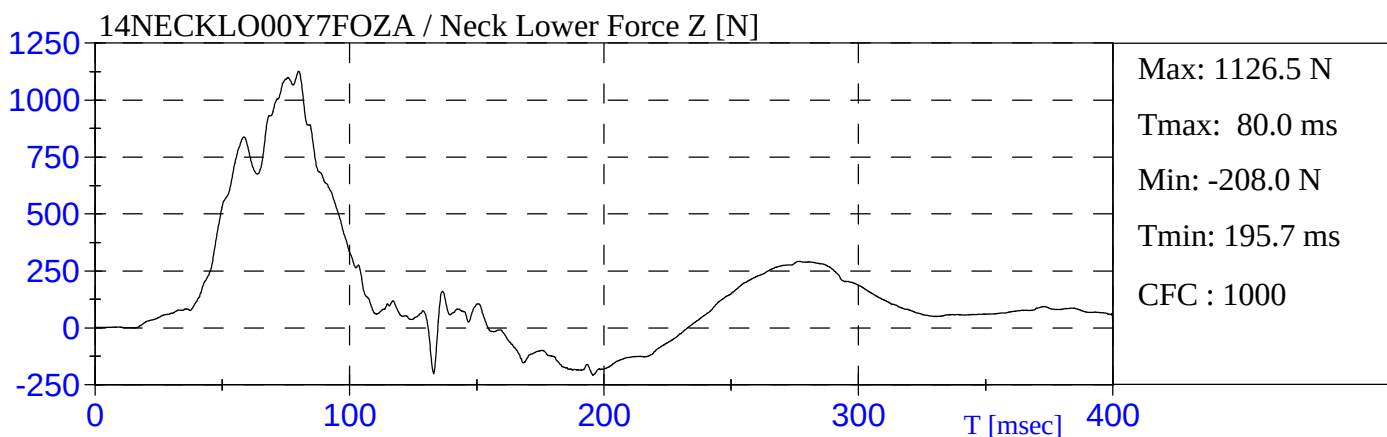
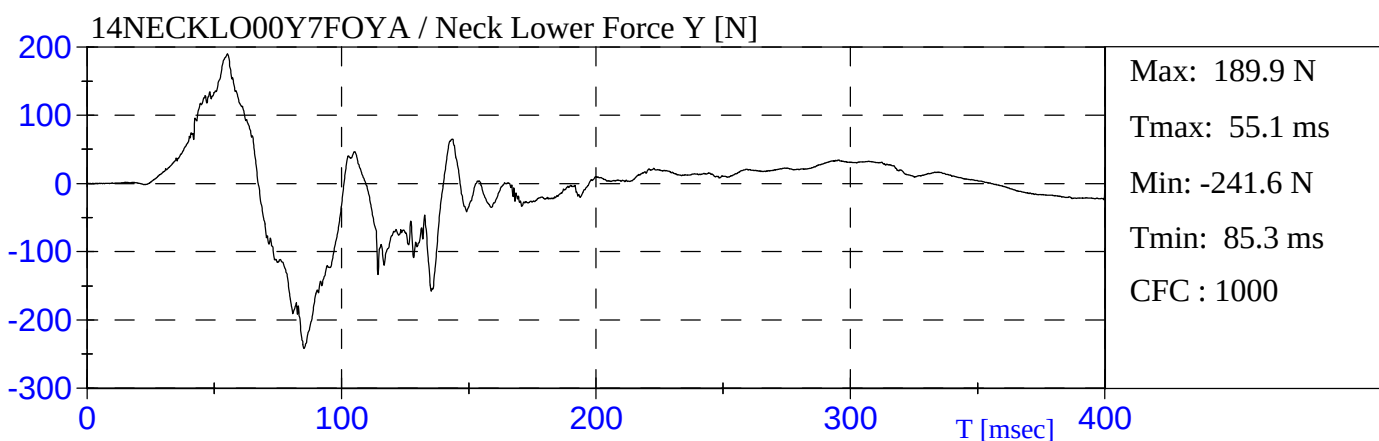
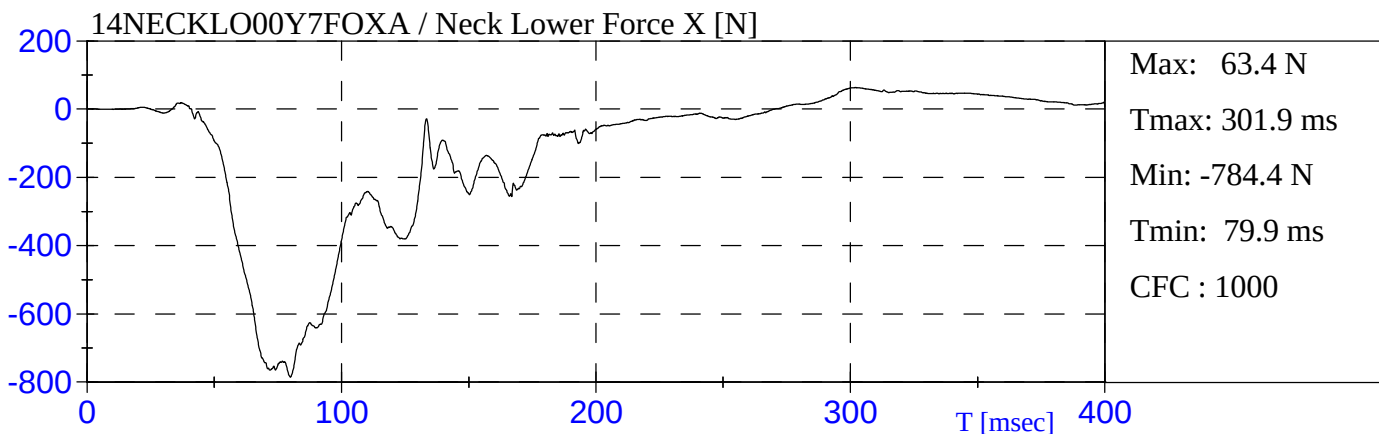


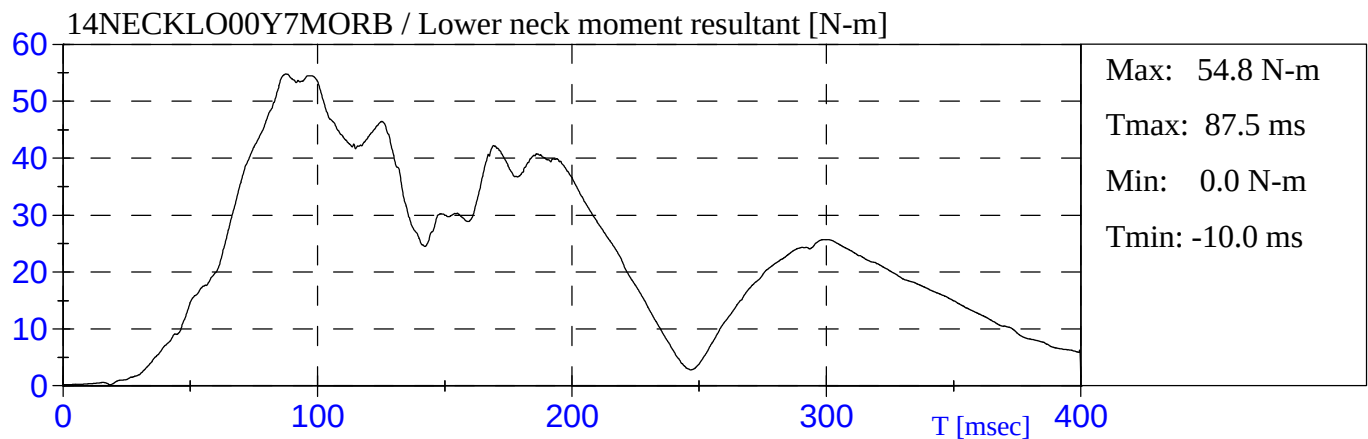
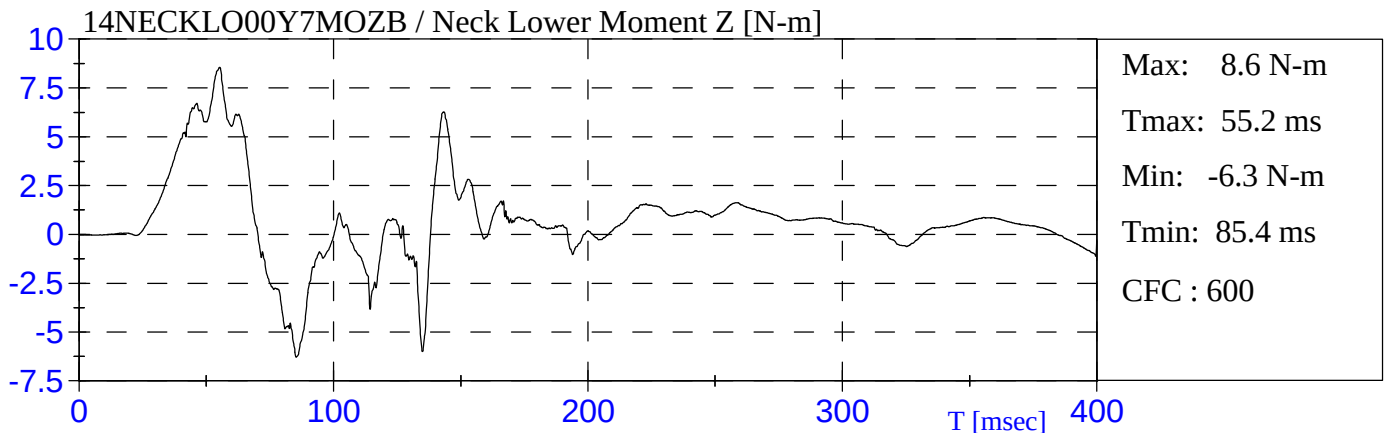
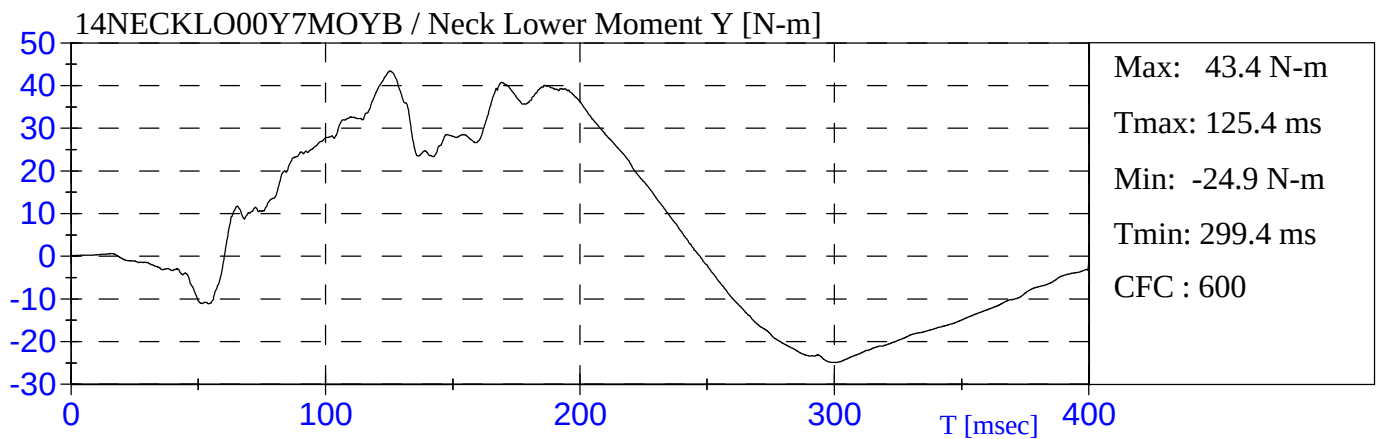
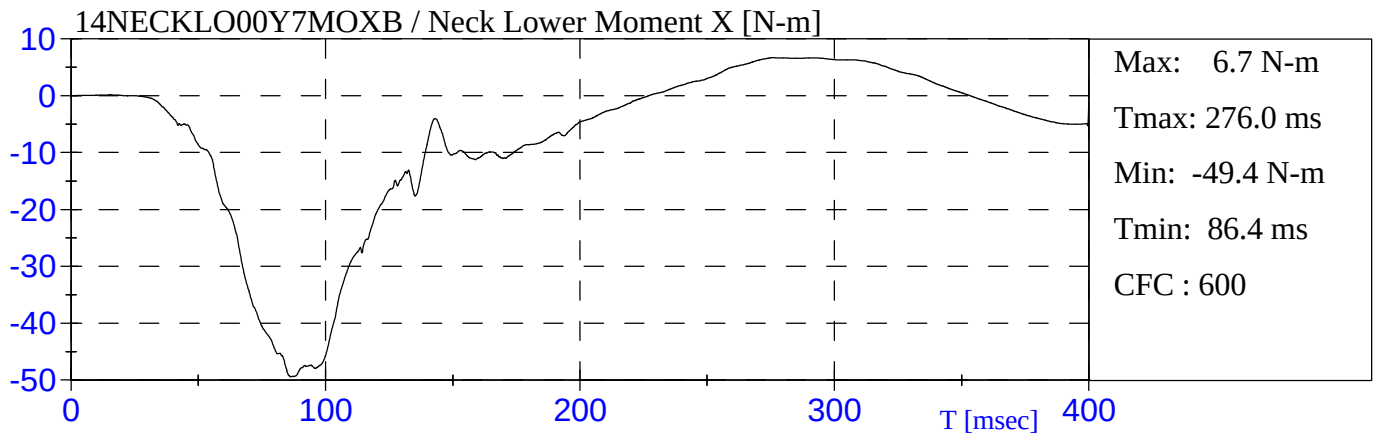


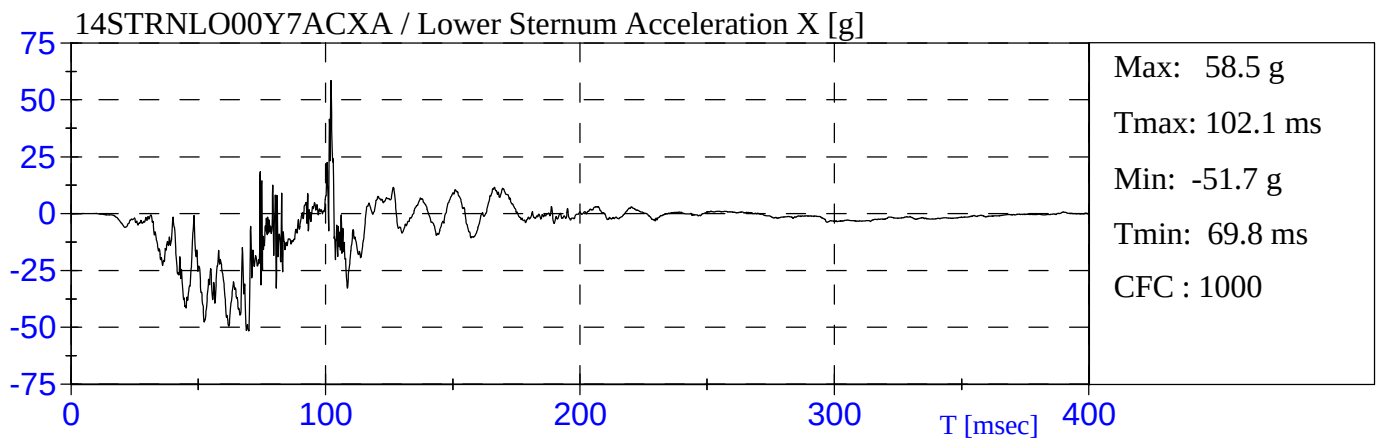
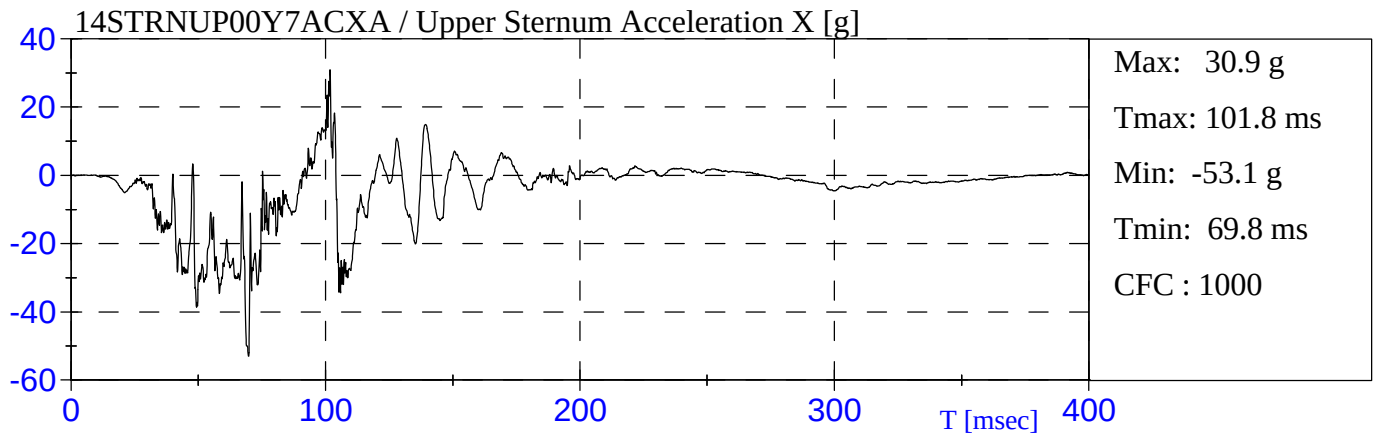


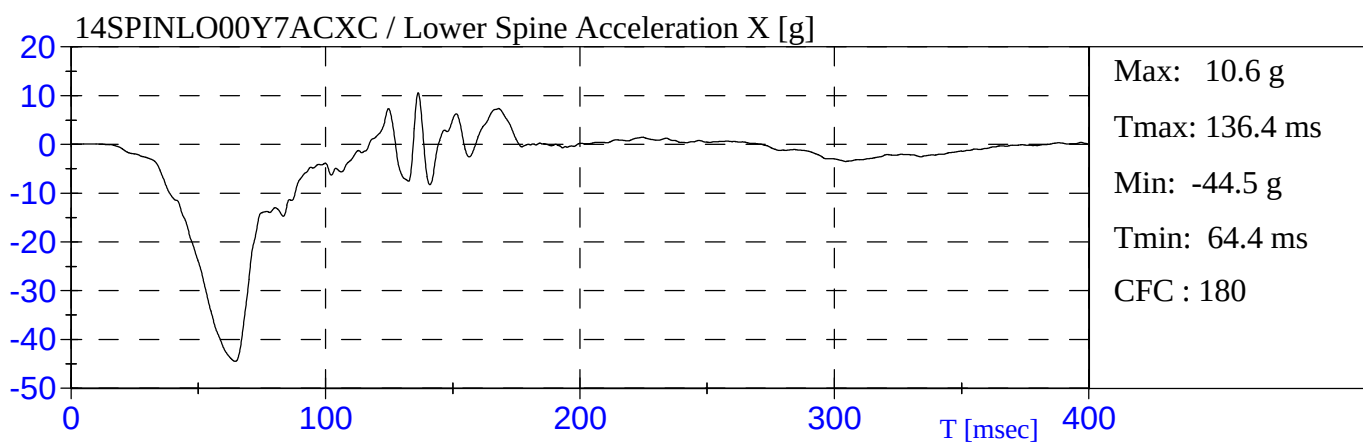
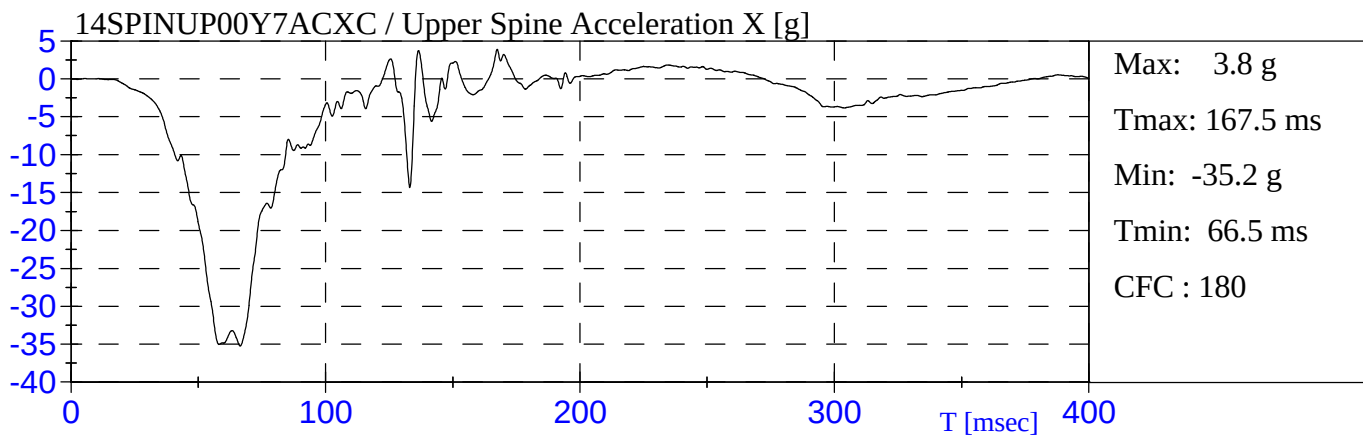


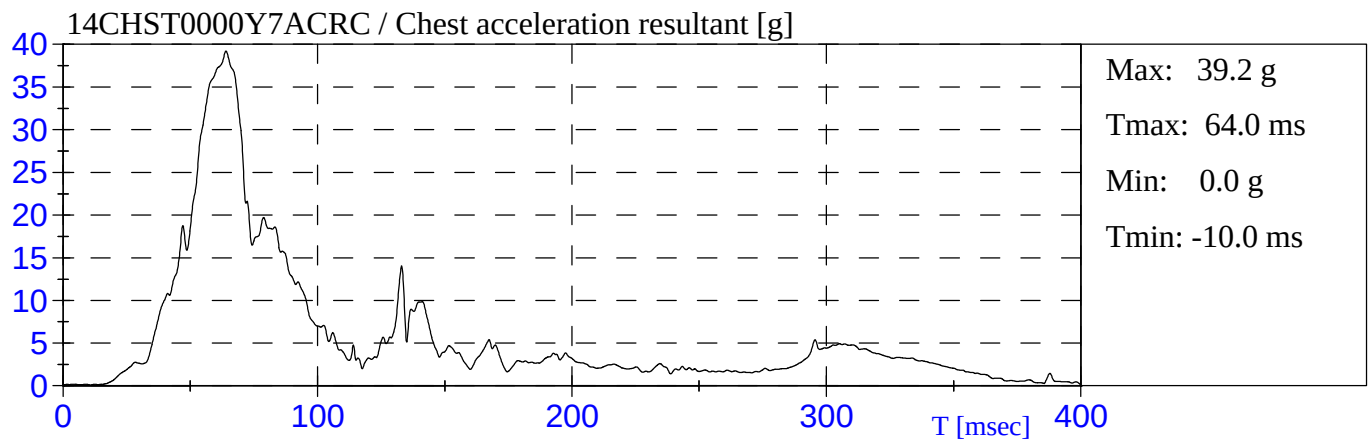
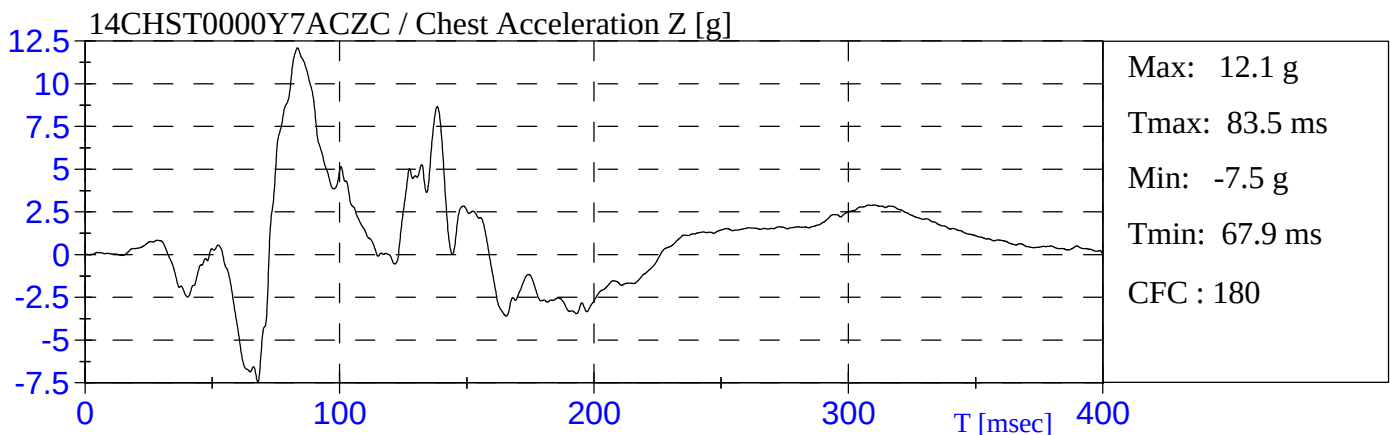
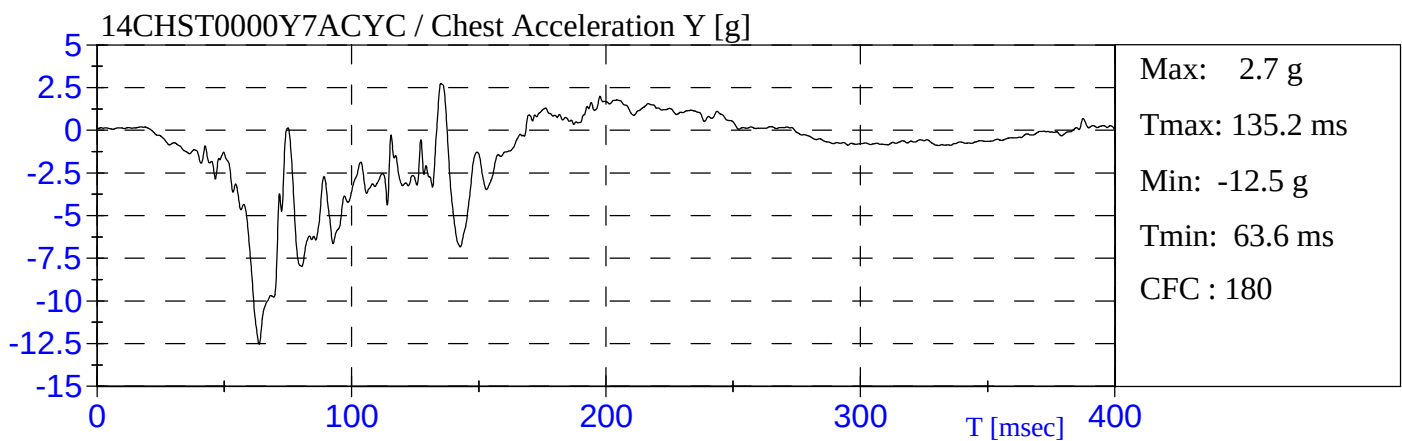
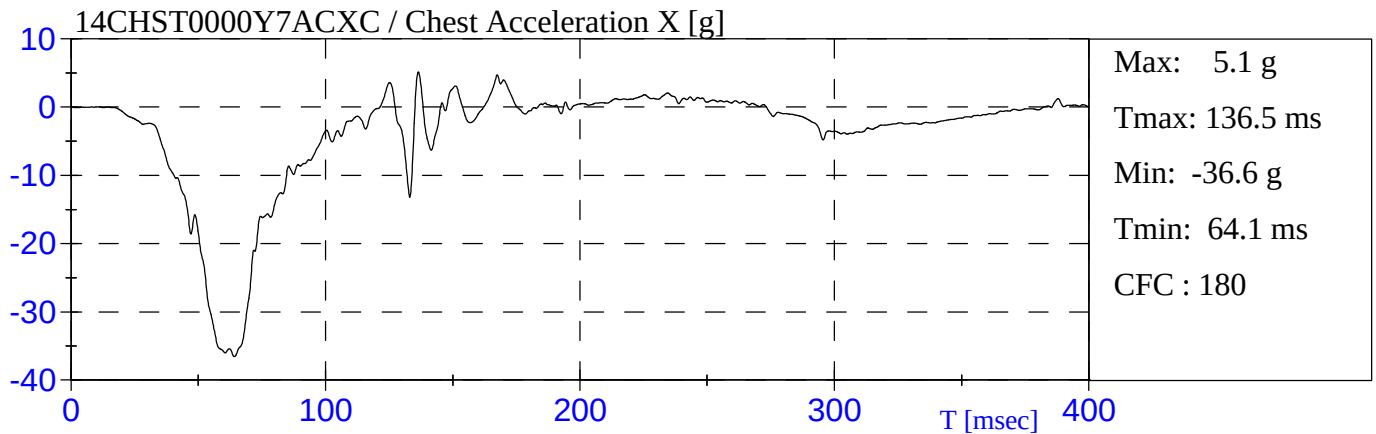


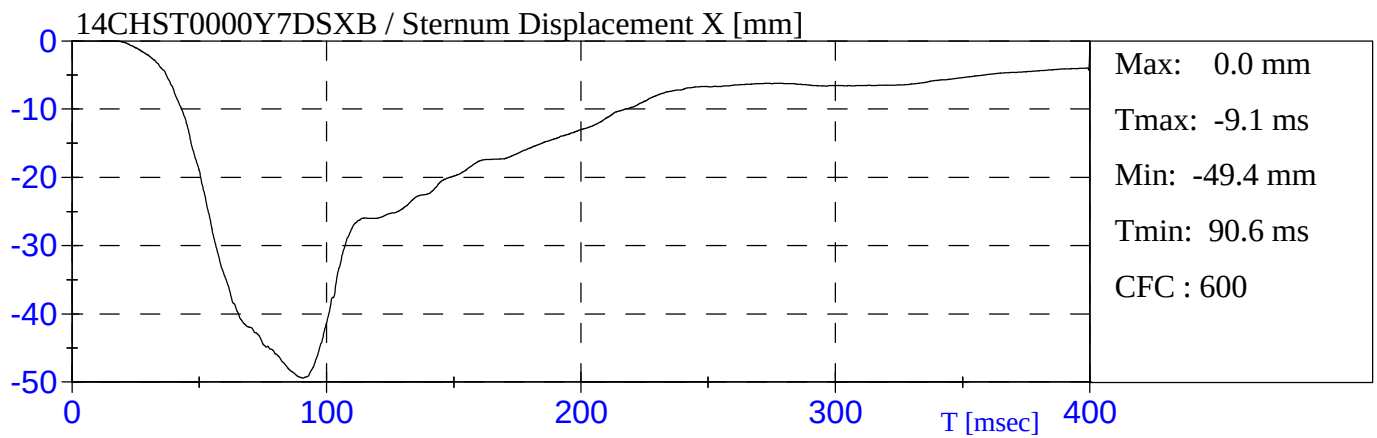


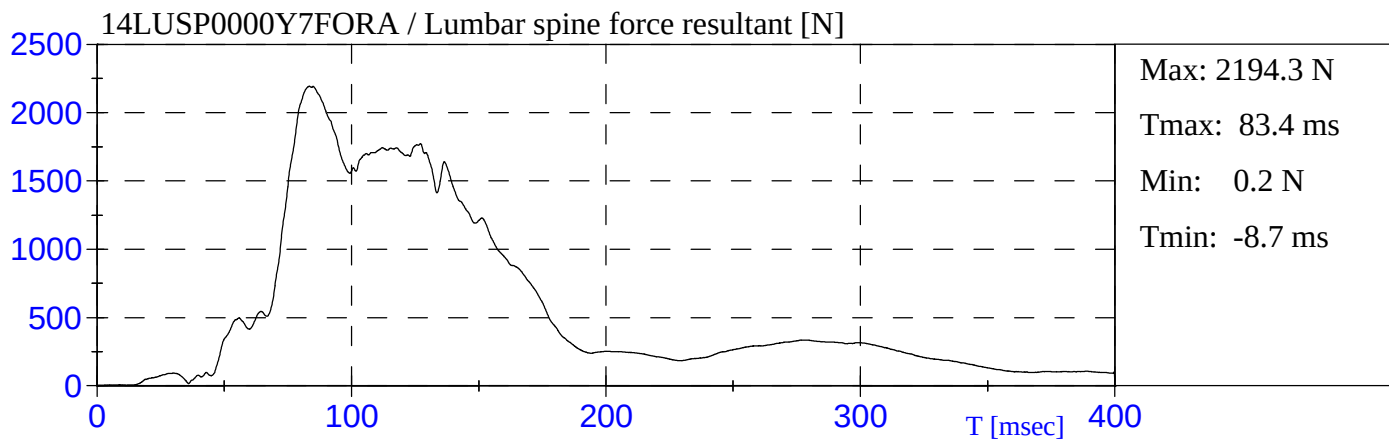
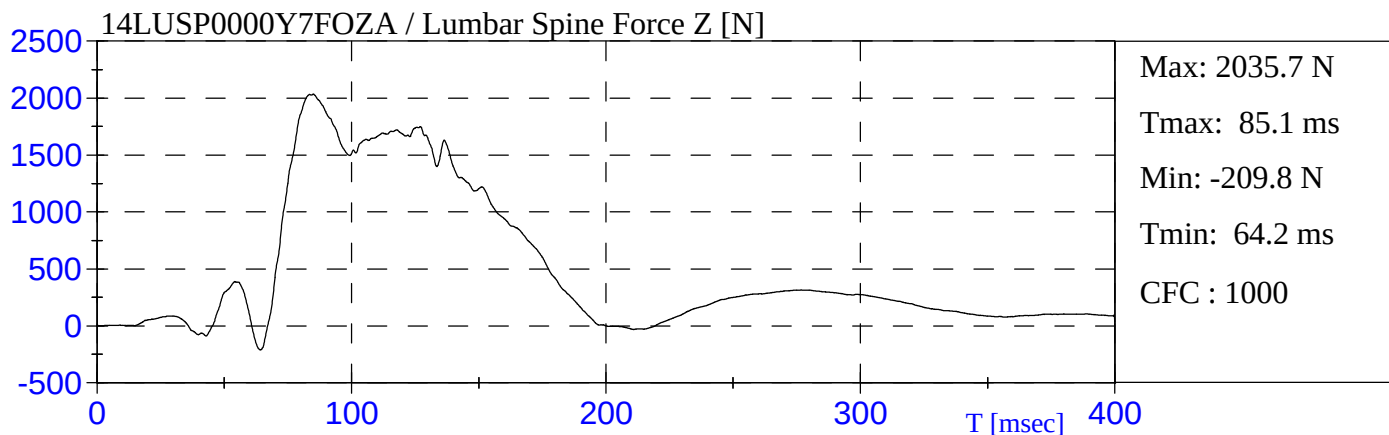
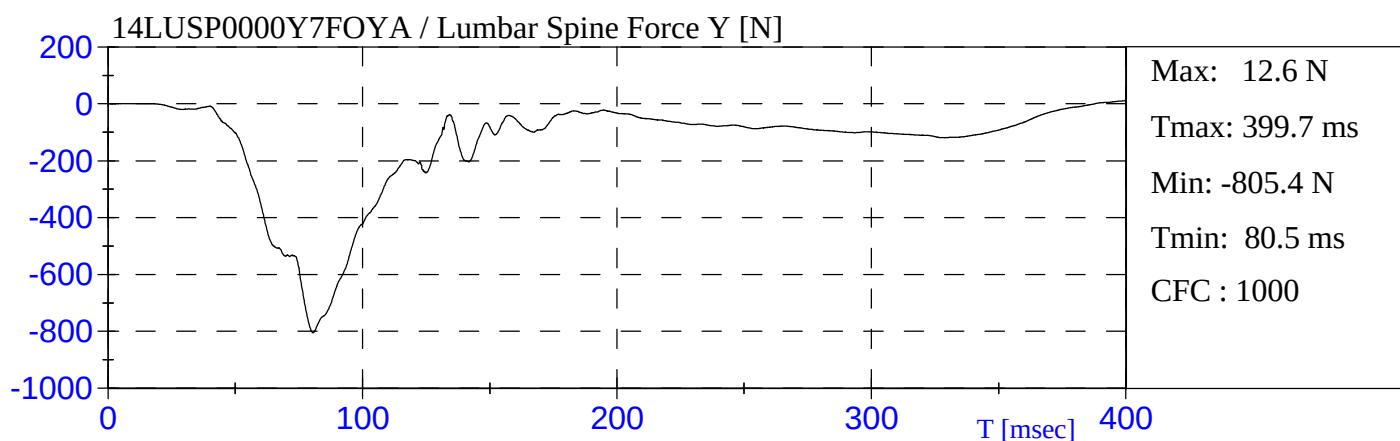
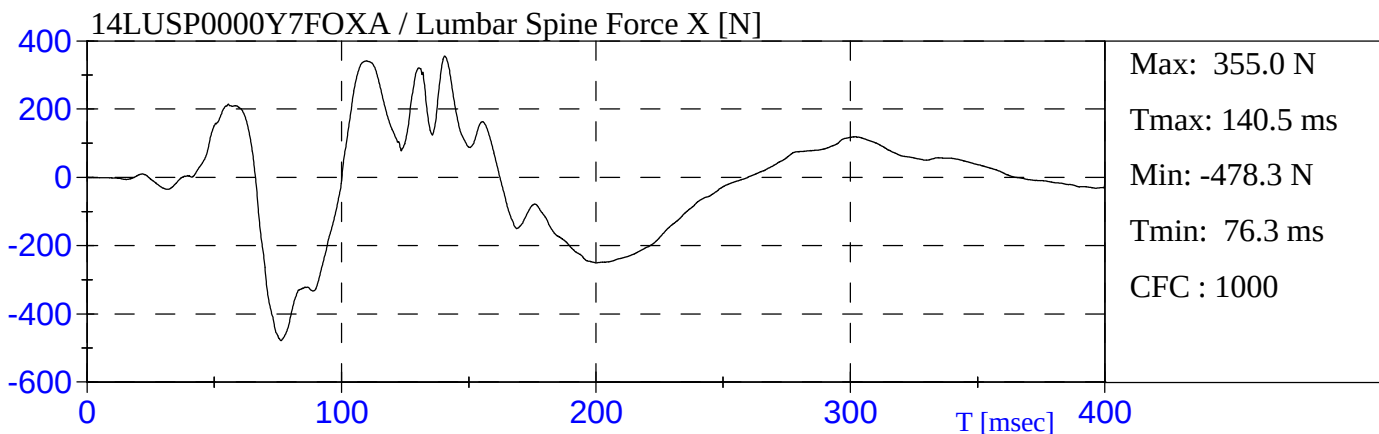


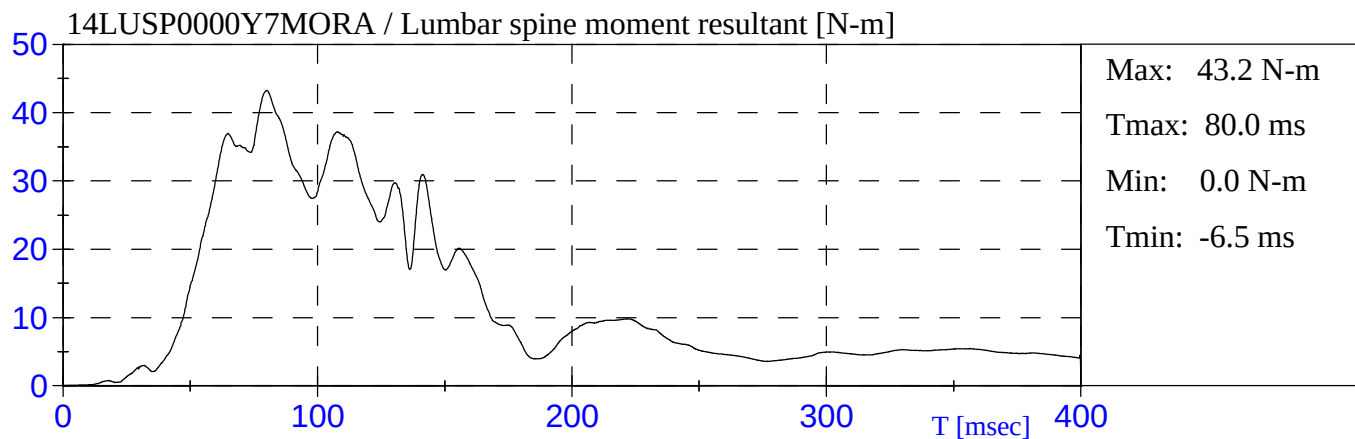
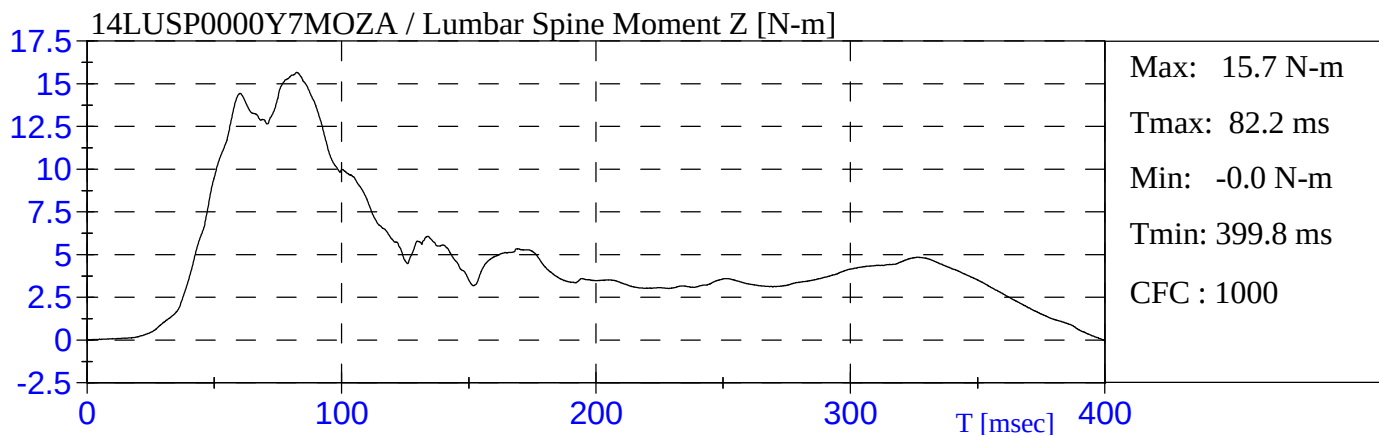
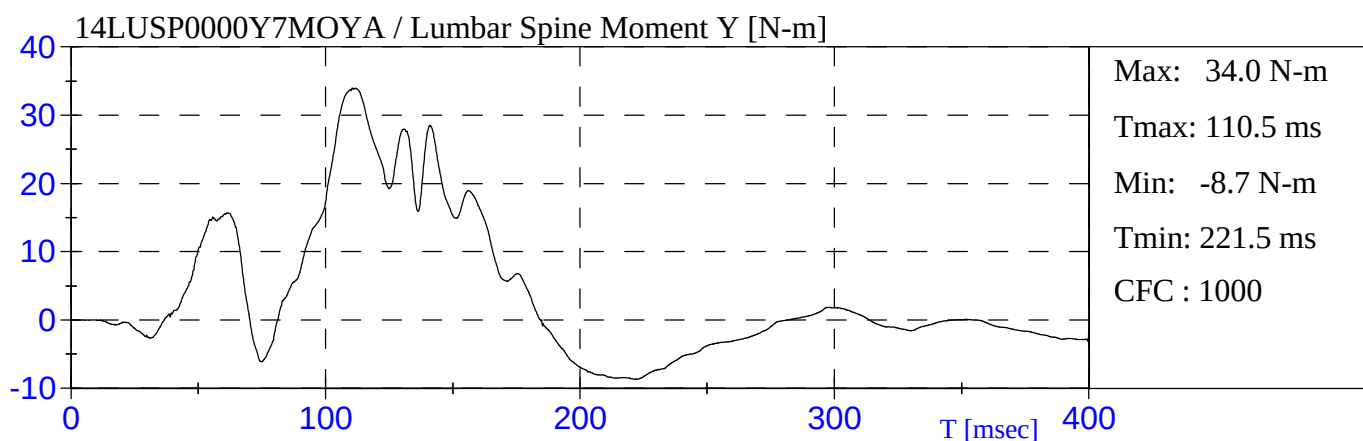
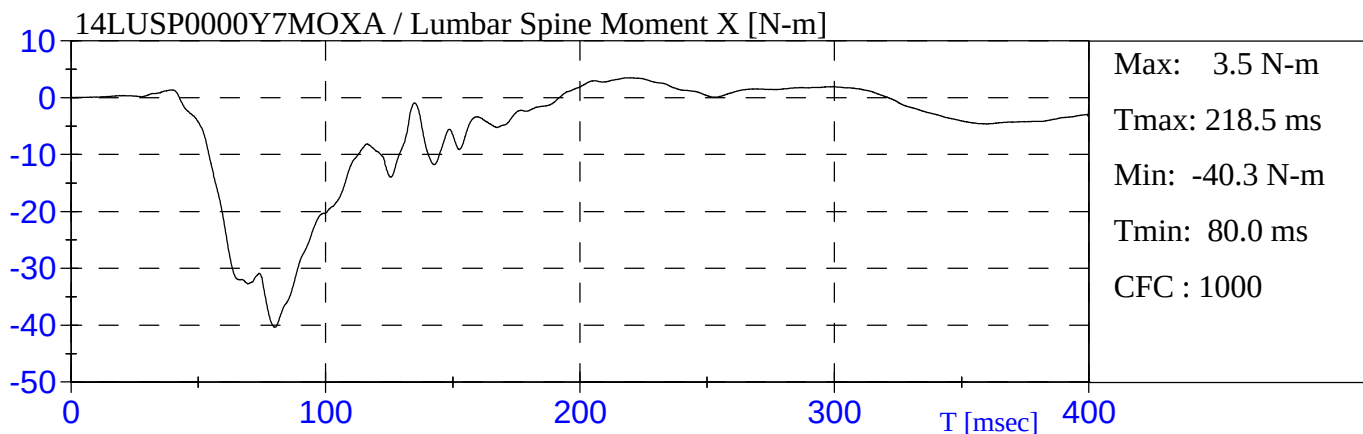


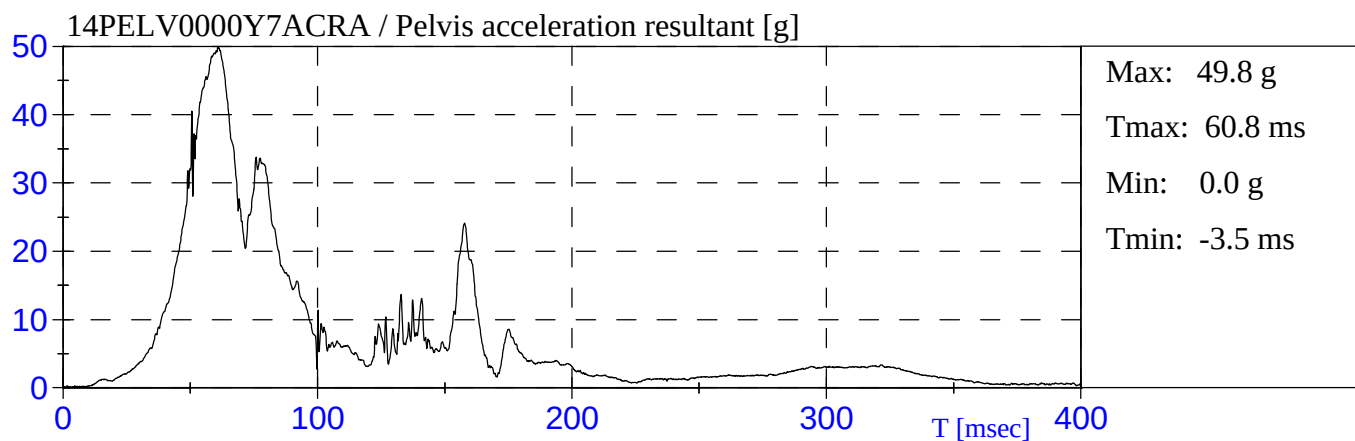
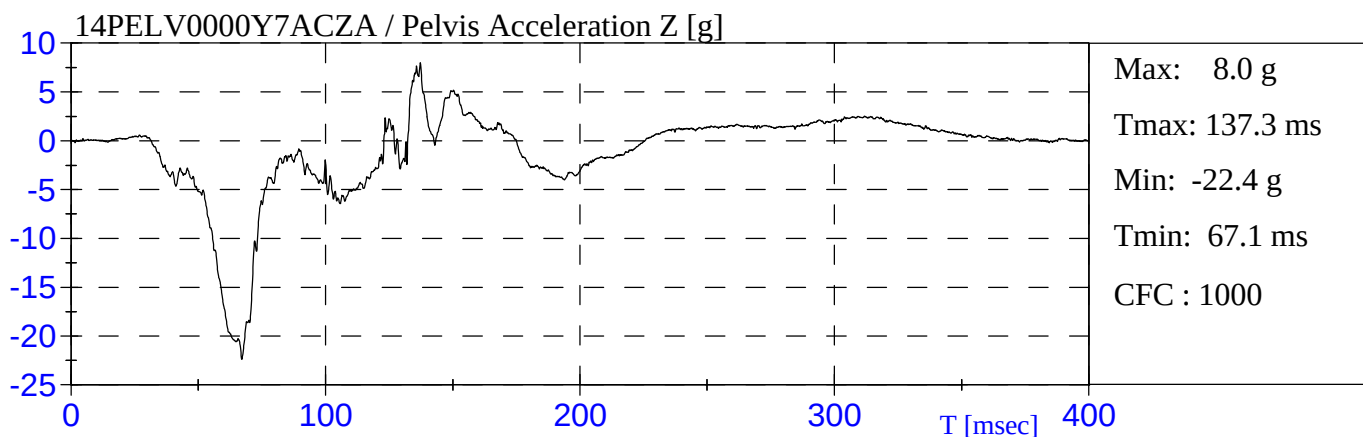
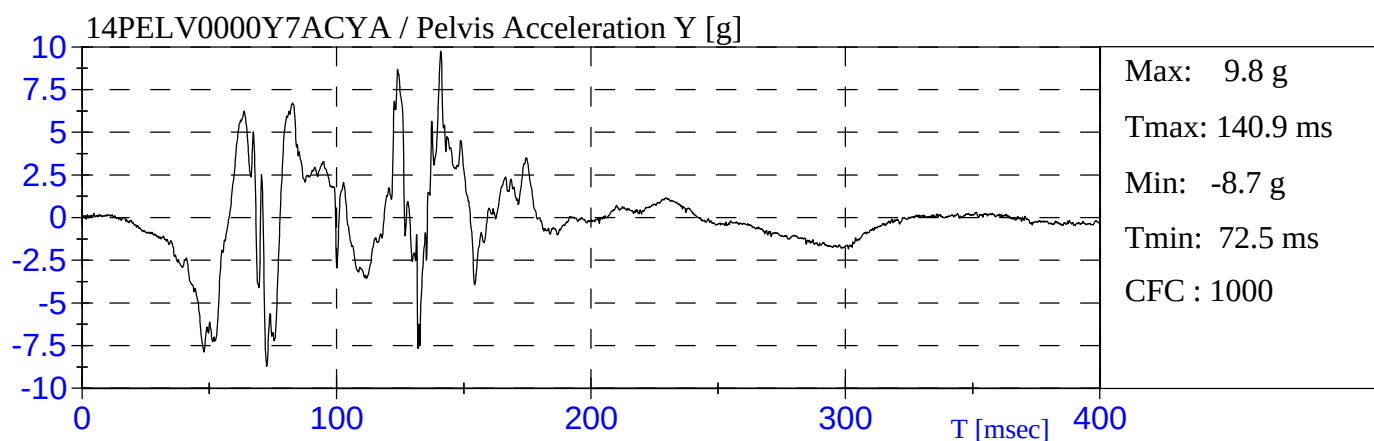
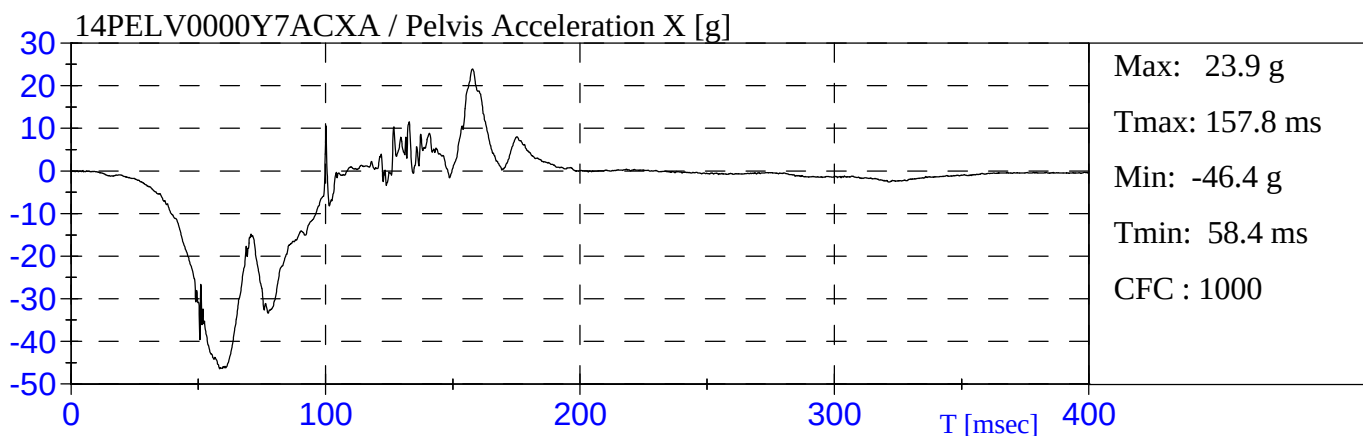


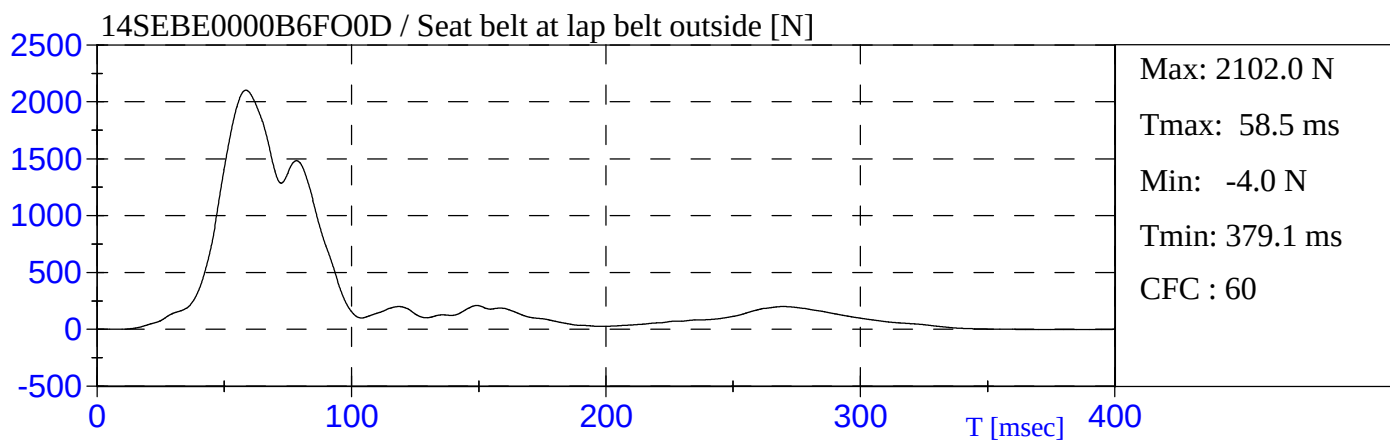
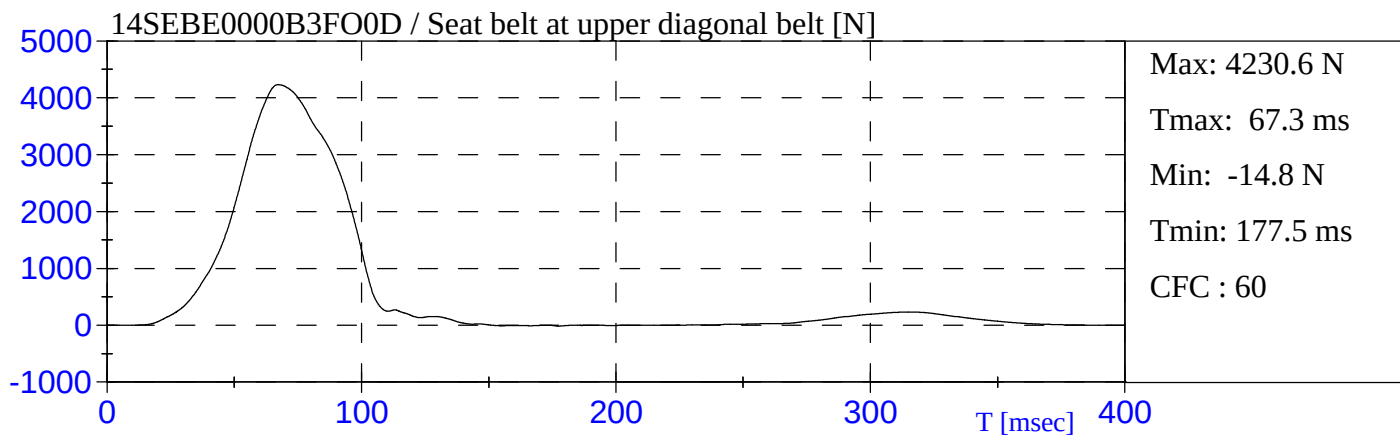


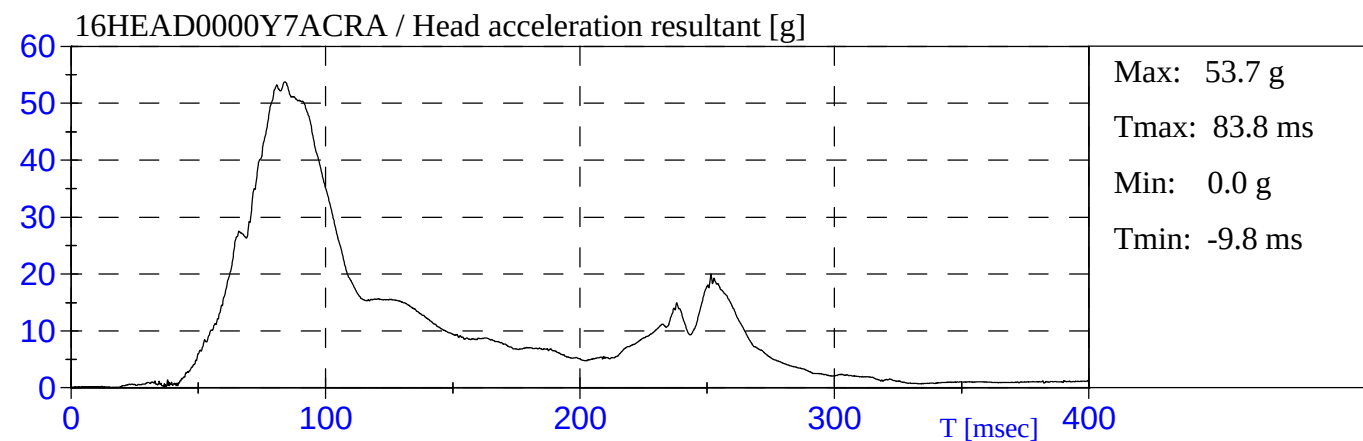
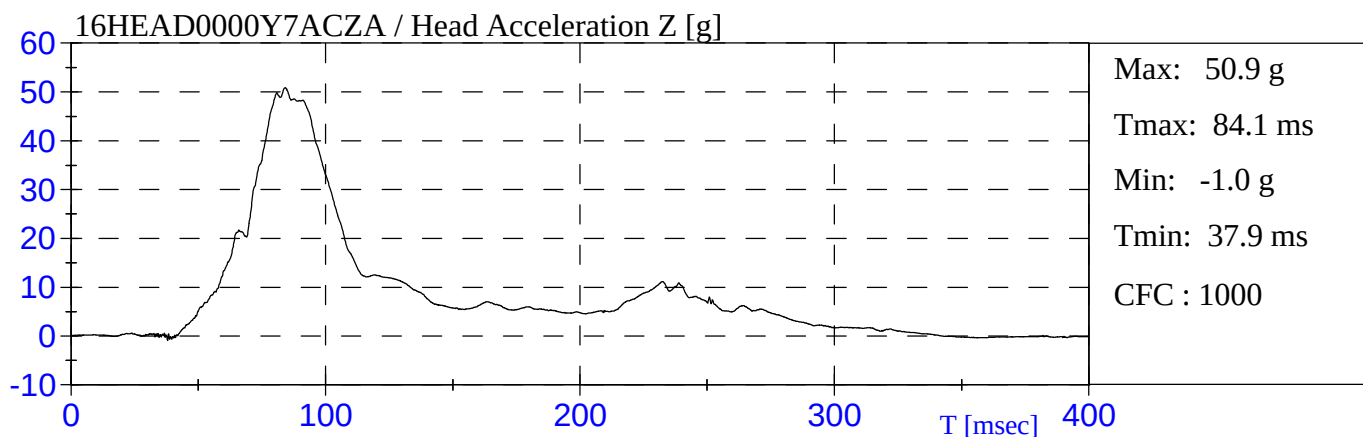
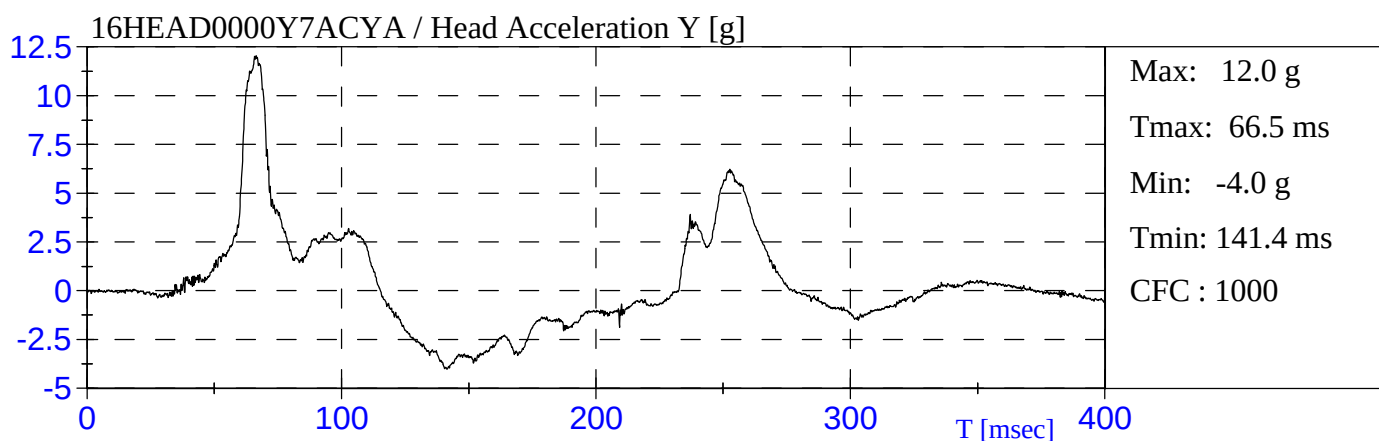
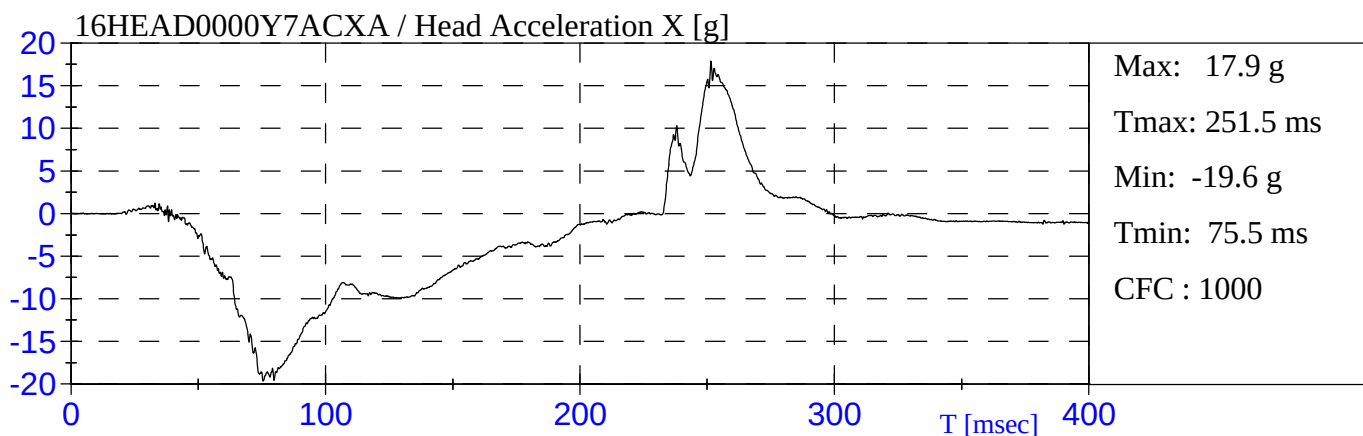


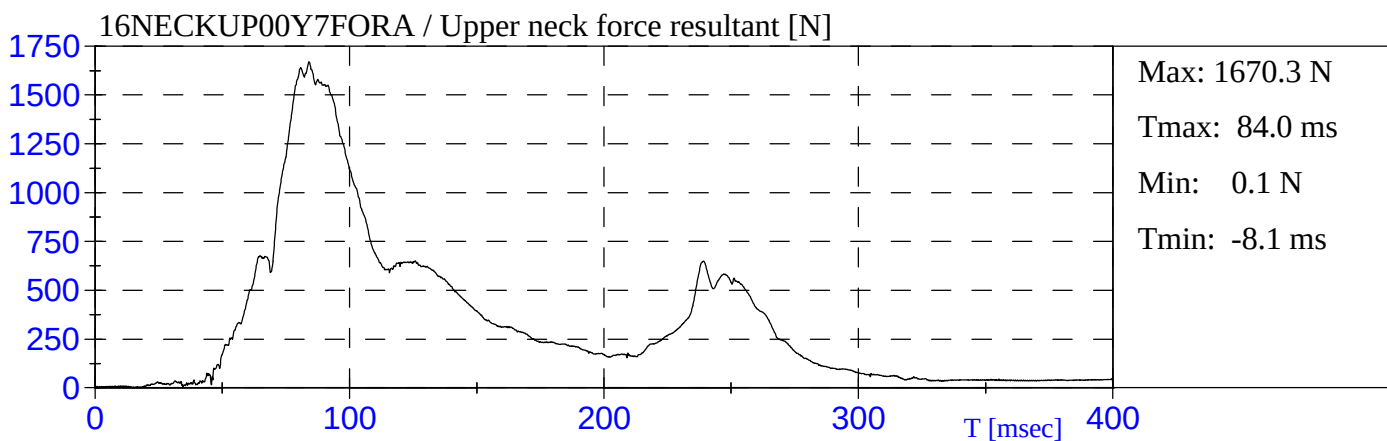
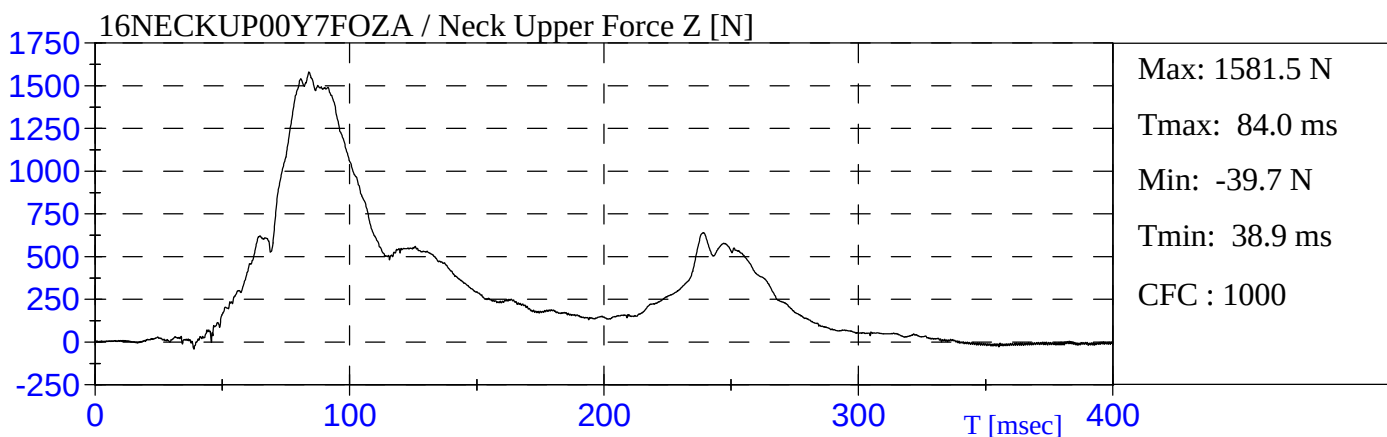
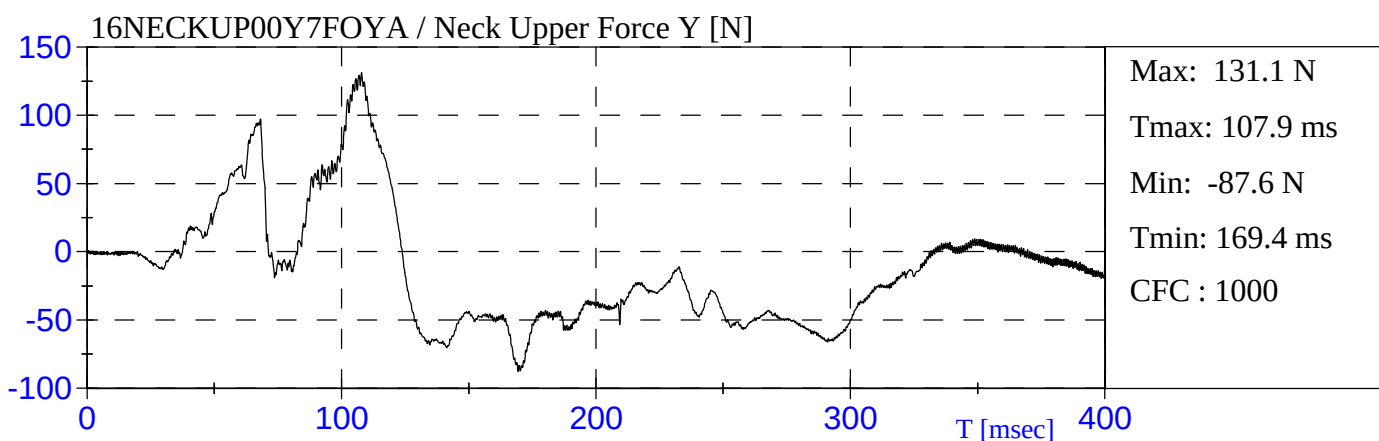
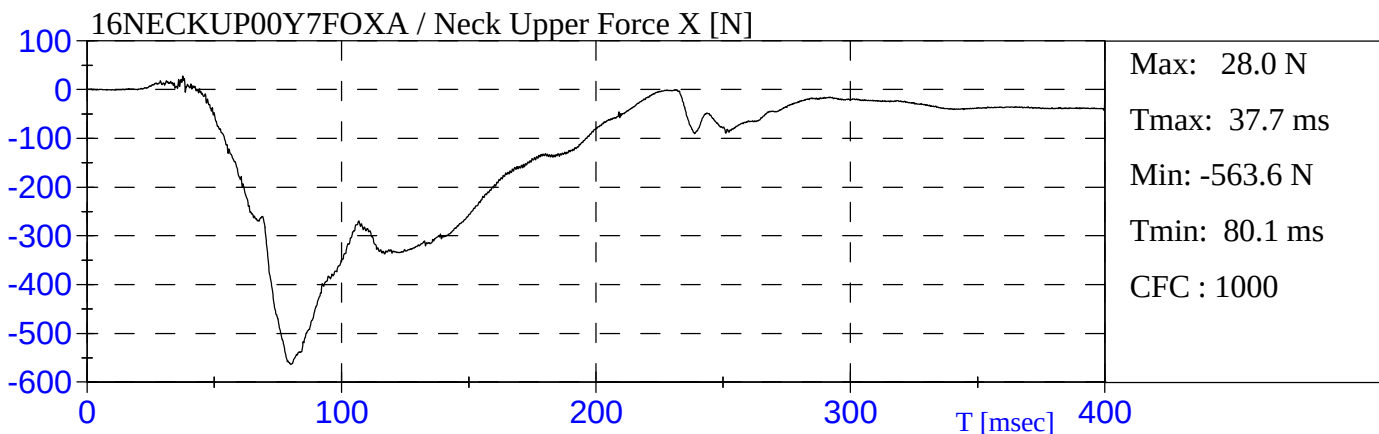


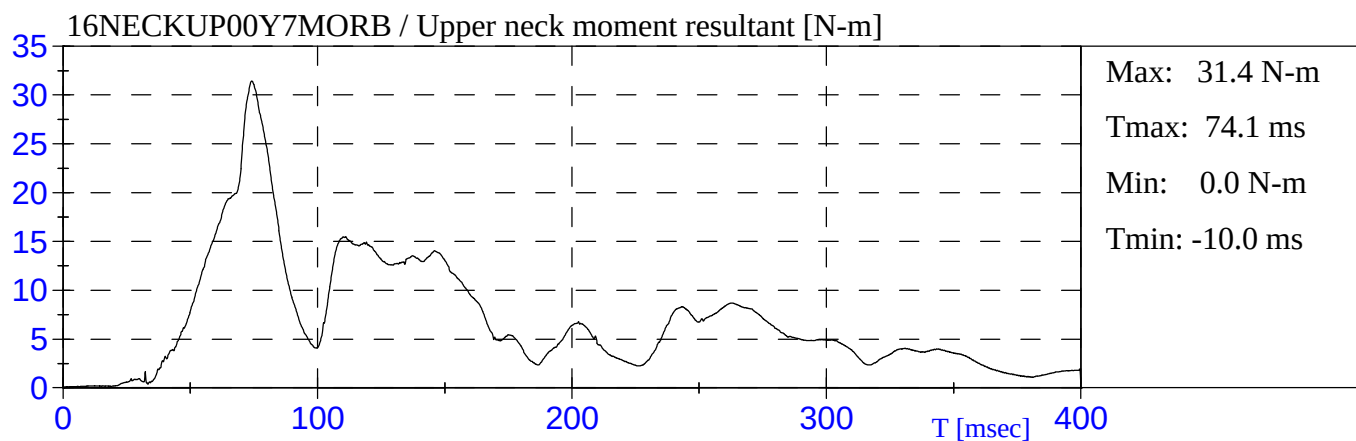
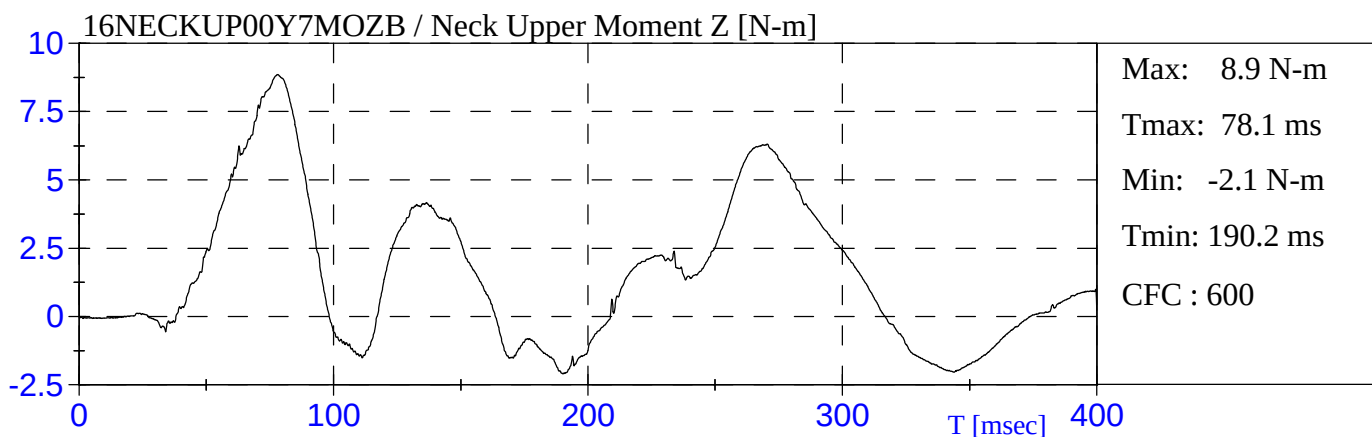
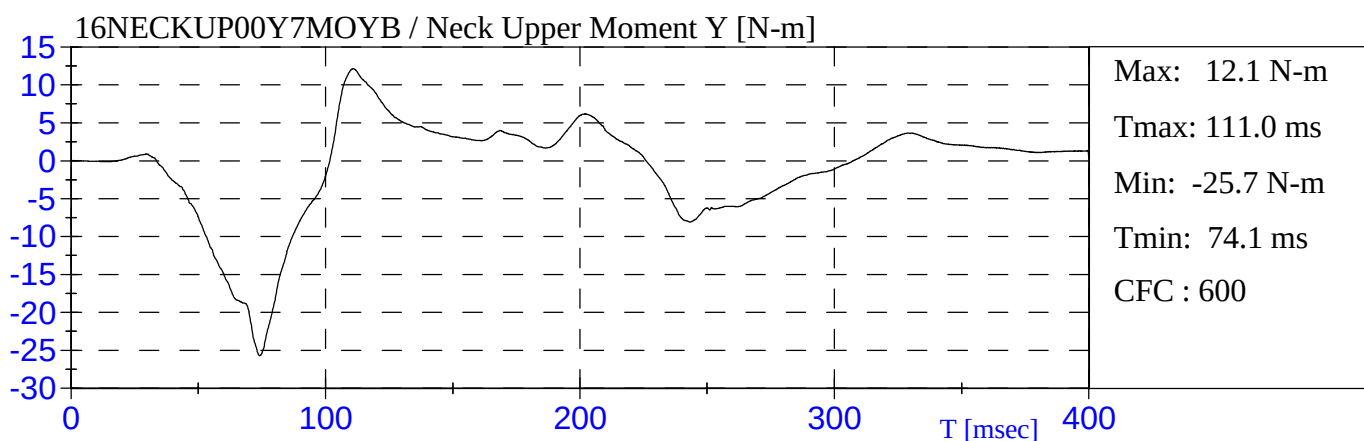
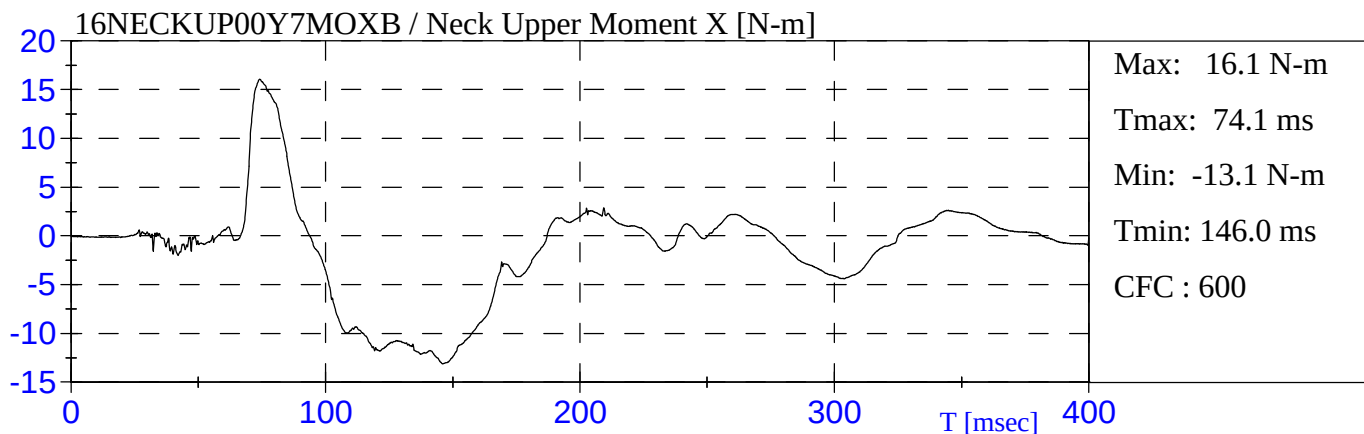


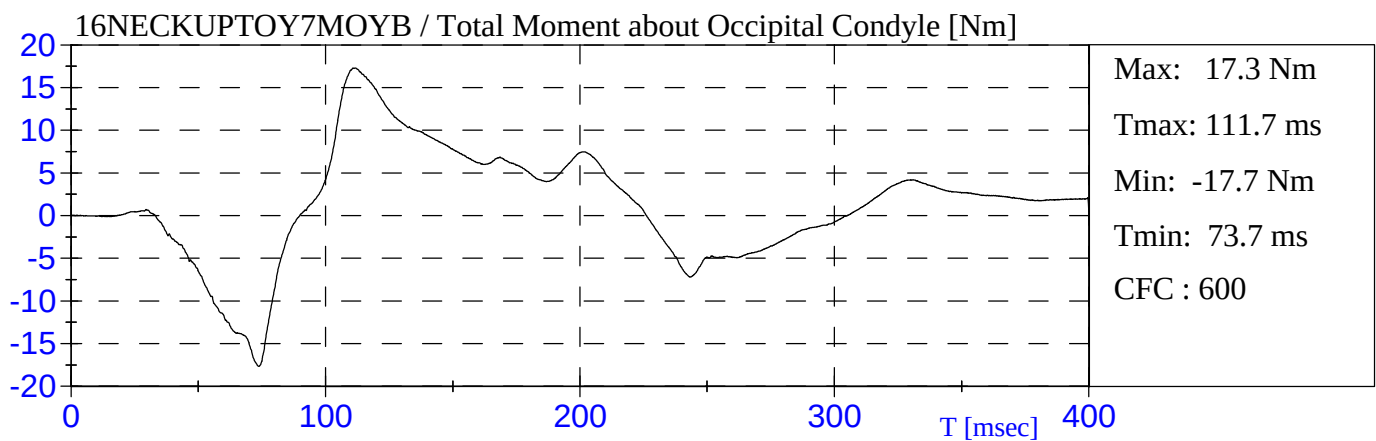
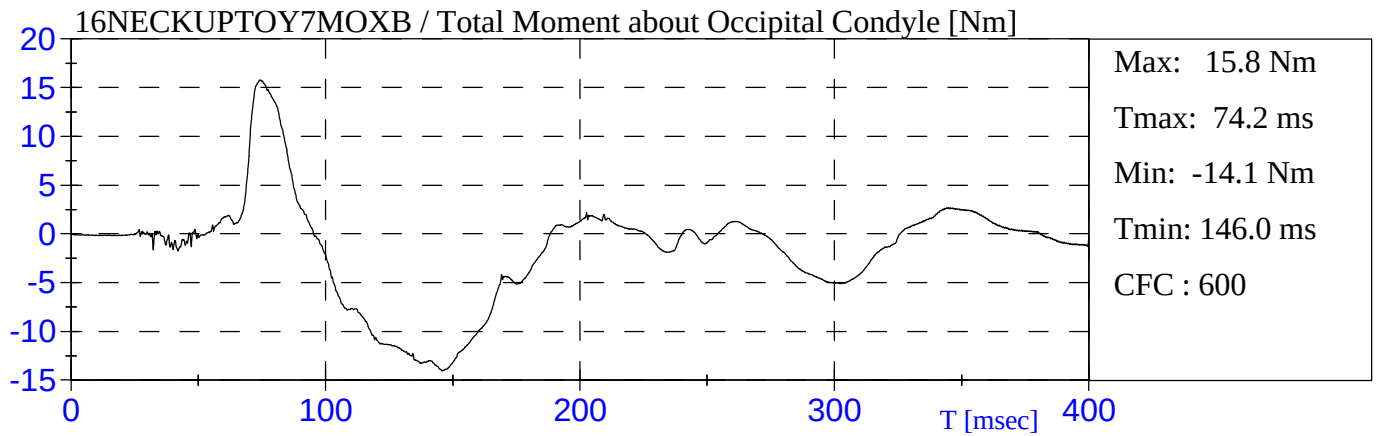


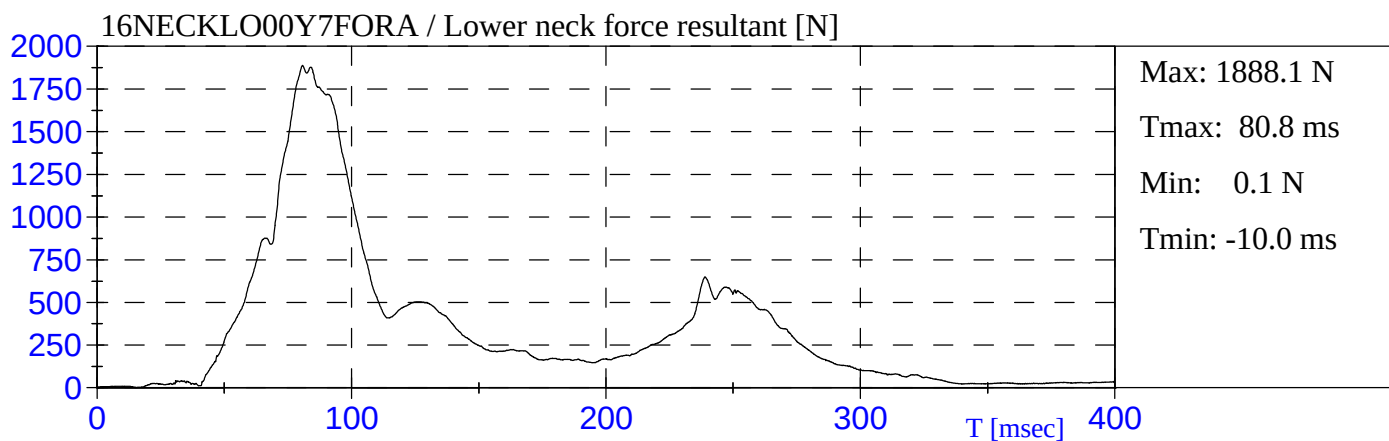
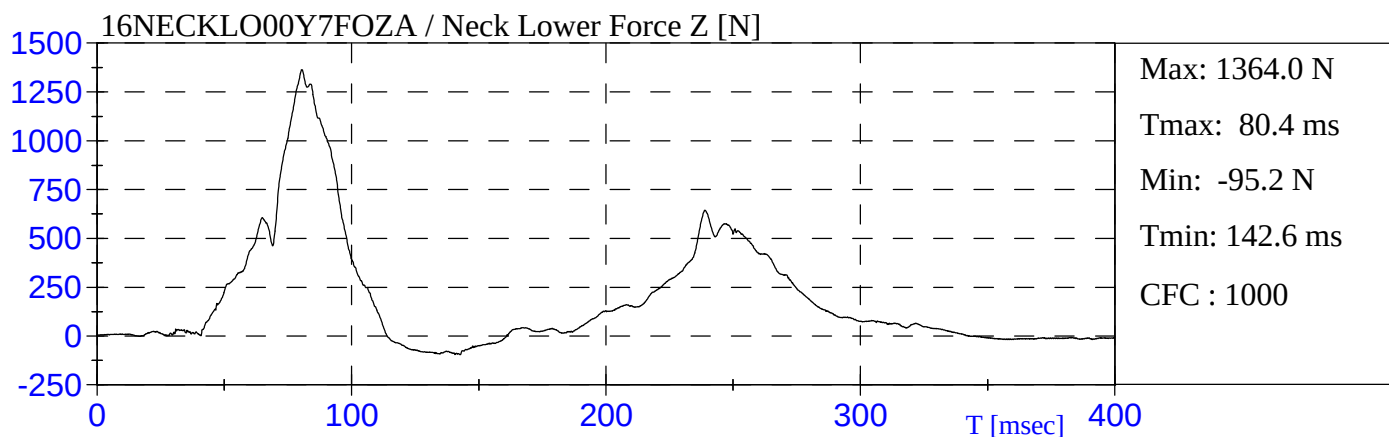
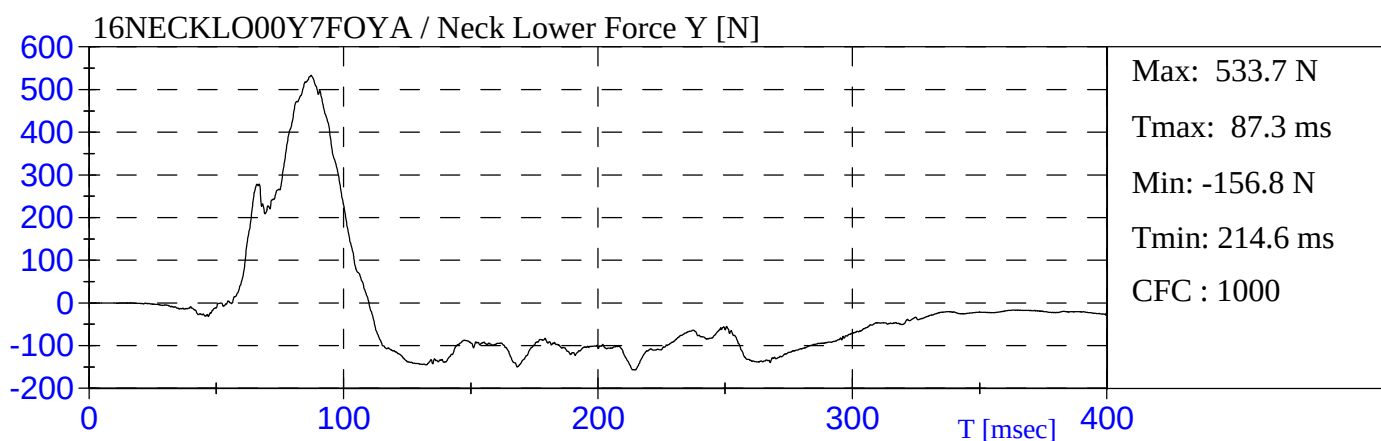
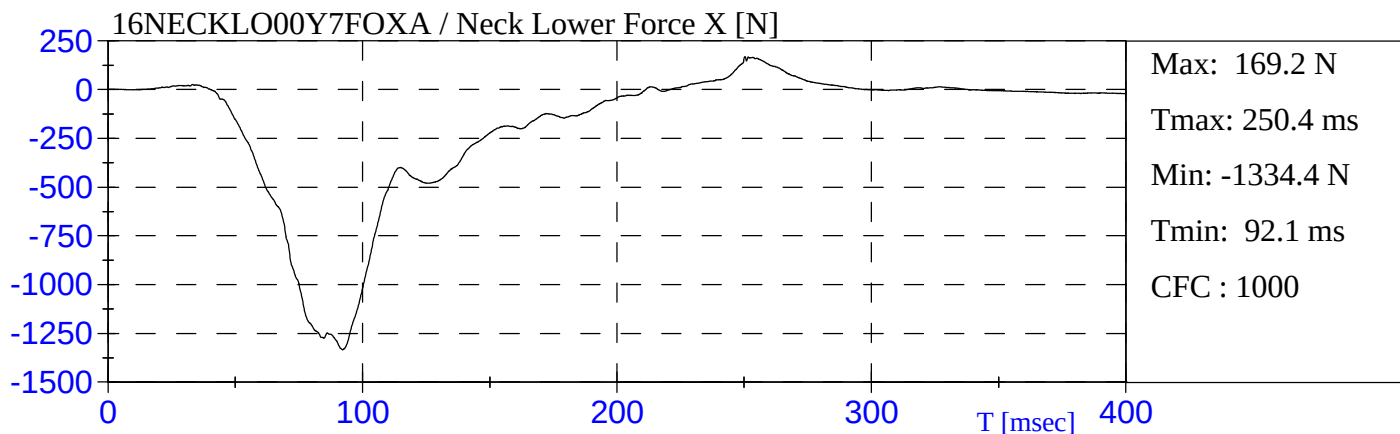


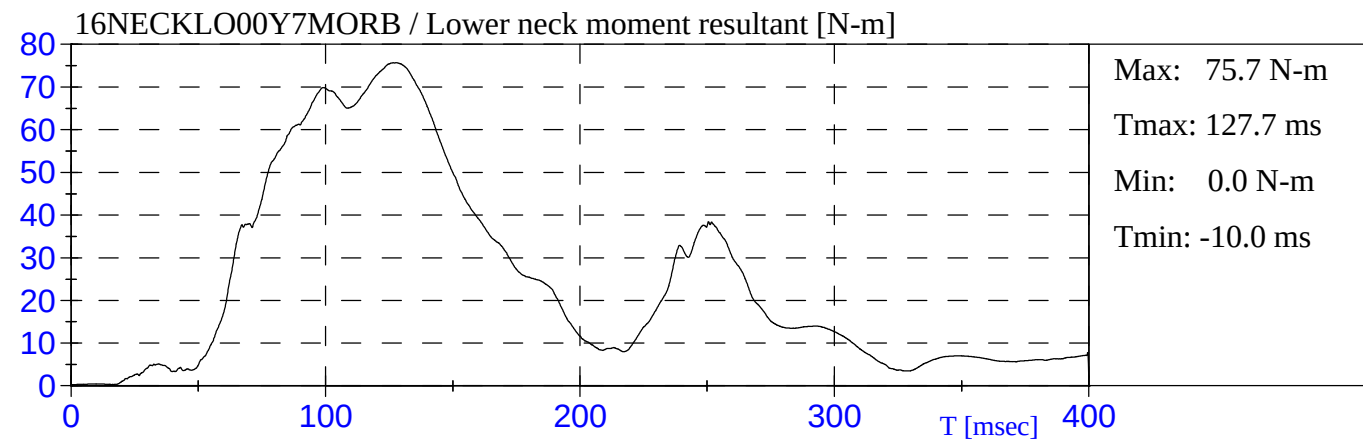
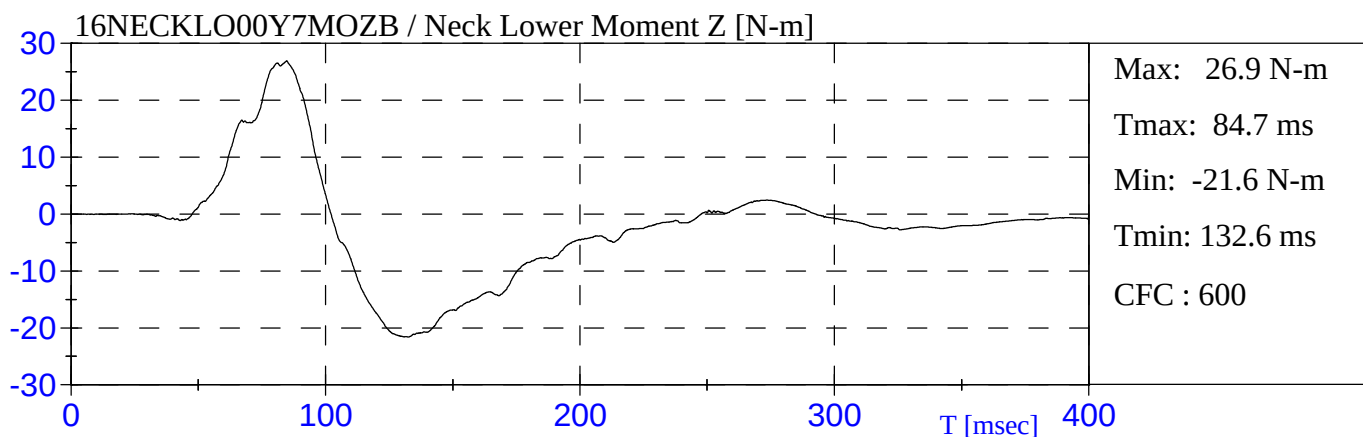
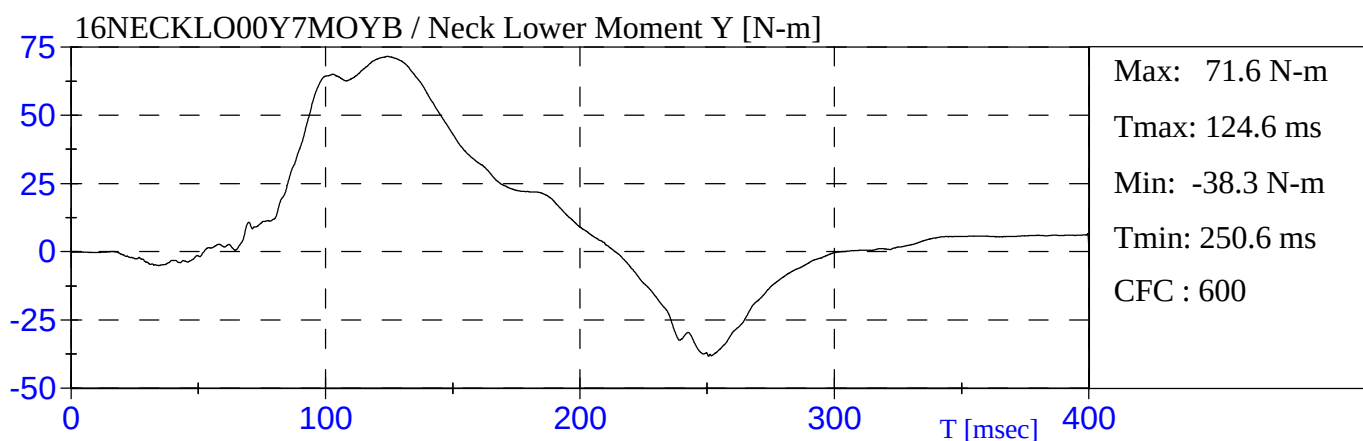
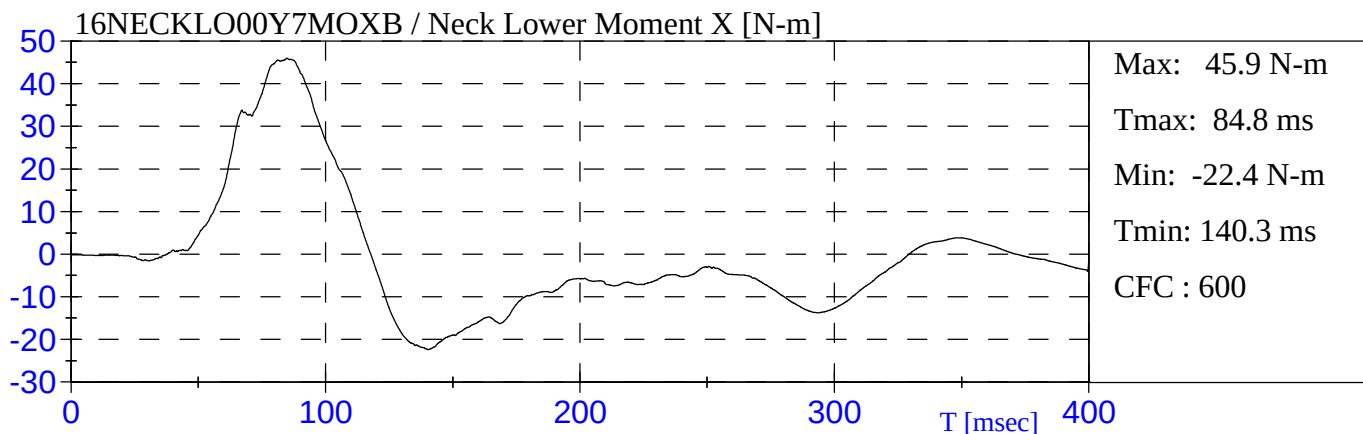


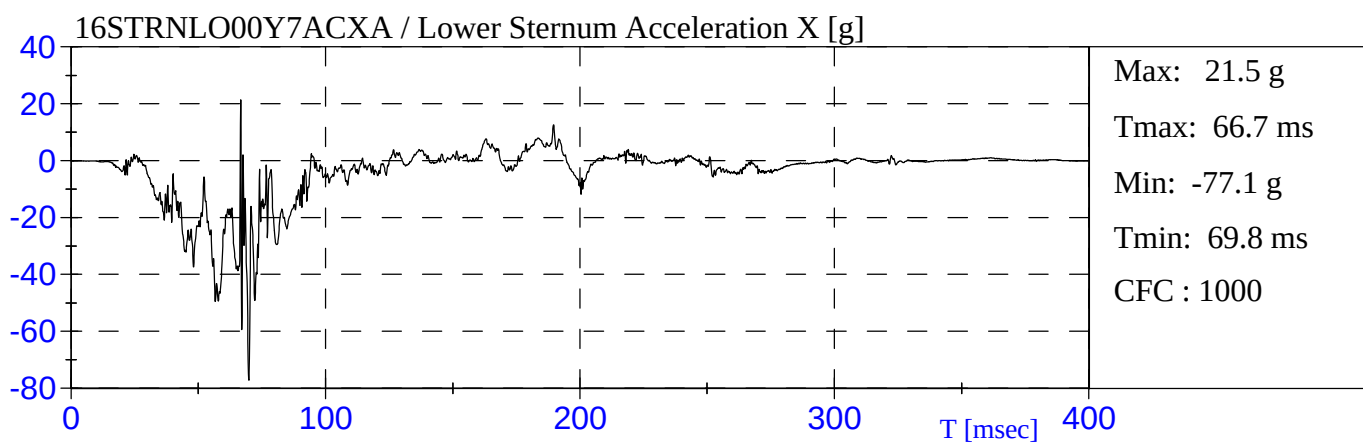
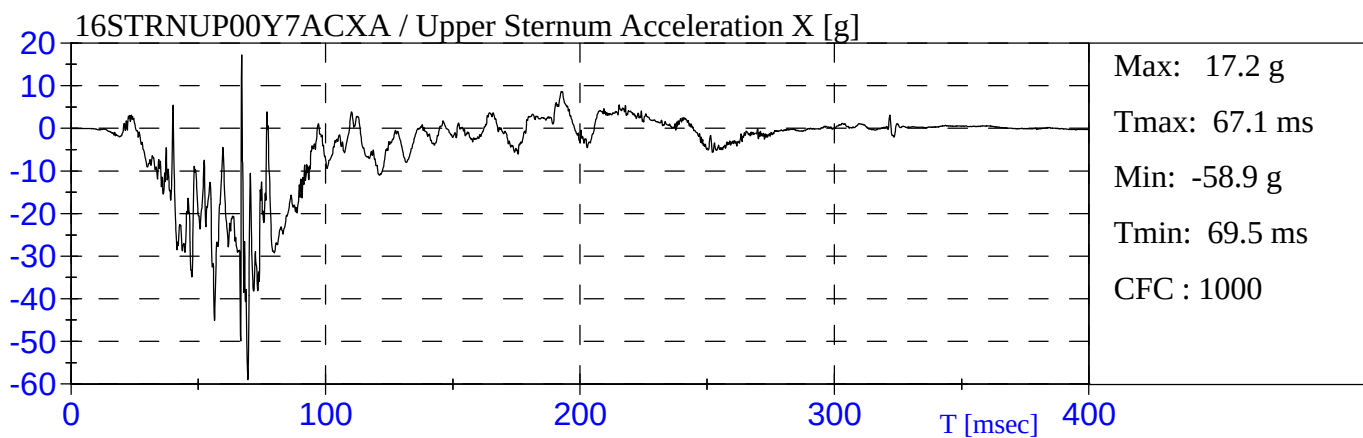


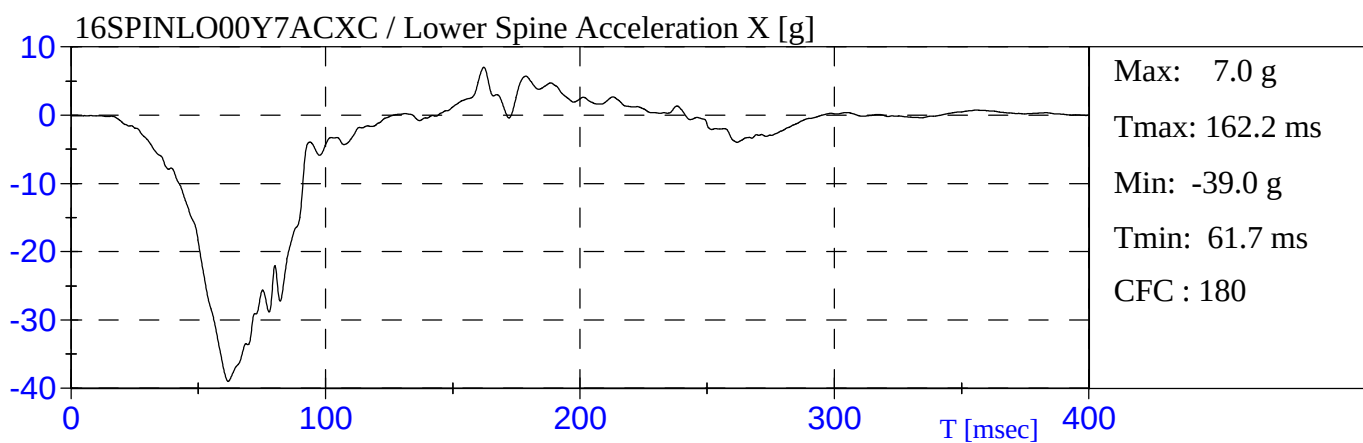
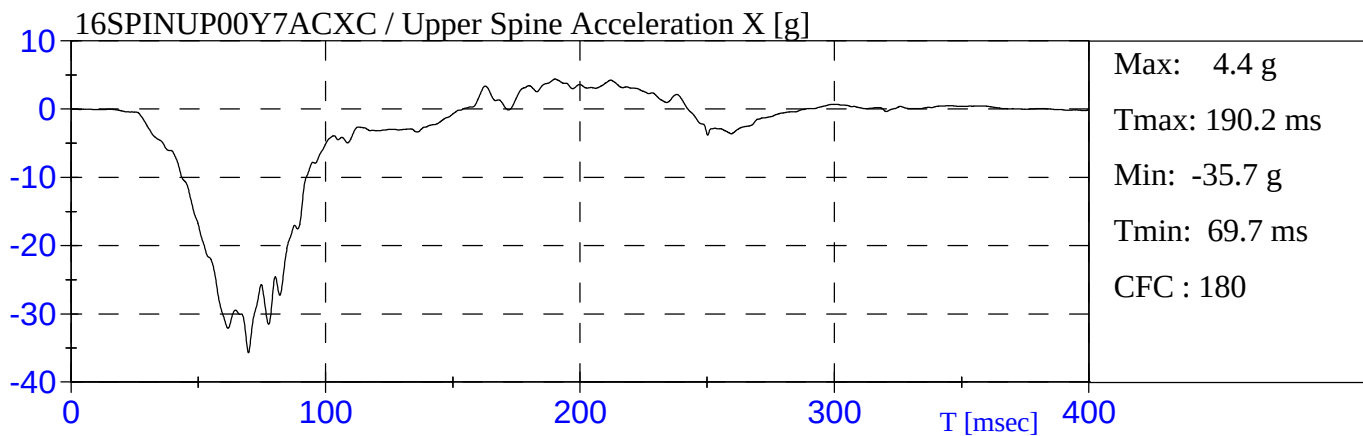


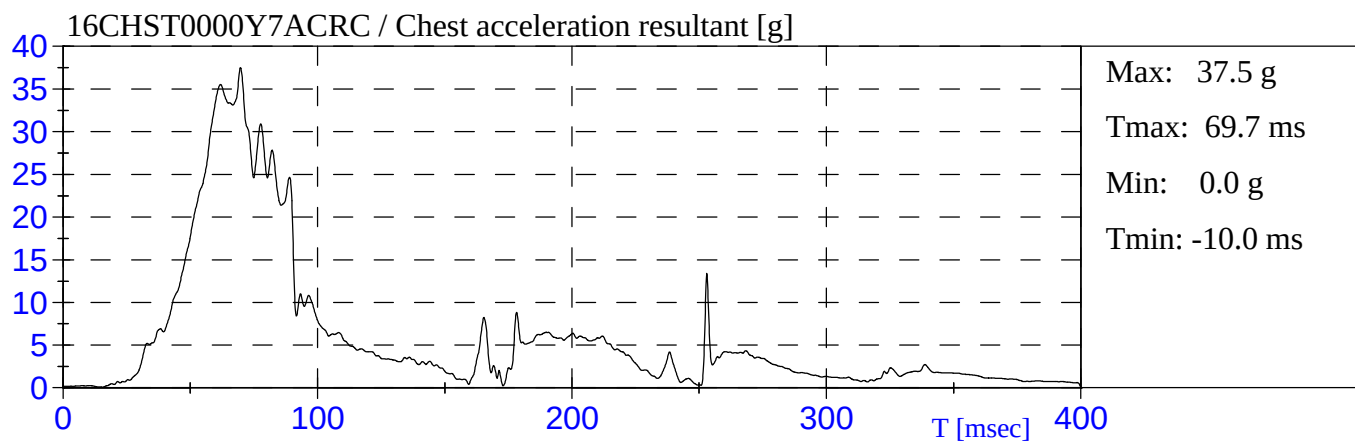
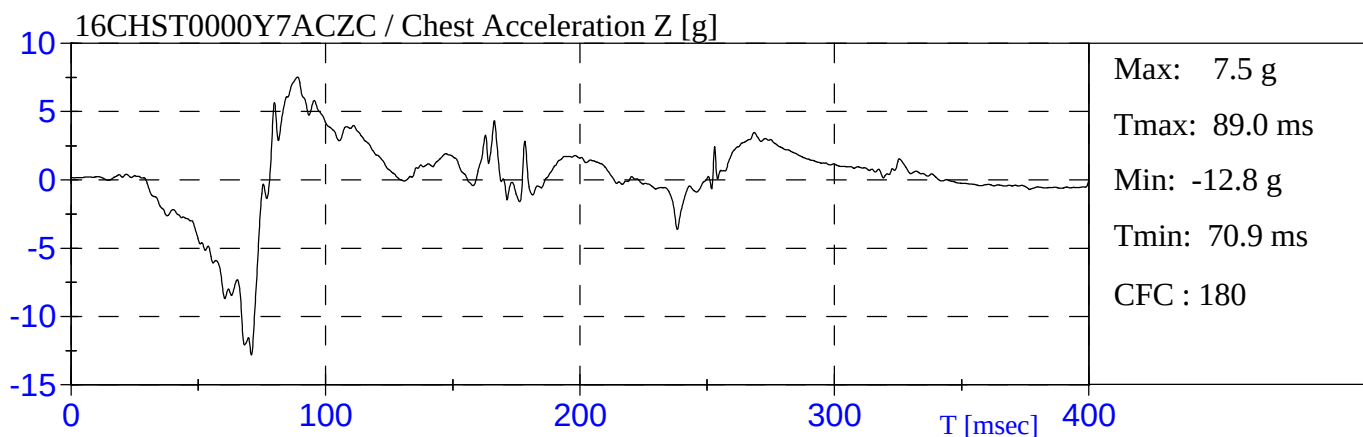
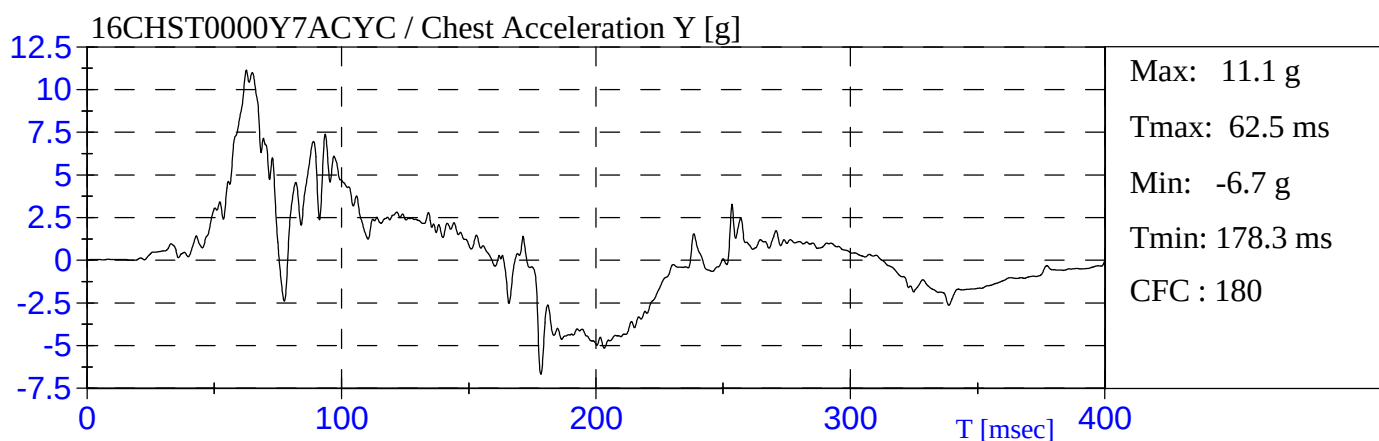
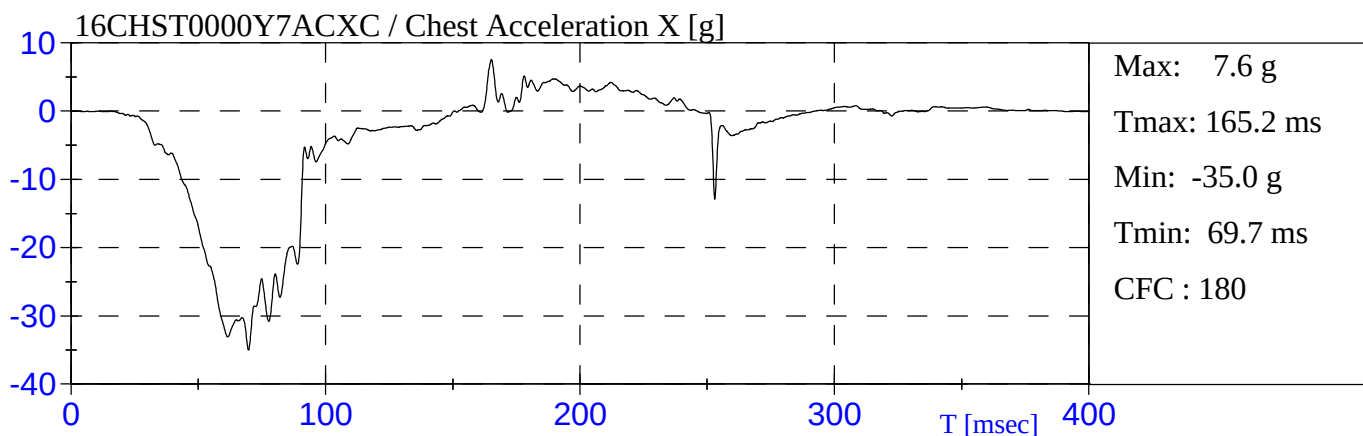


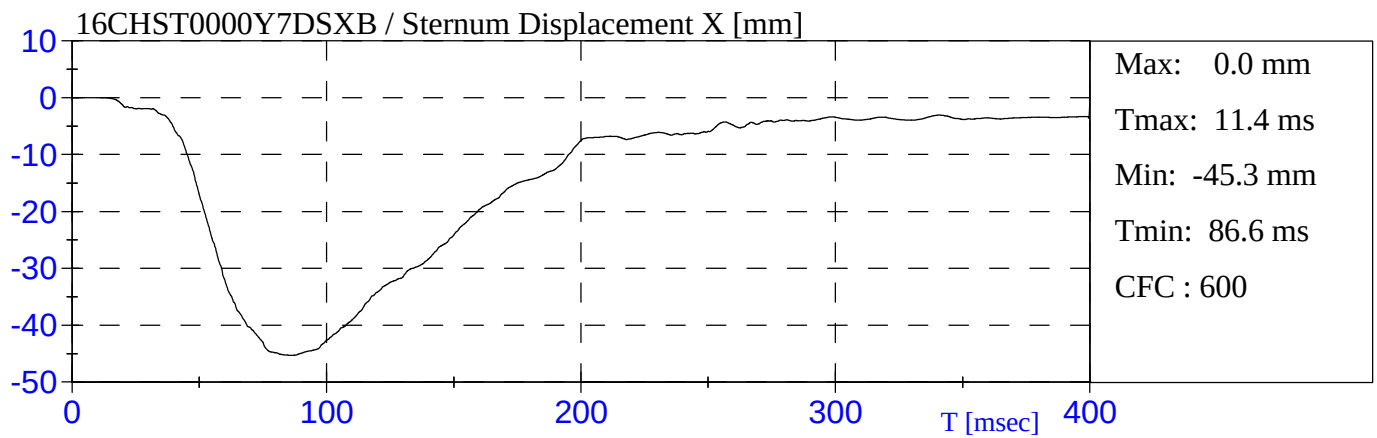


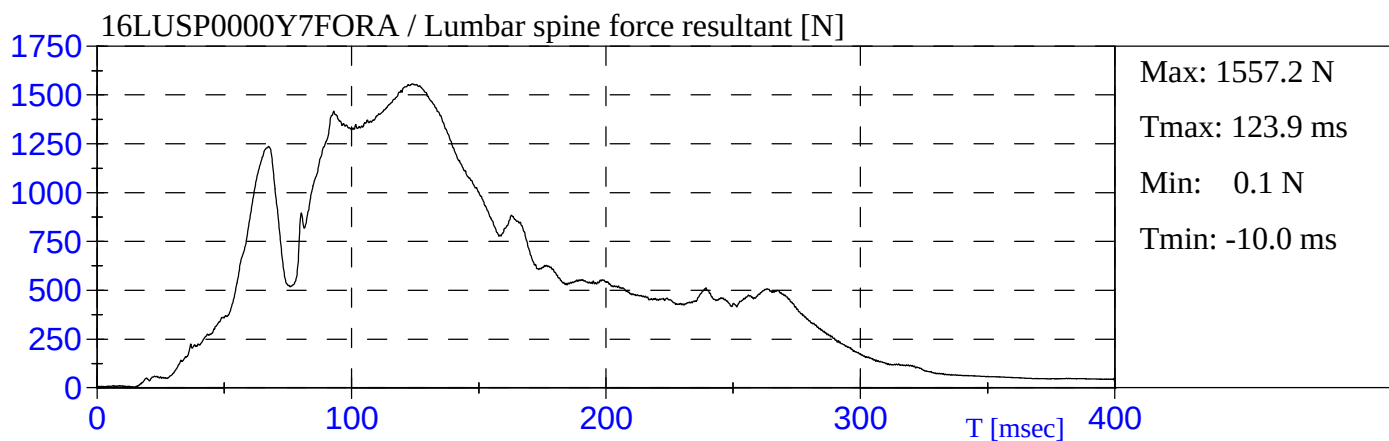
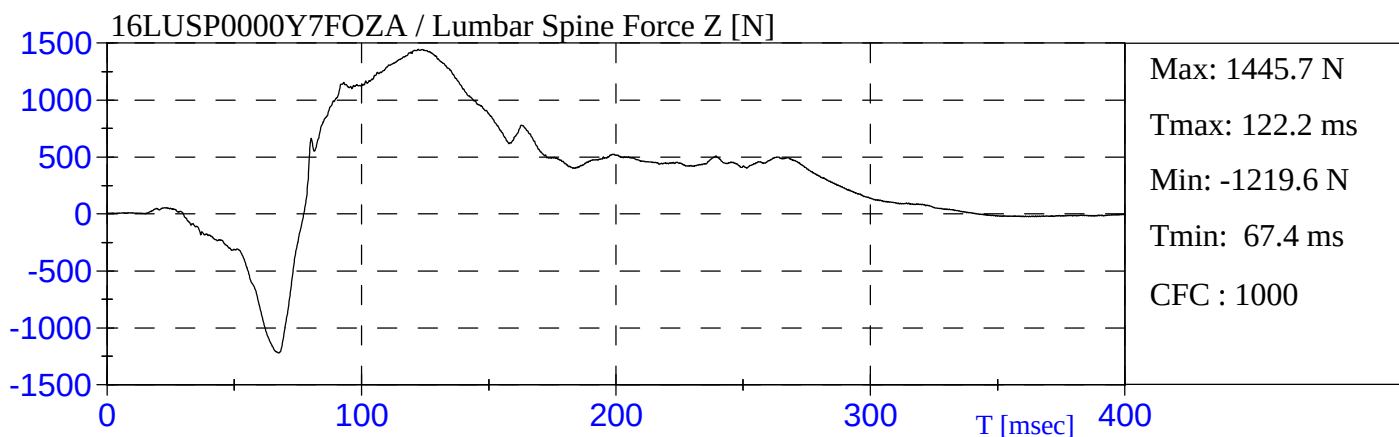
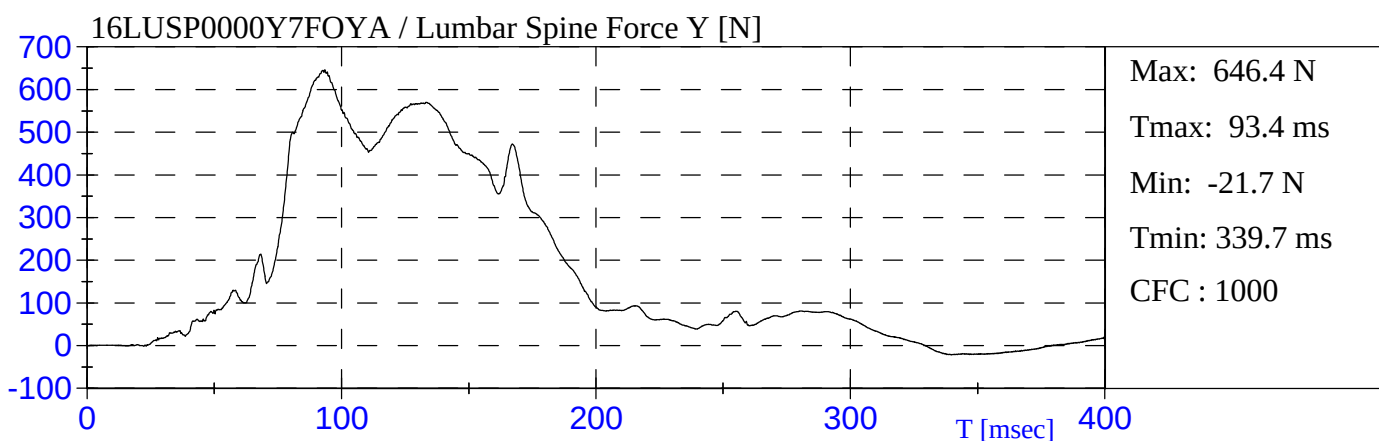
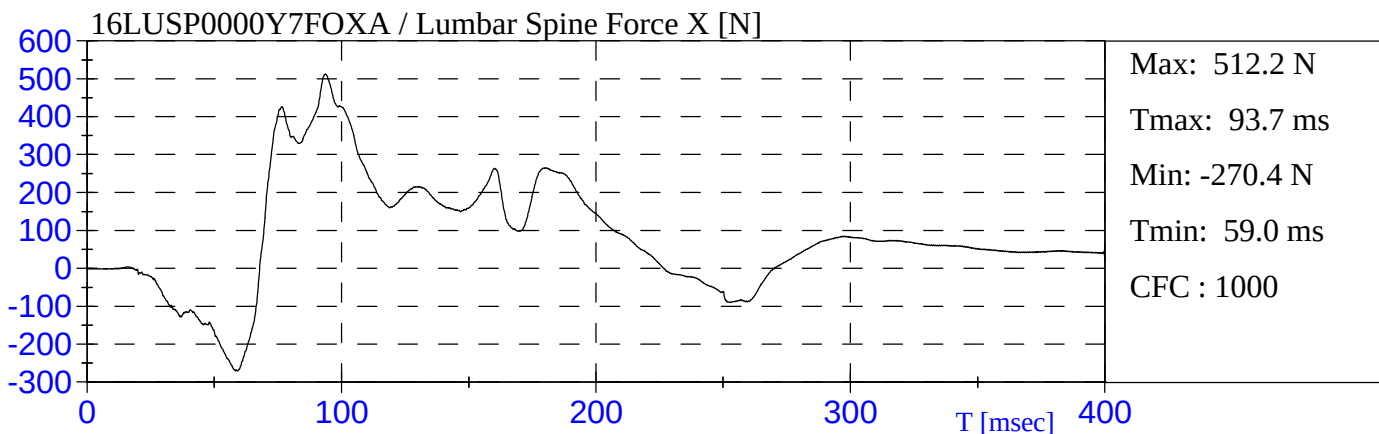


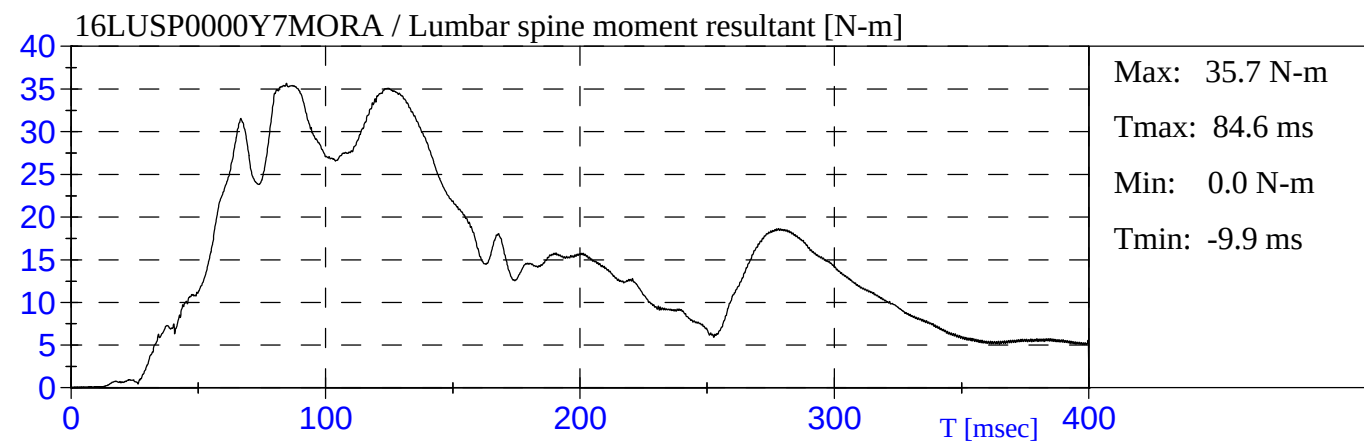
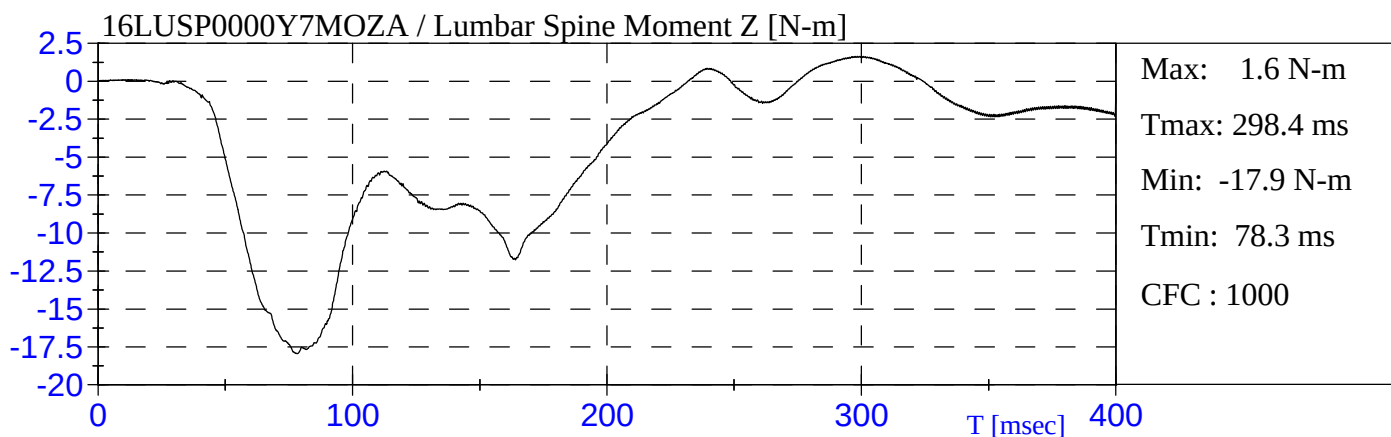
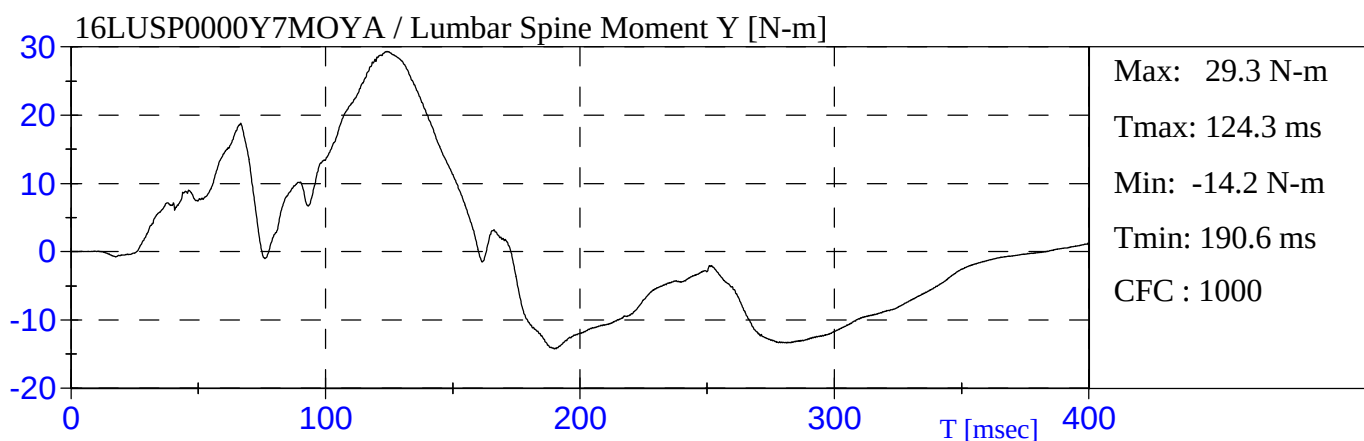
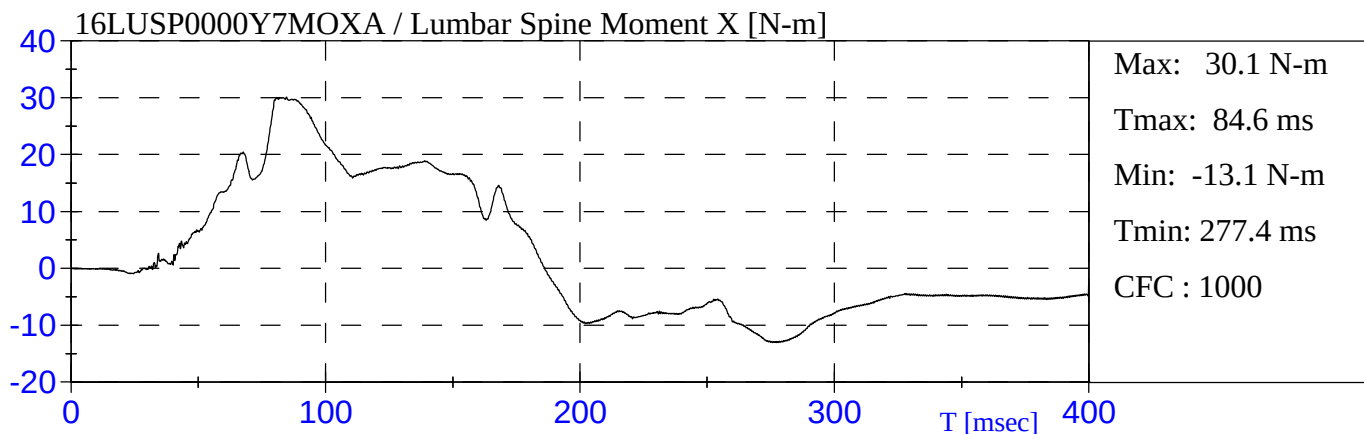


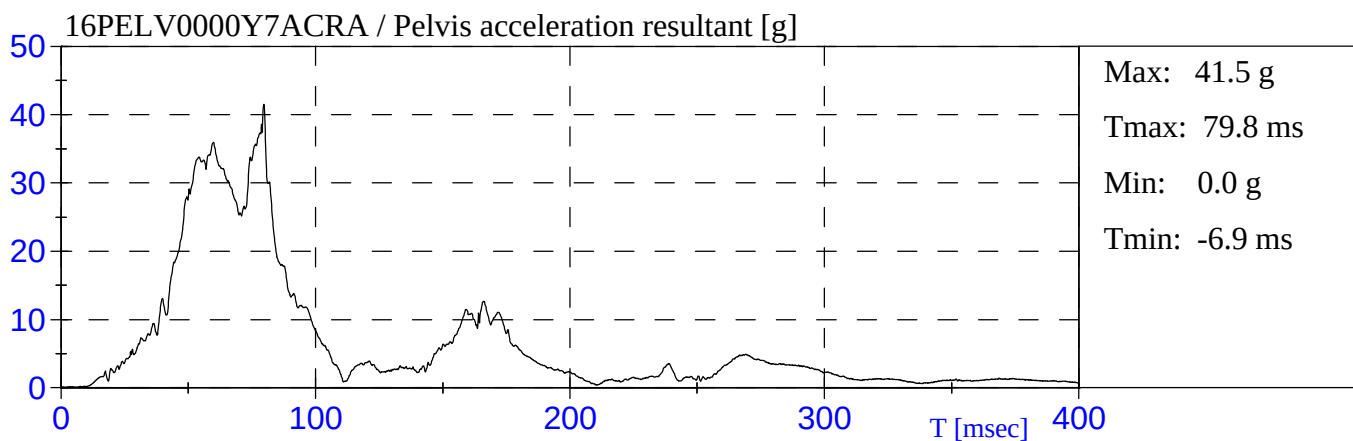
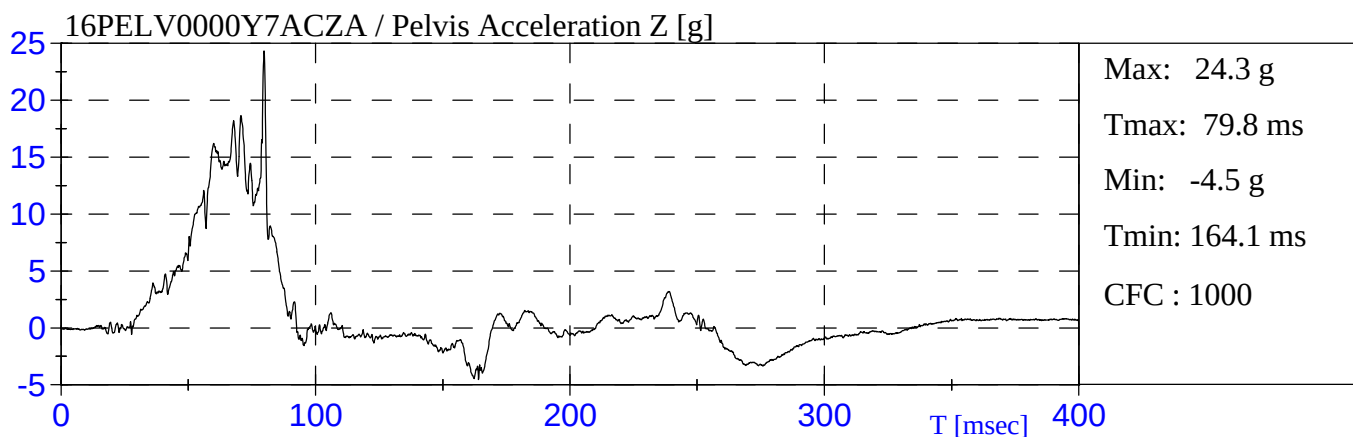
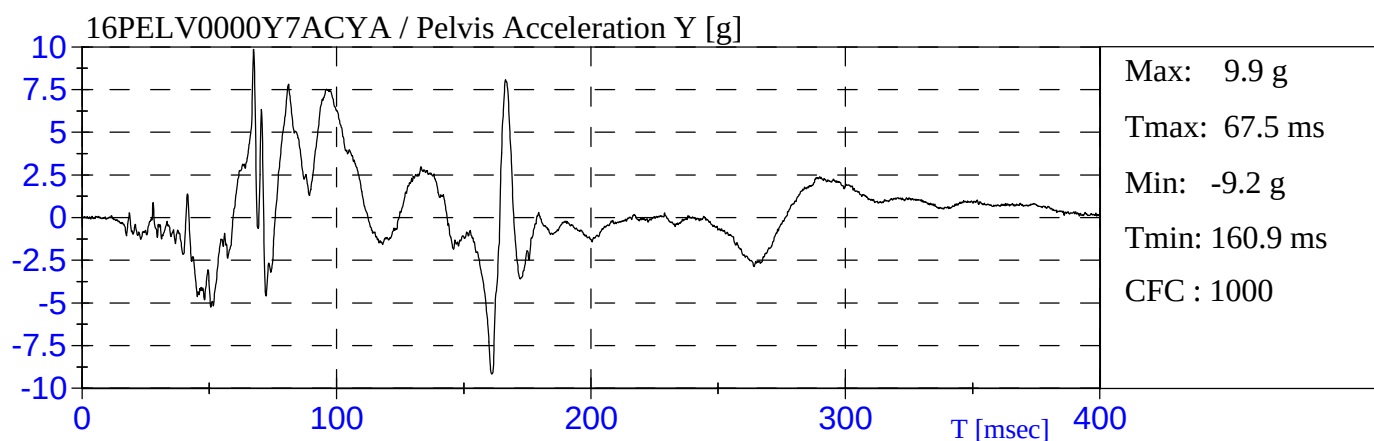
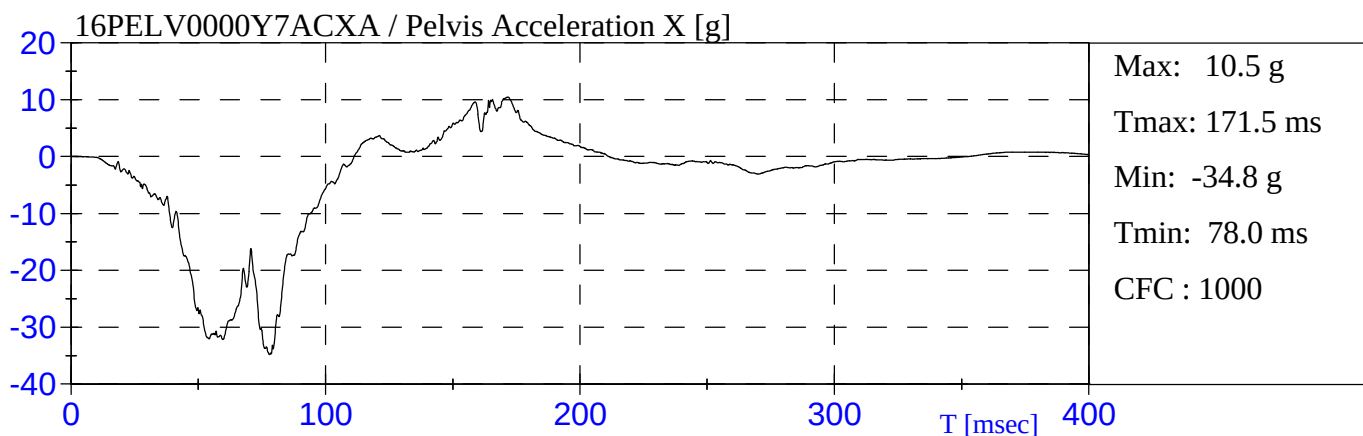


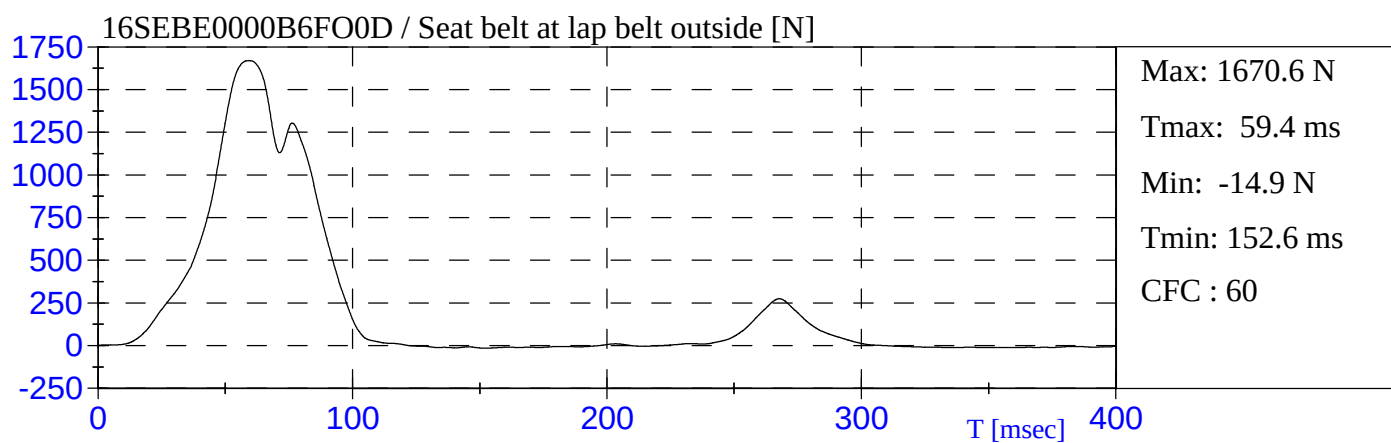
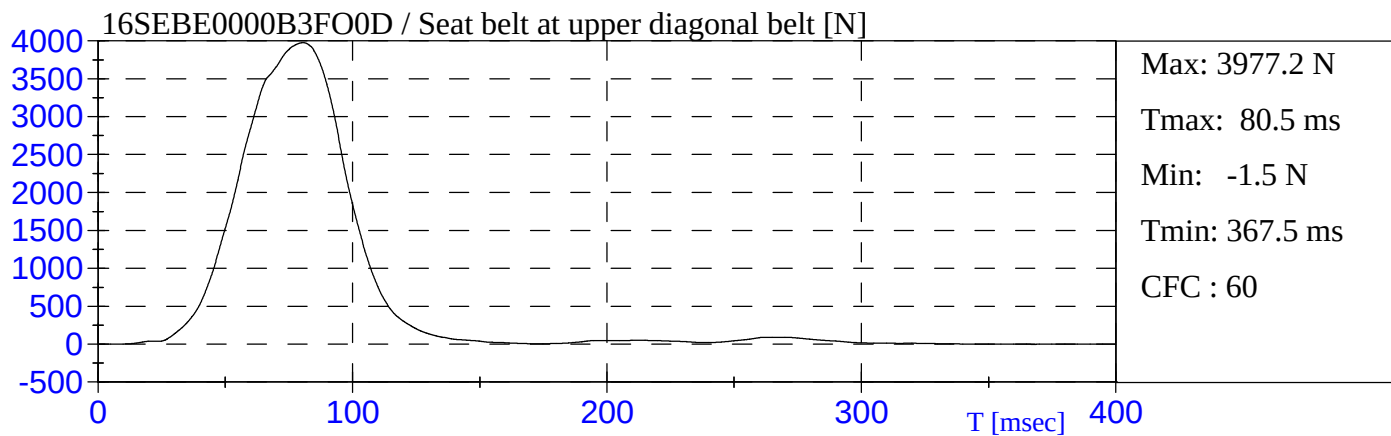


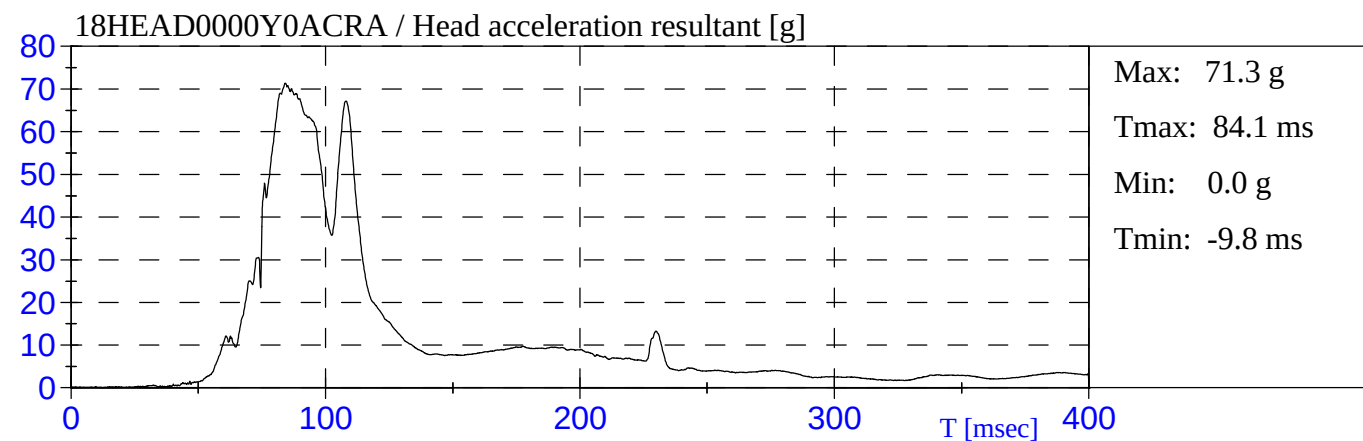
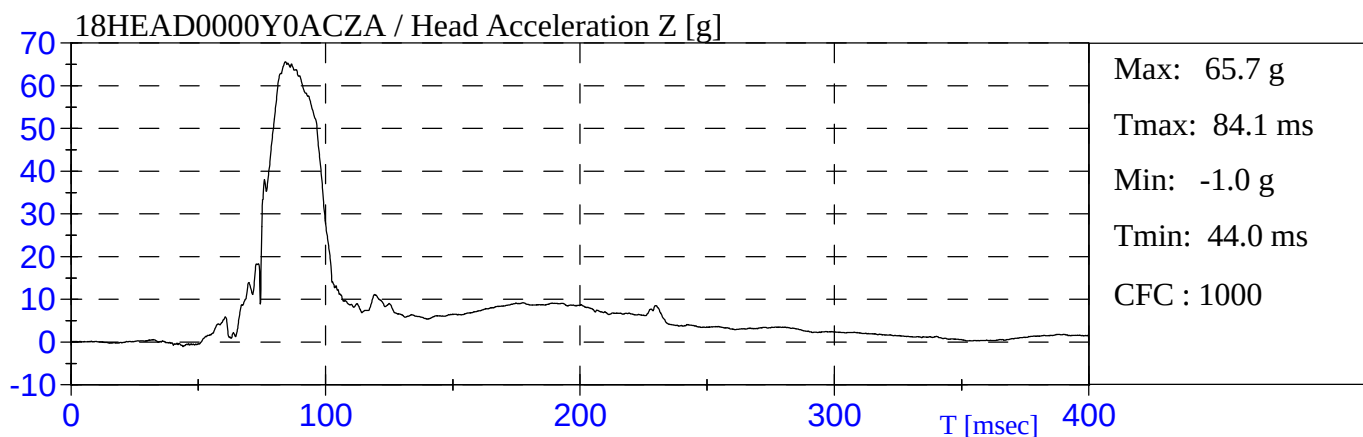
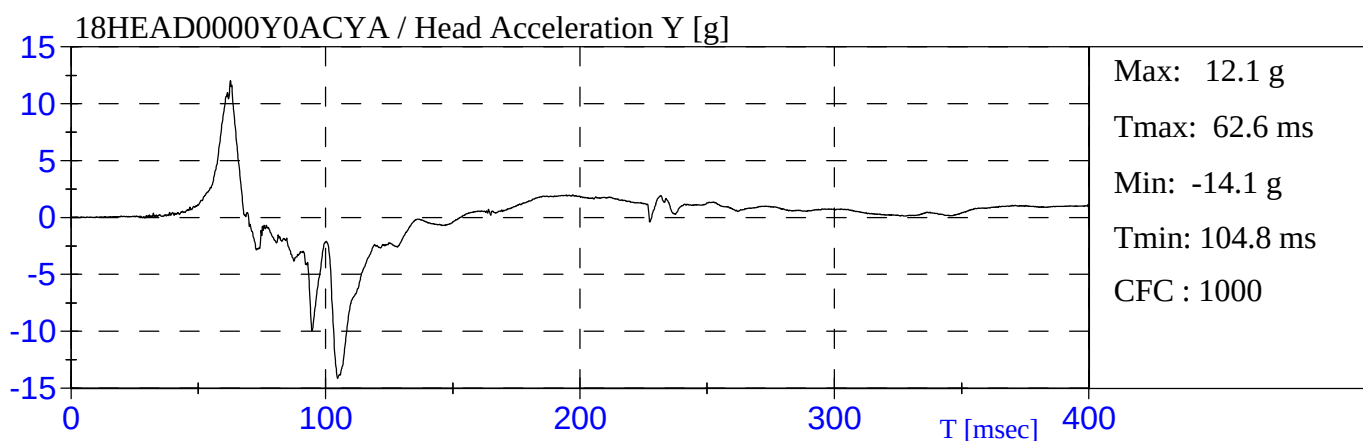
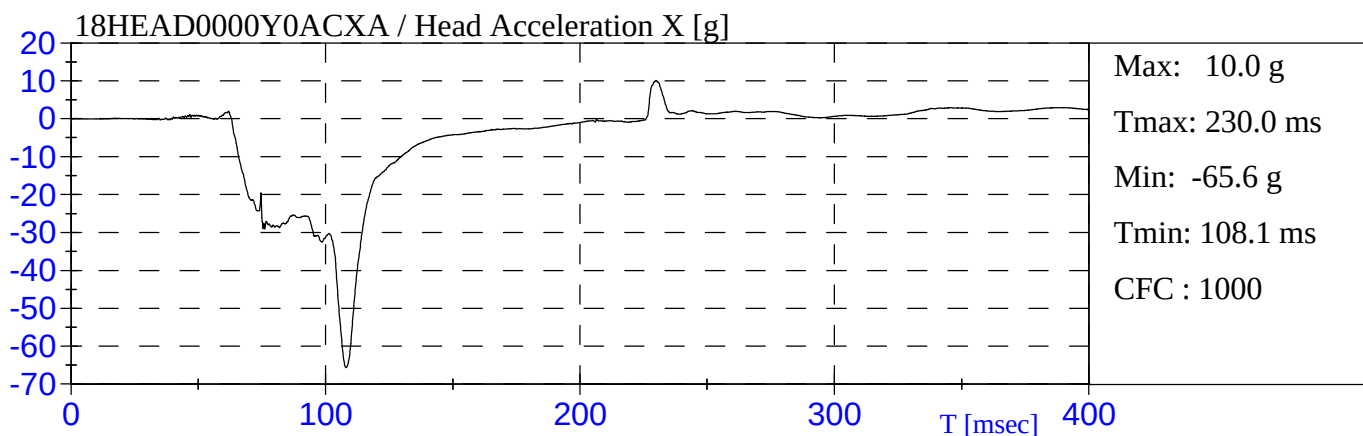


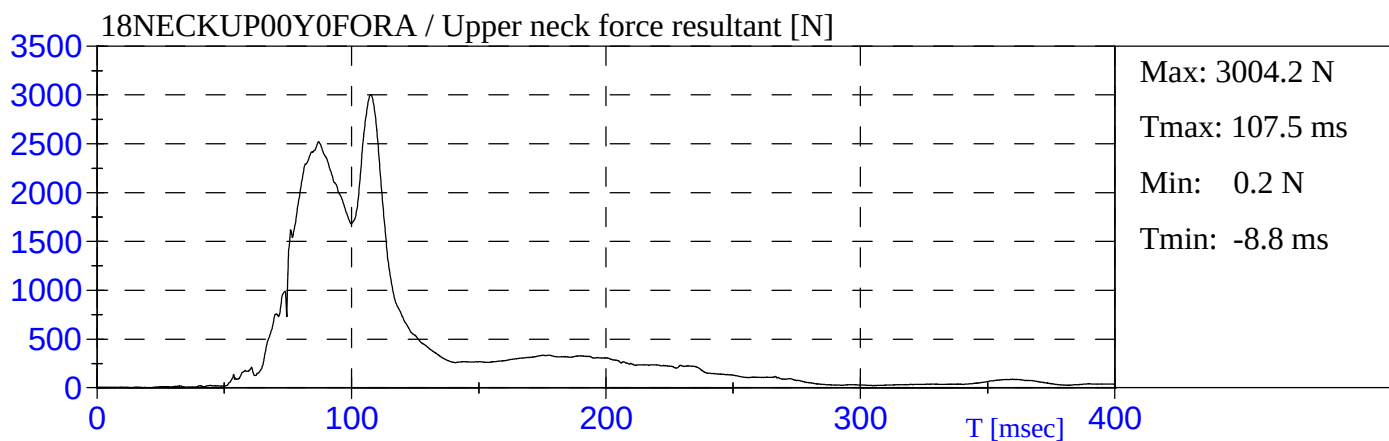
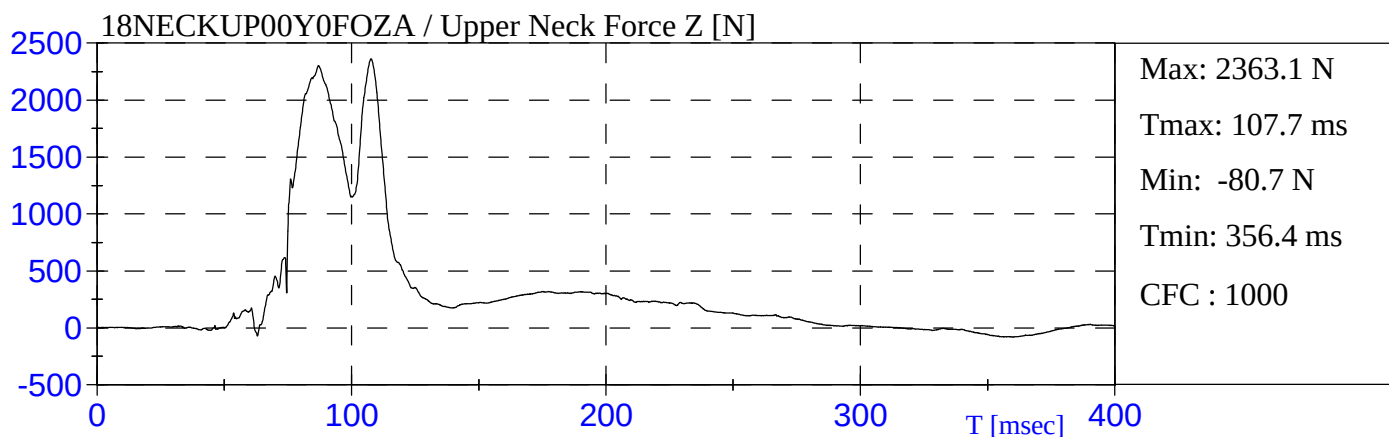
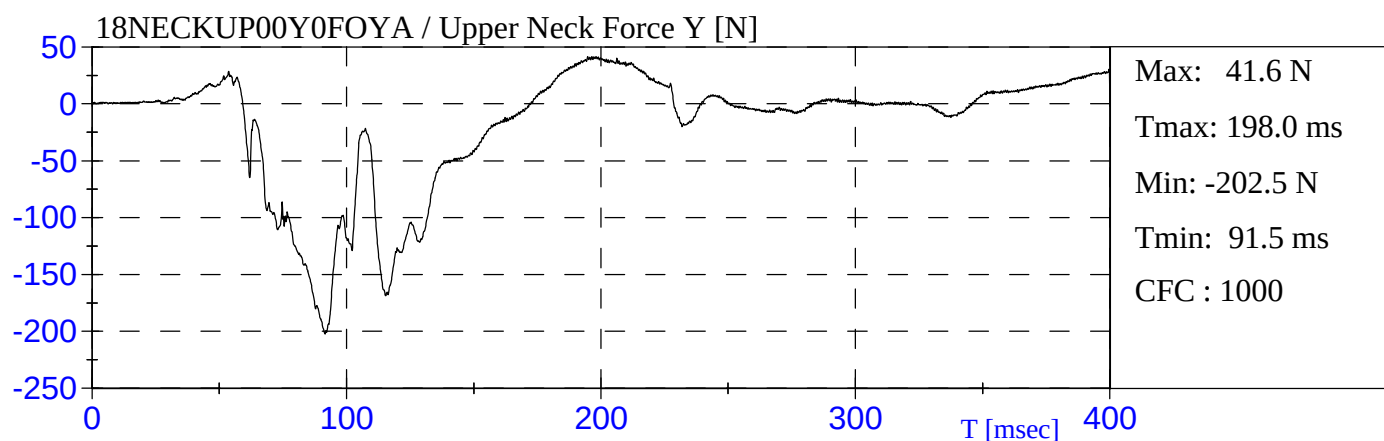
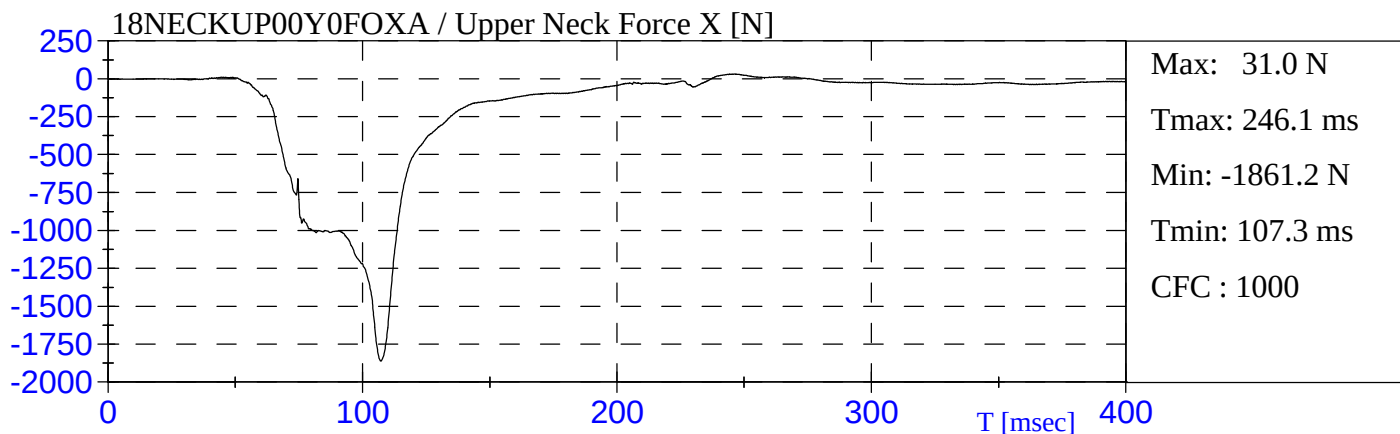


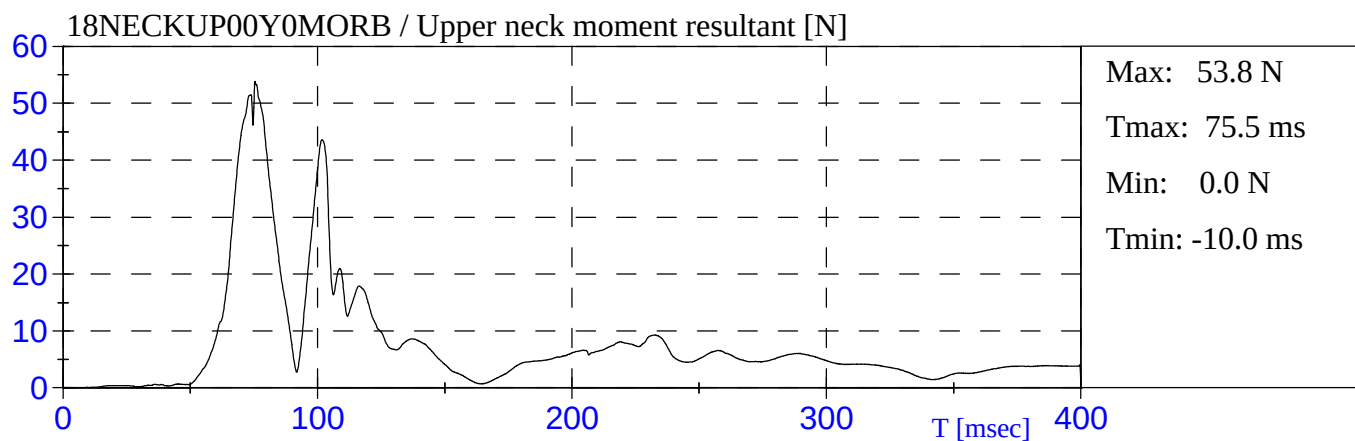
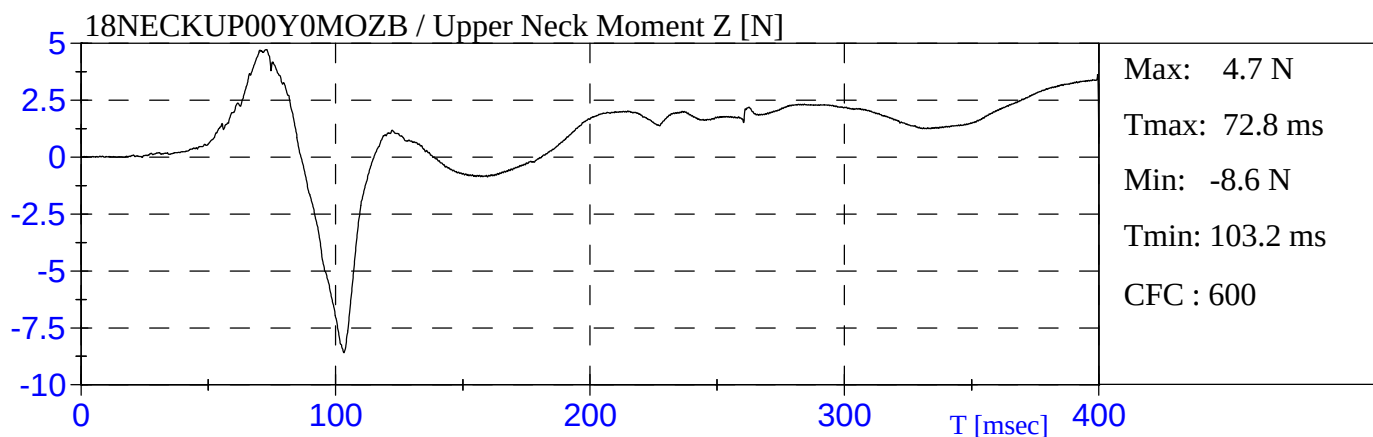
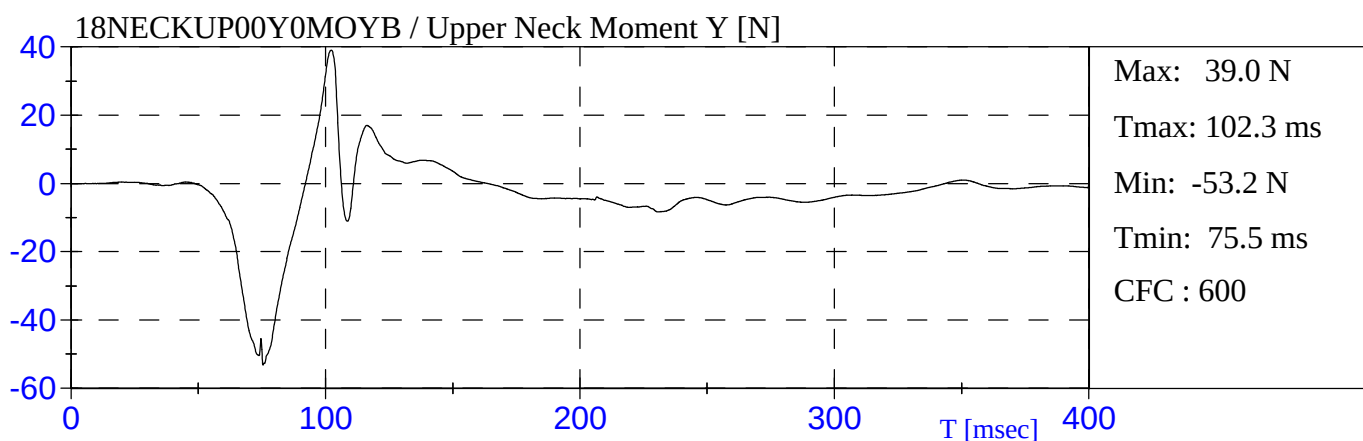
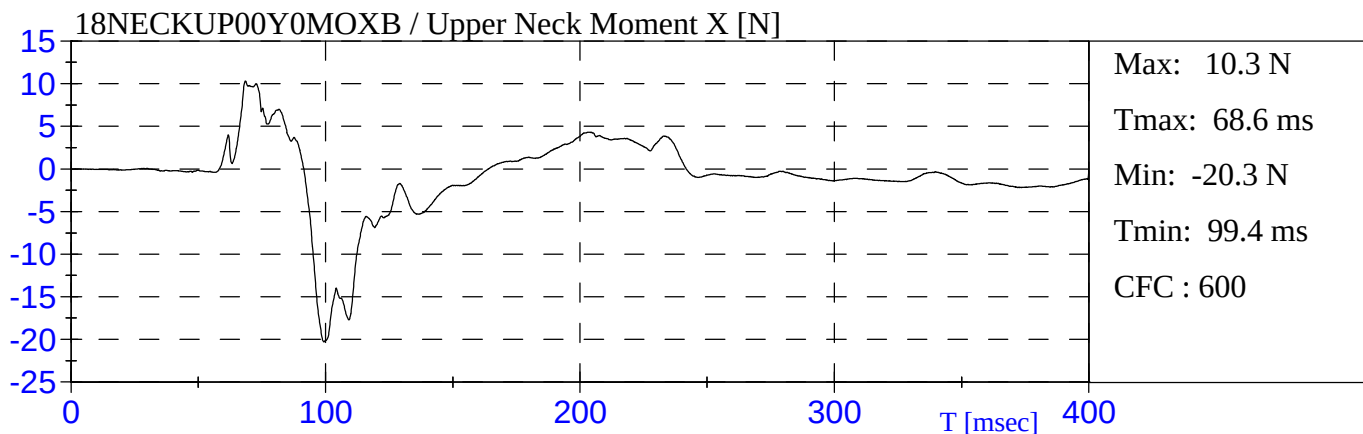


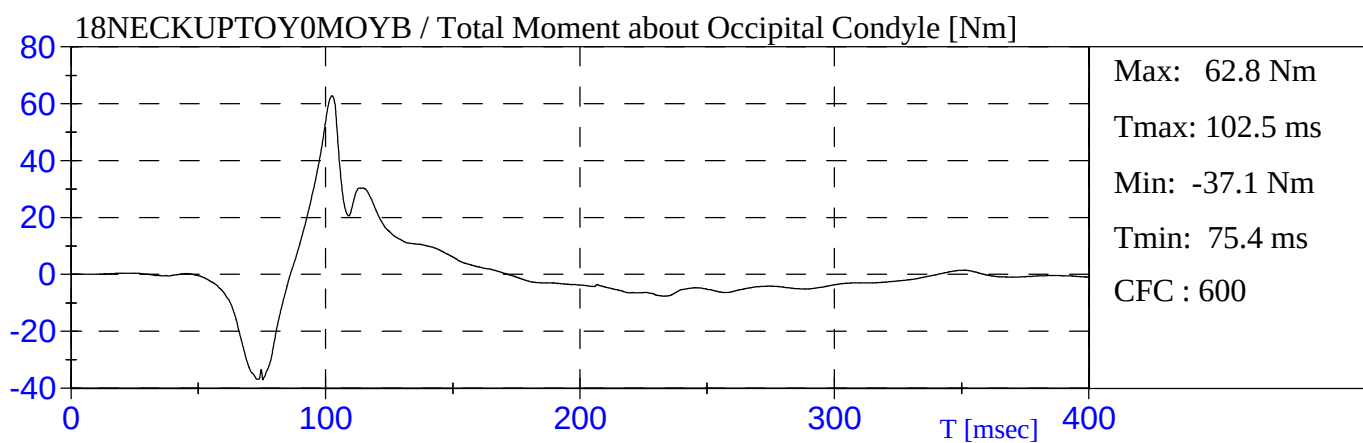
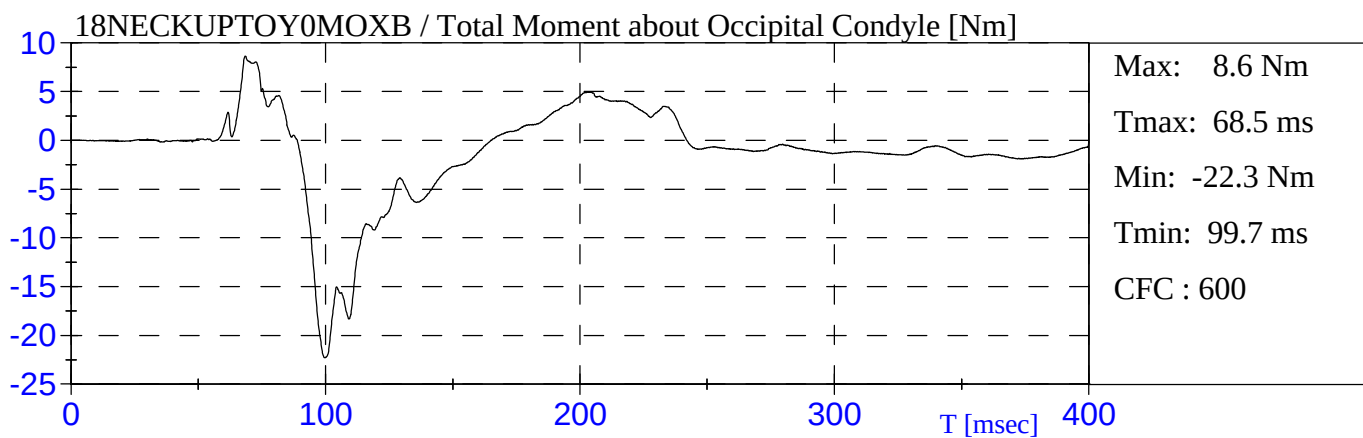




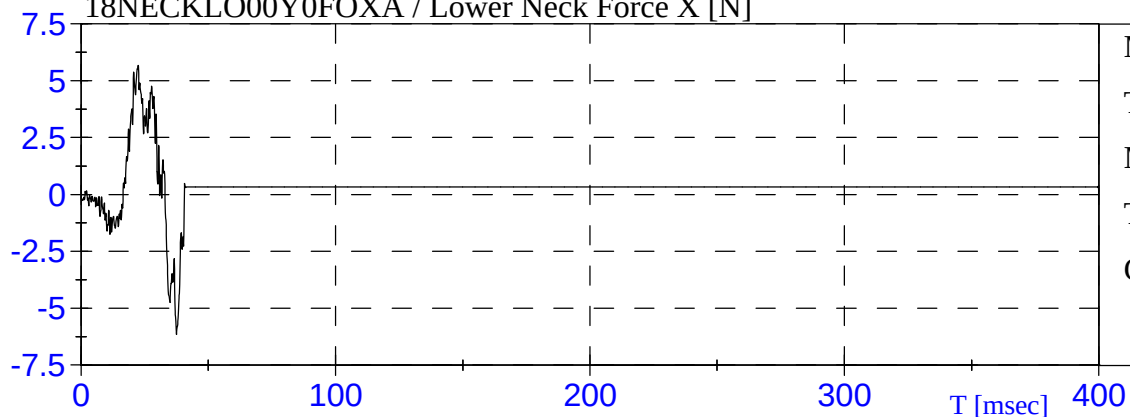






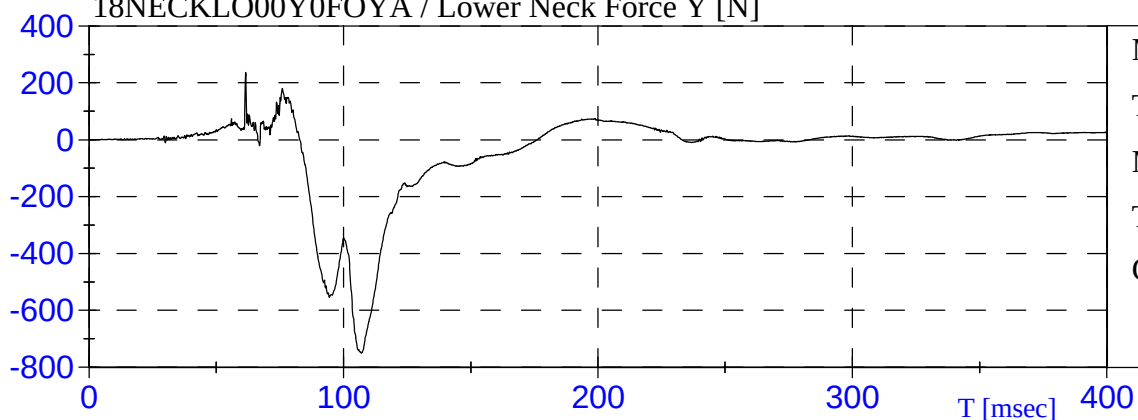


18NECKLO00Y0FOXA / Lower Neck Force X [N]



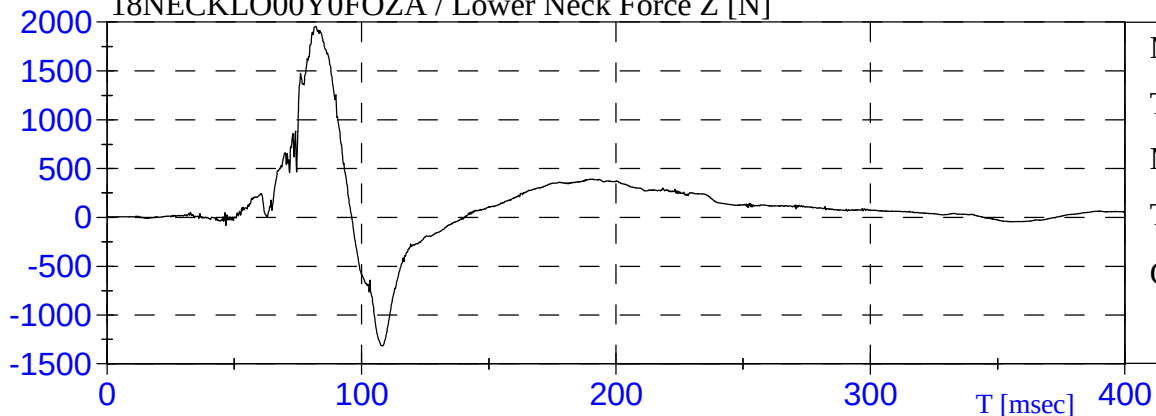
Max: 5.7 N
Tmax: 22.4 ms
Min: -6.2 N
Tmin: 37.5 ms
CFC : 1000

18NECKLO00Y0FOYA / Lower Neck Force Y [N]



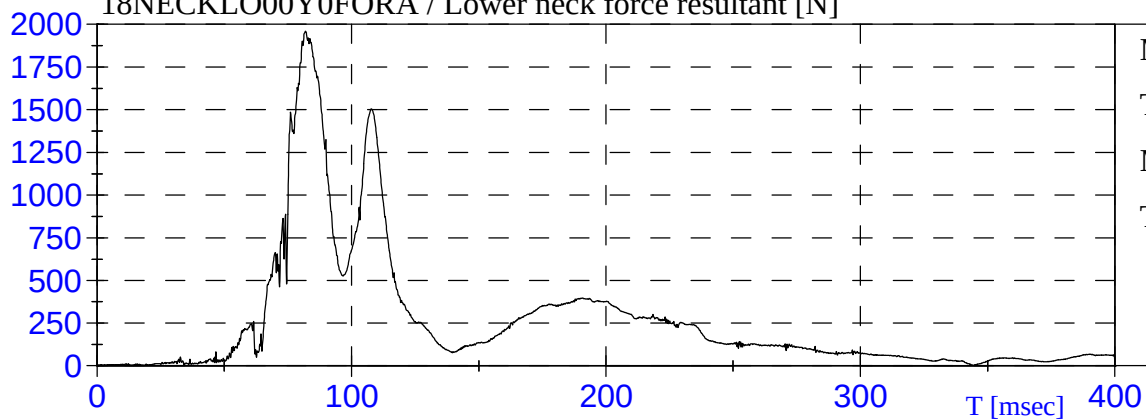
Max: 236.4 N
Tmax: 61.5 ms
Min: -750.9 N
Tmin: 107.0 ms
CFC : 1000

18NECKLO00Y0FOZA / Lower Neck Force Z [N]

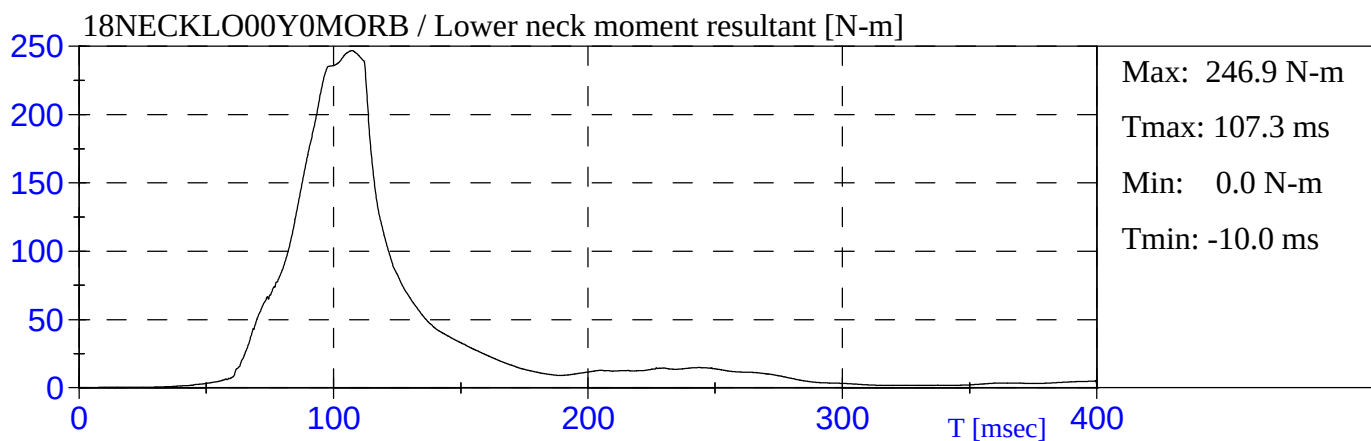
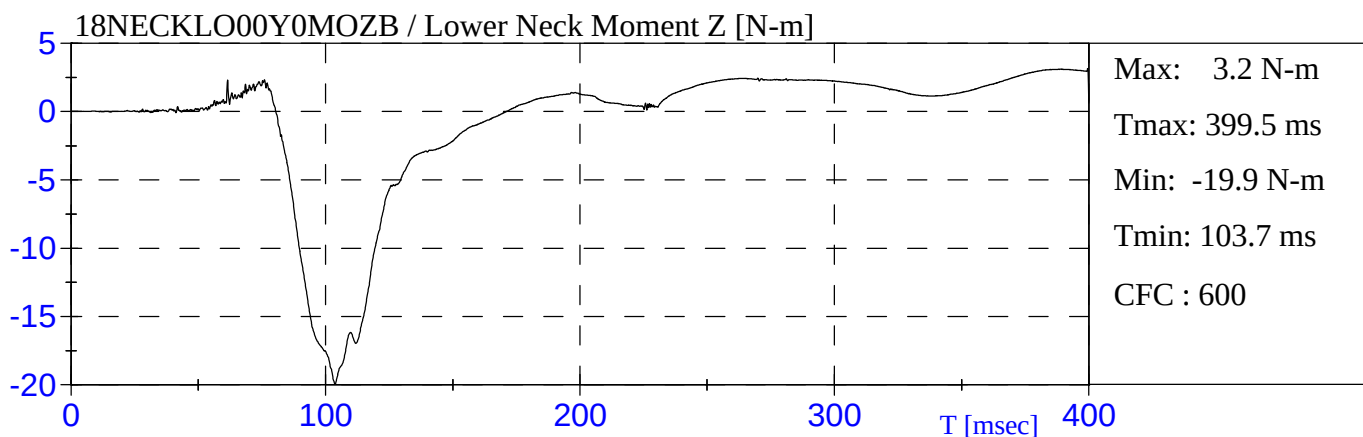
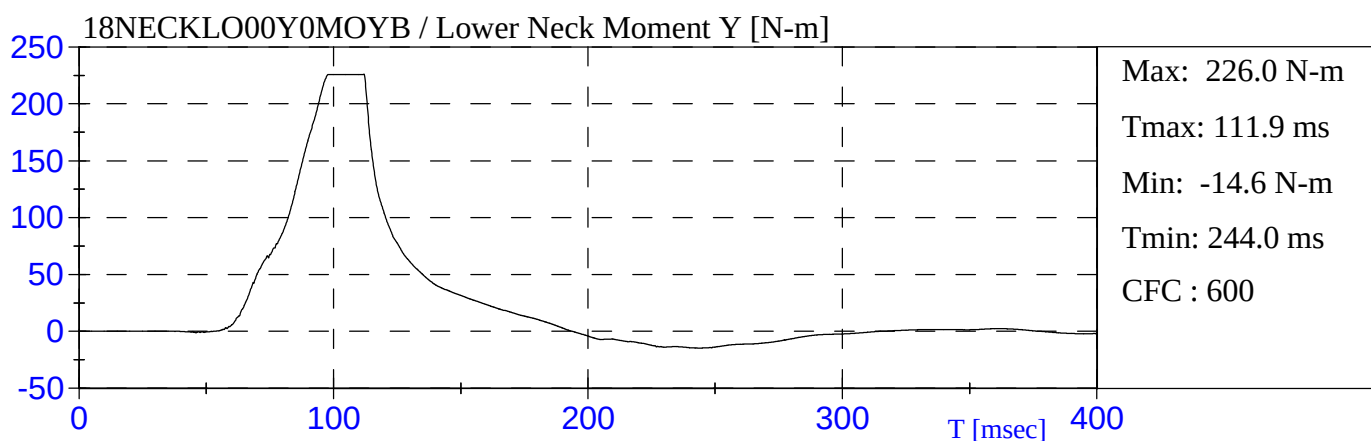
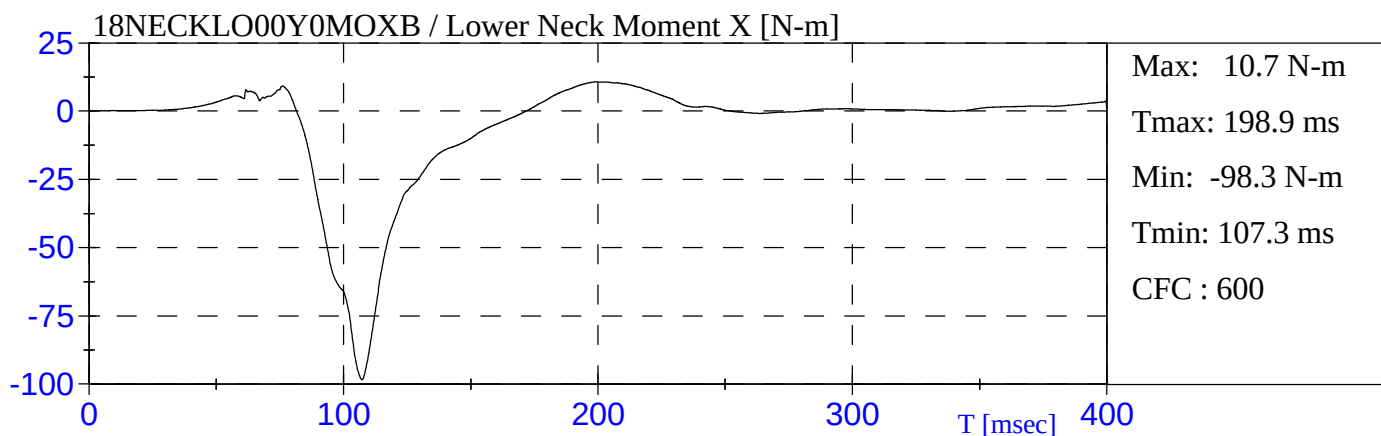


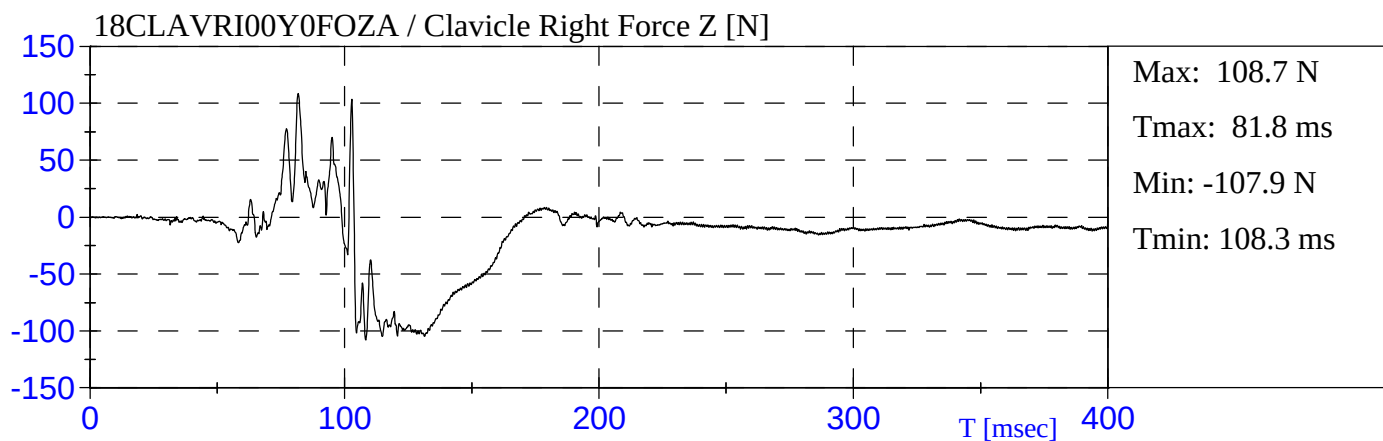
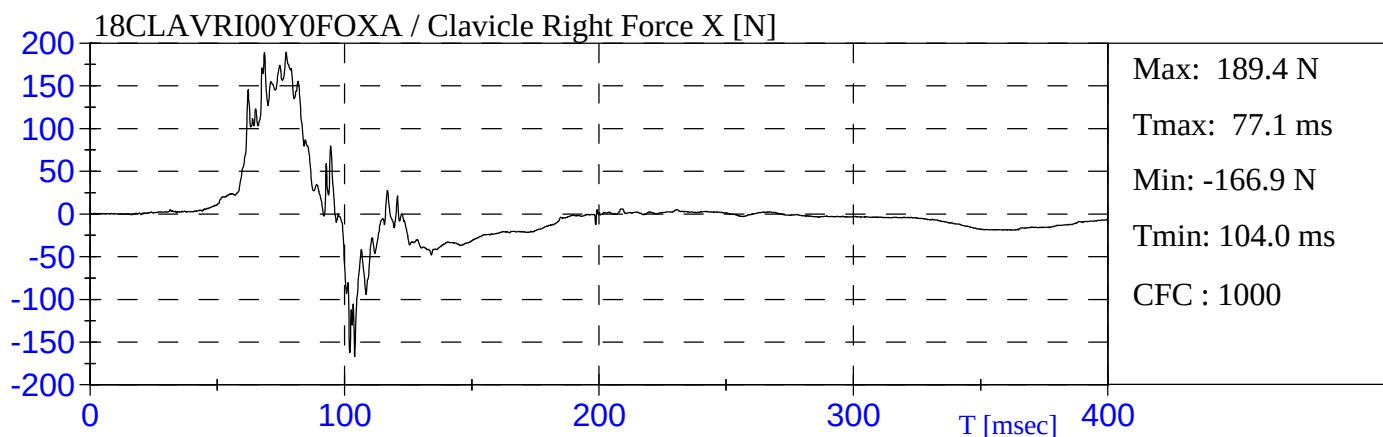
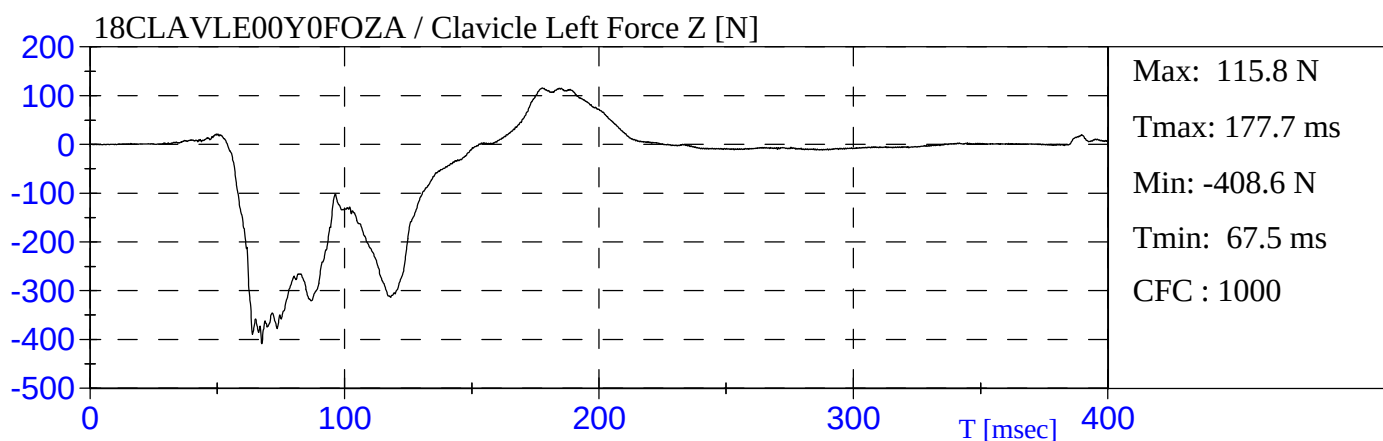
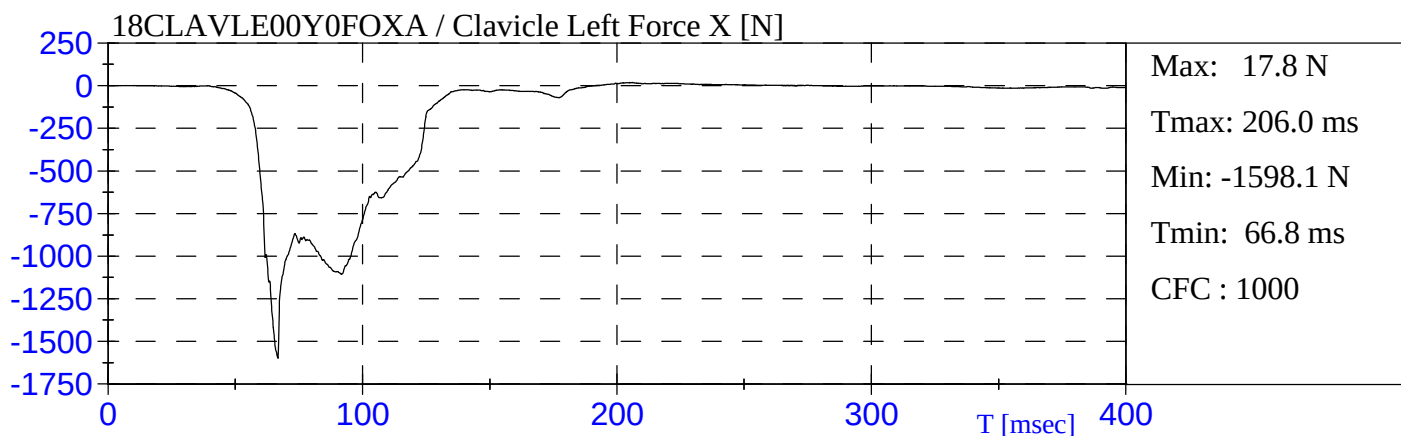
Max: 1957.5 N
Tmax: 81.9 ms
Min: -1314.4 N
Tmin: 108.2 ms
CFC : 1000

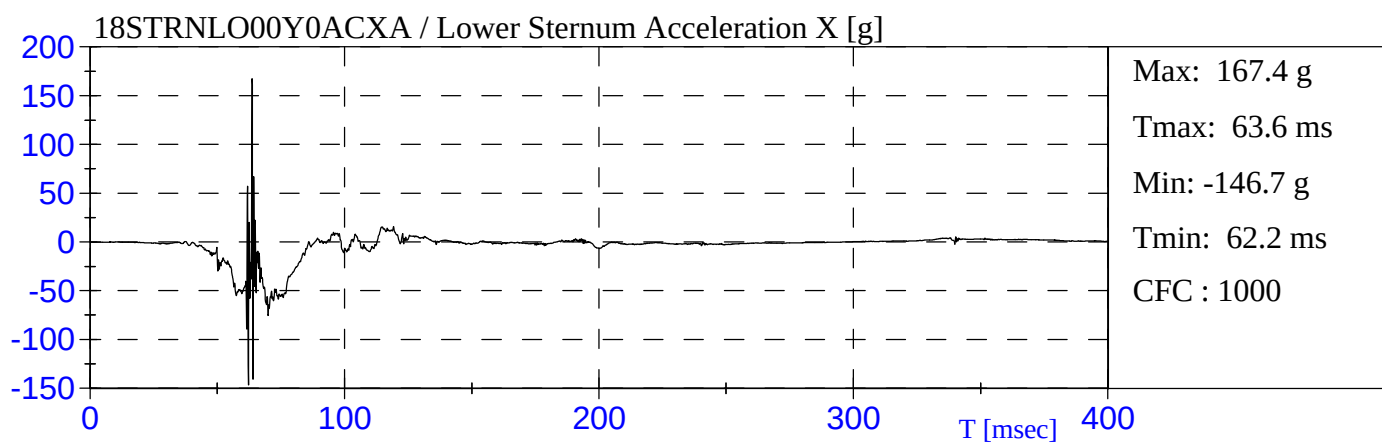
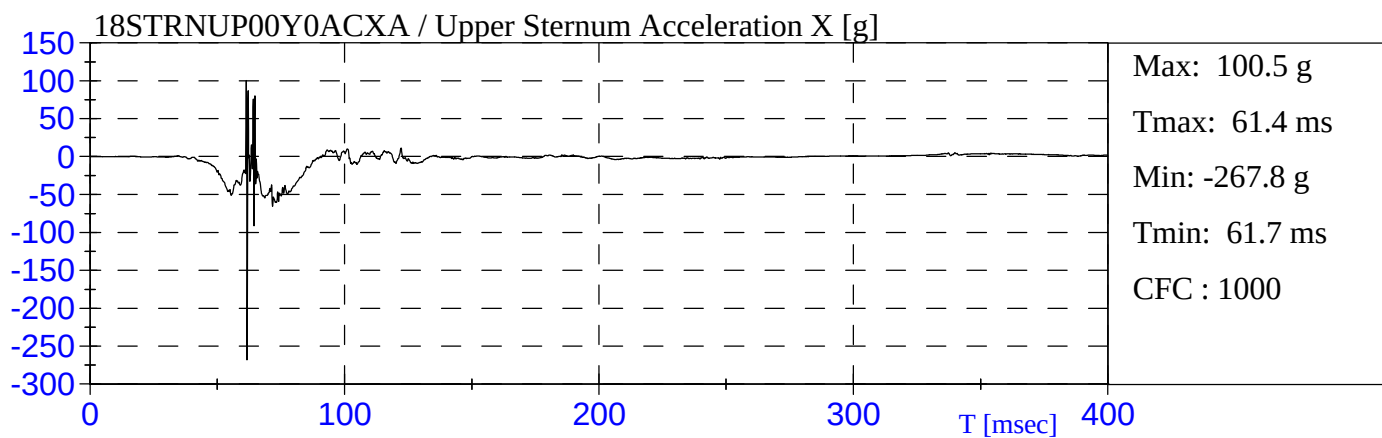
18NECKLO00Y0FORA / Lower neck force resultant [N]

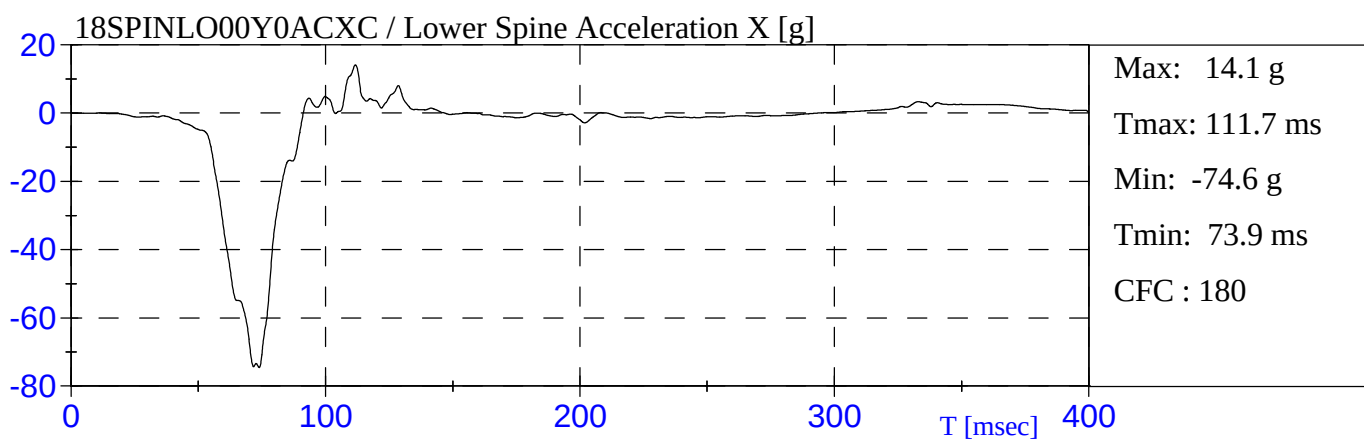


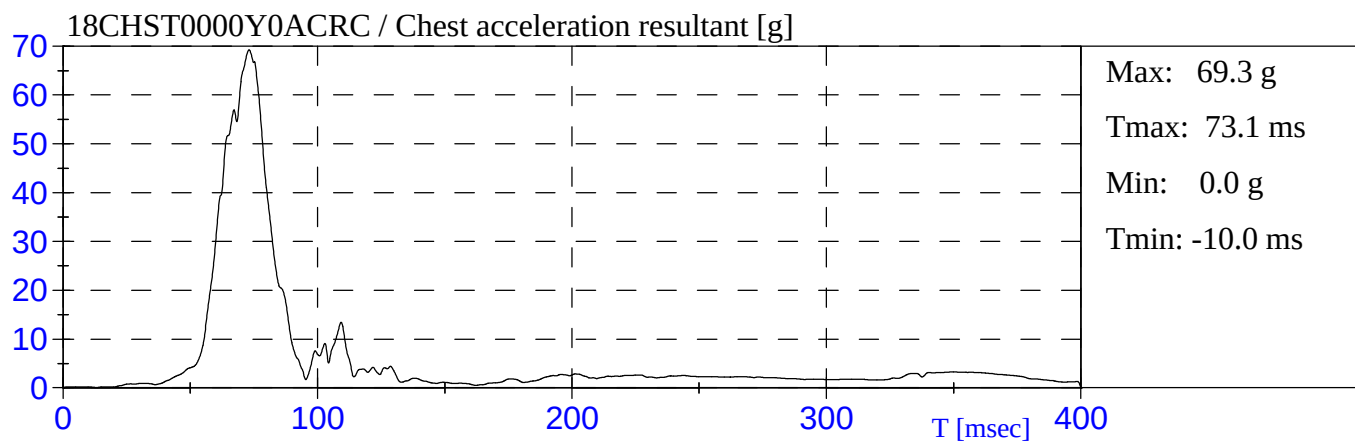
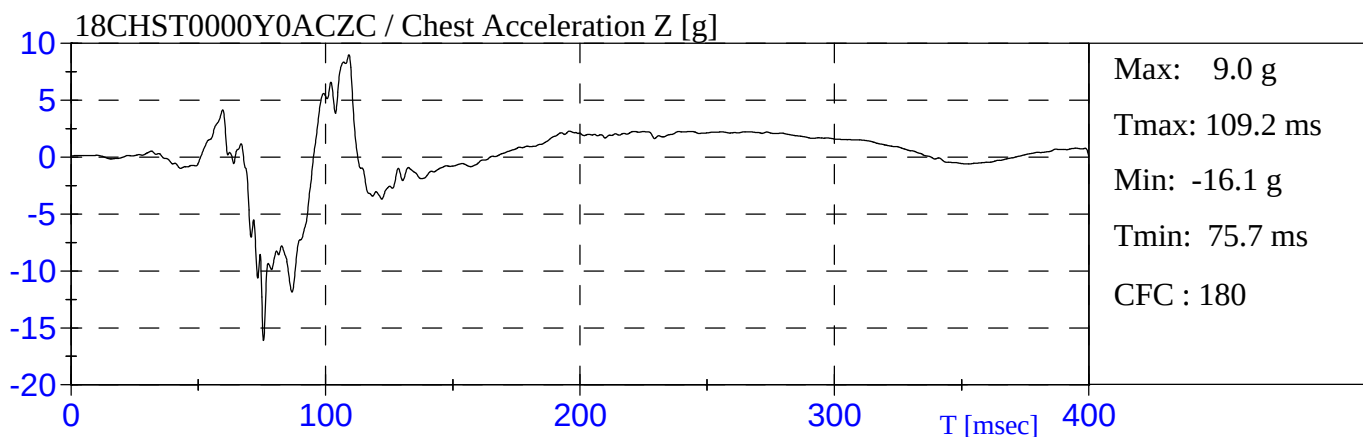
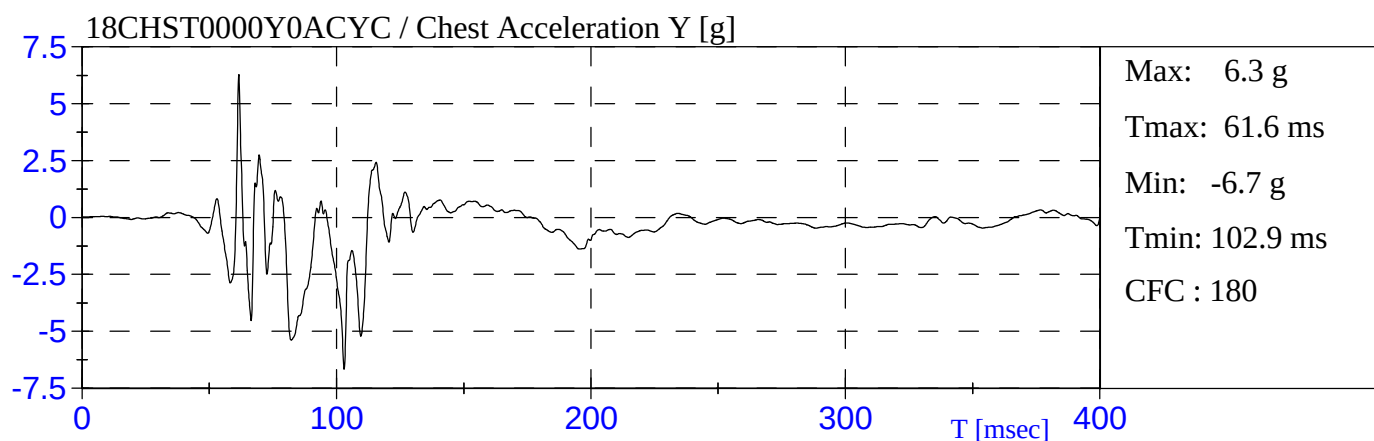
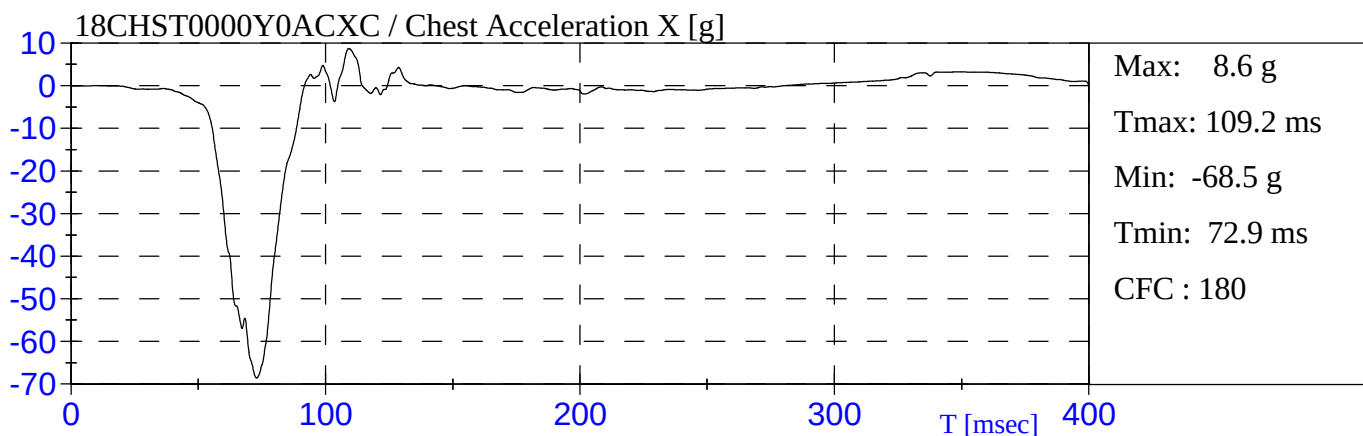
Max: 1957.7 N
Tmax: 81.9 ms
Min: 0.2 N
Tmin: -9.8 ms

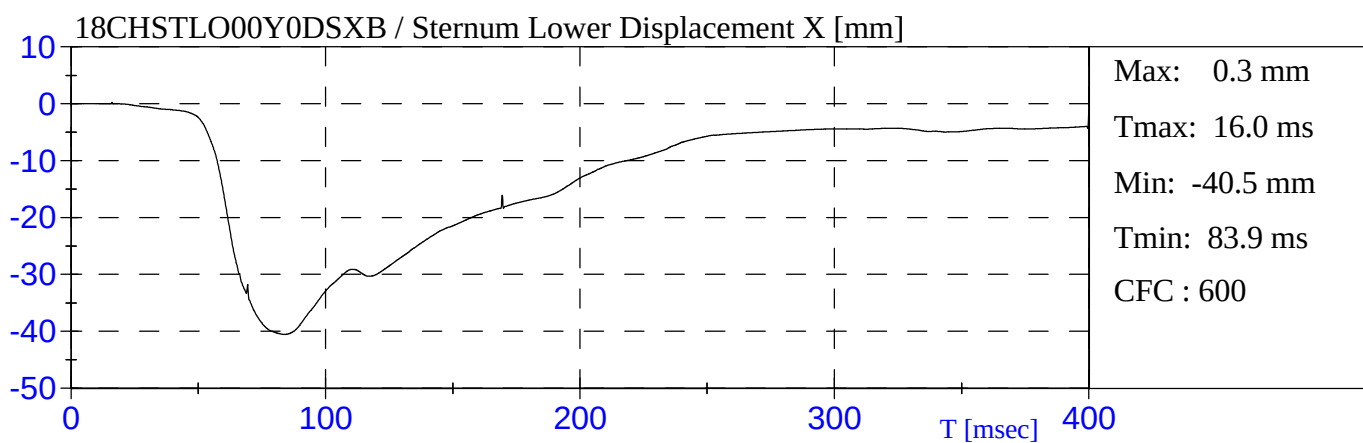
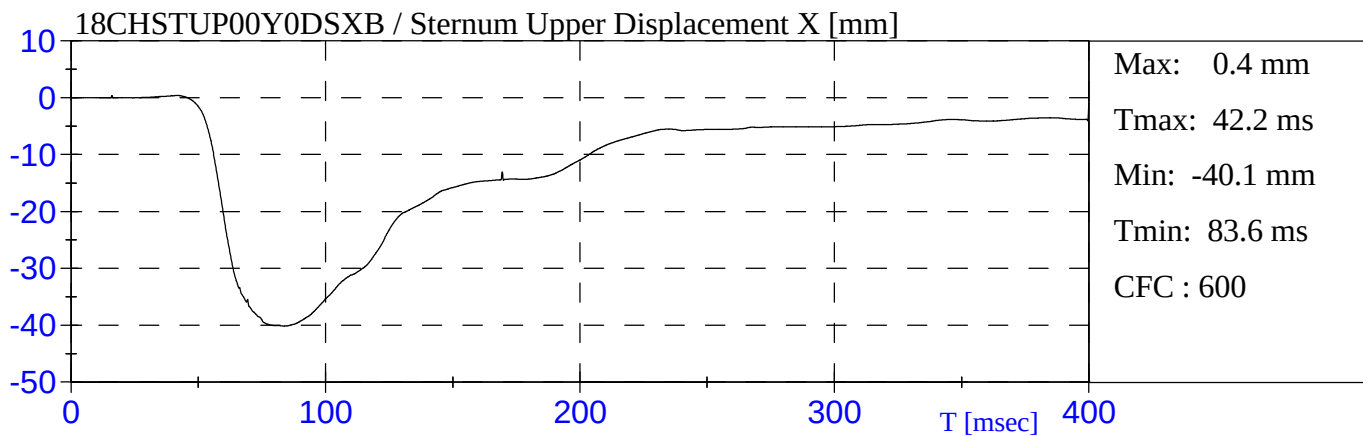


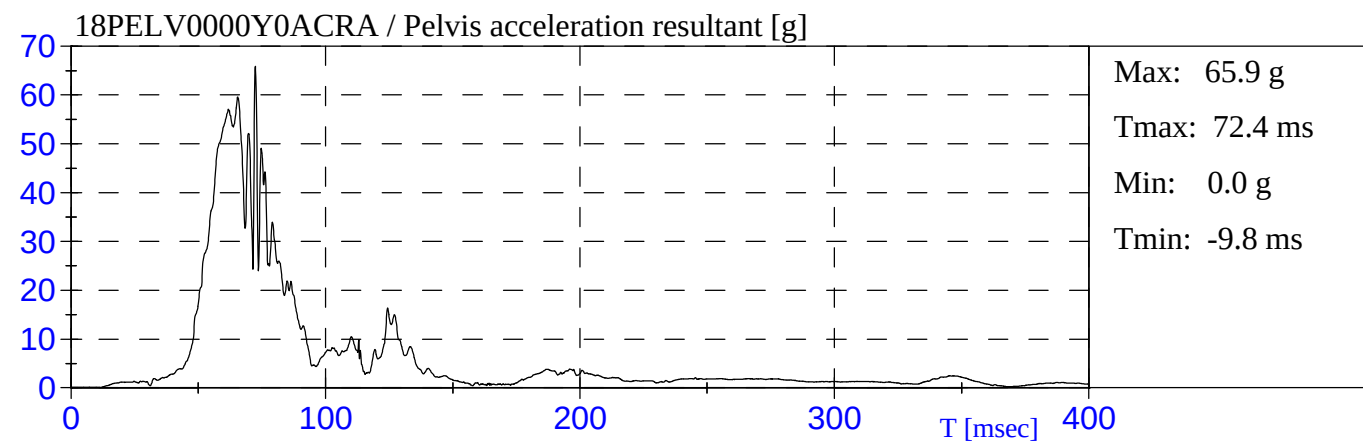
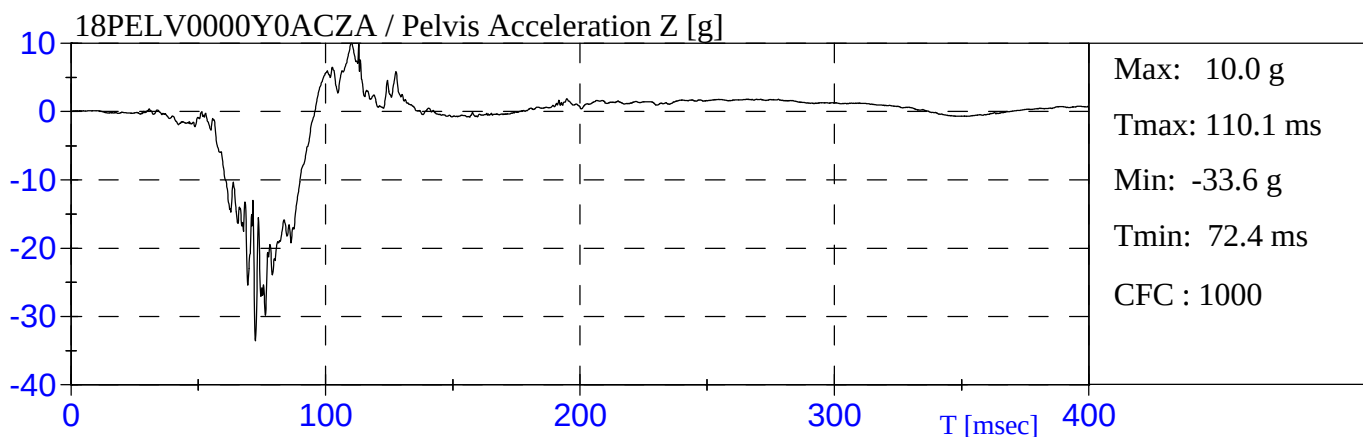
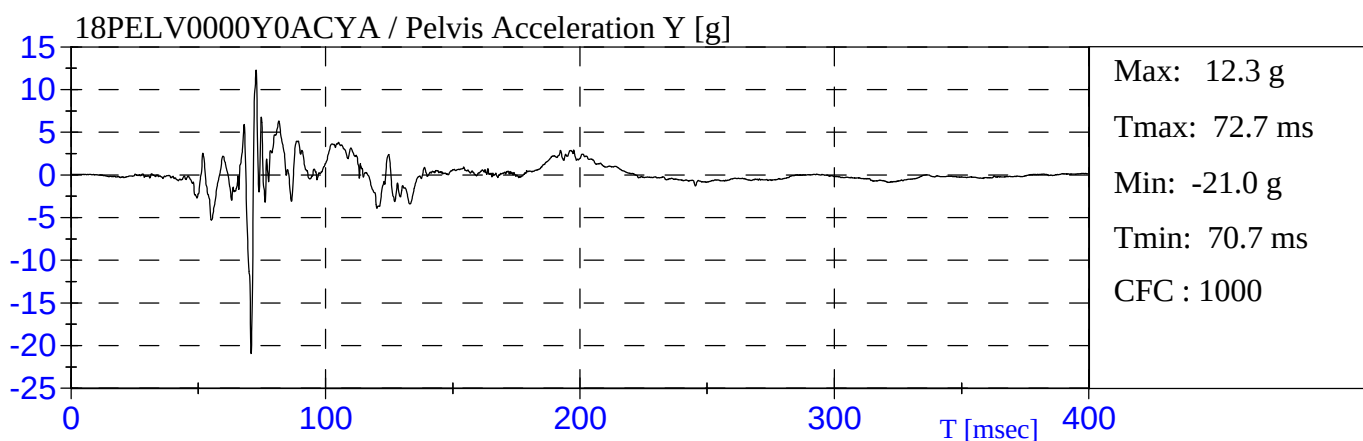
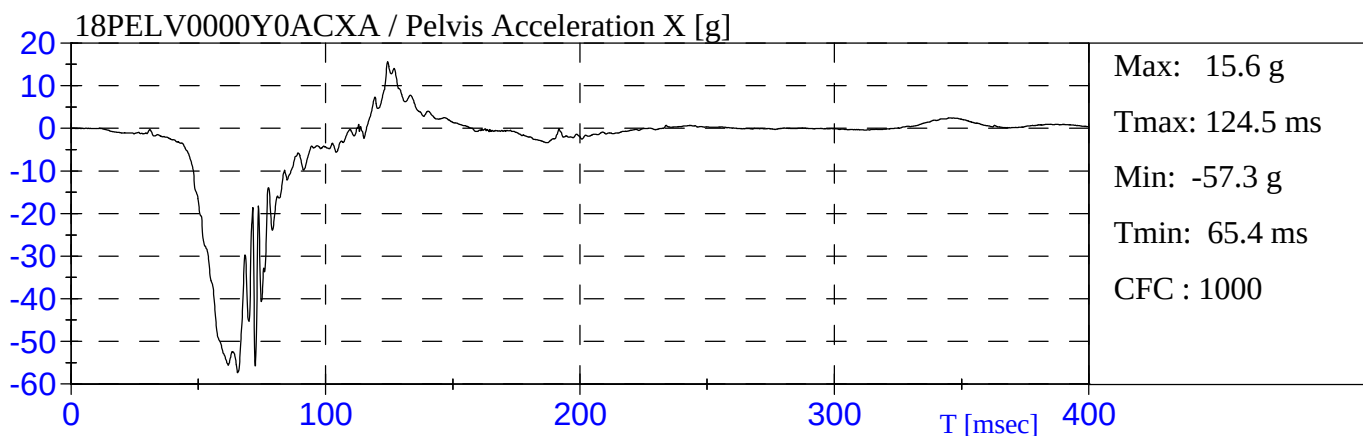


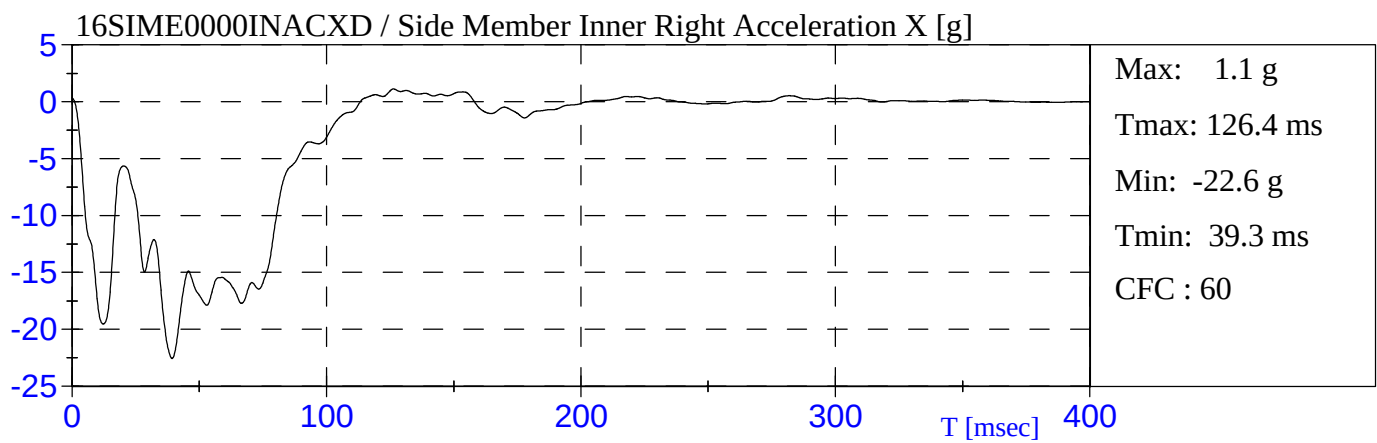
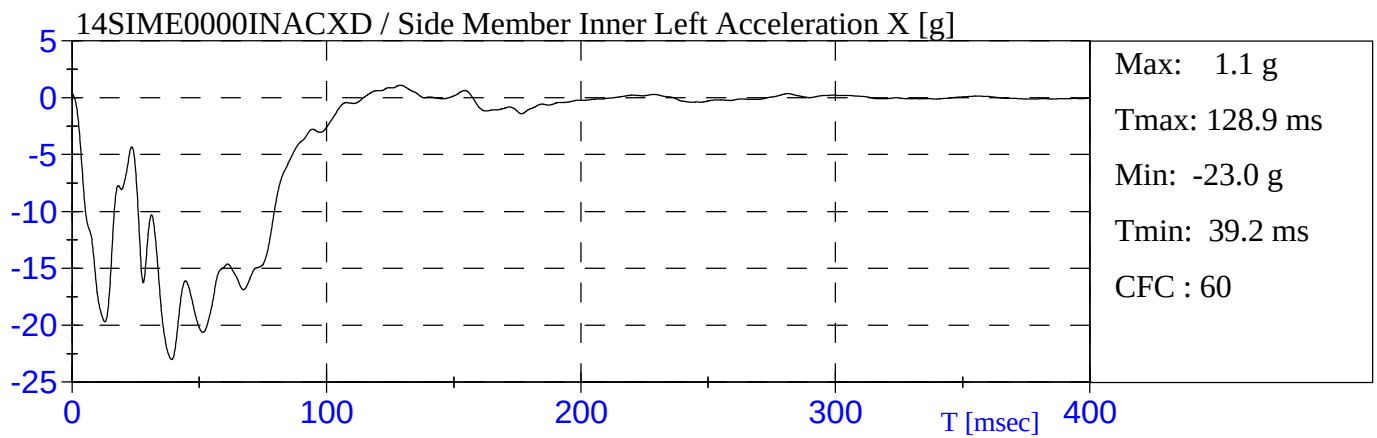


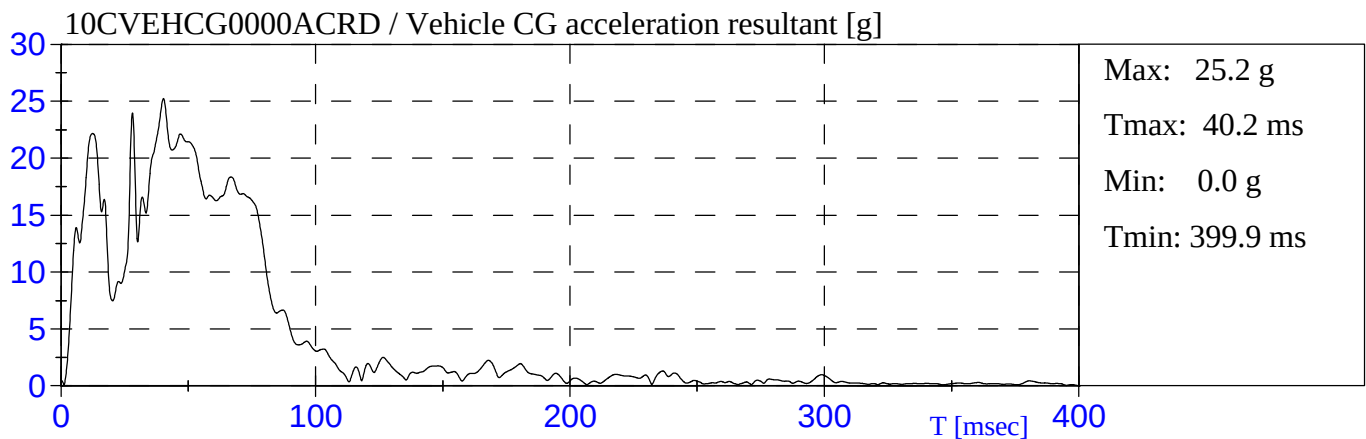
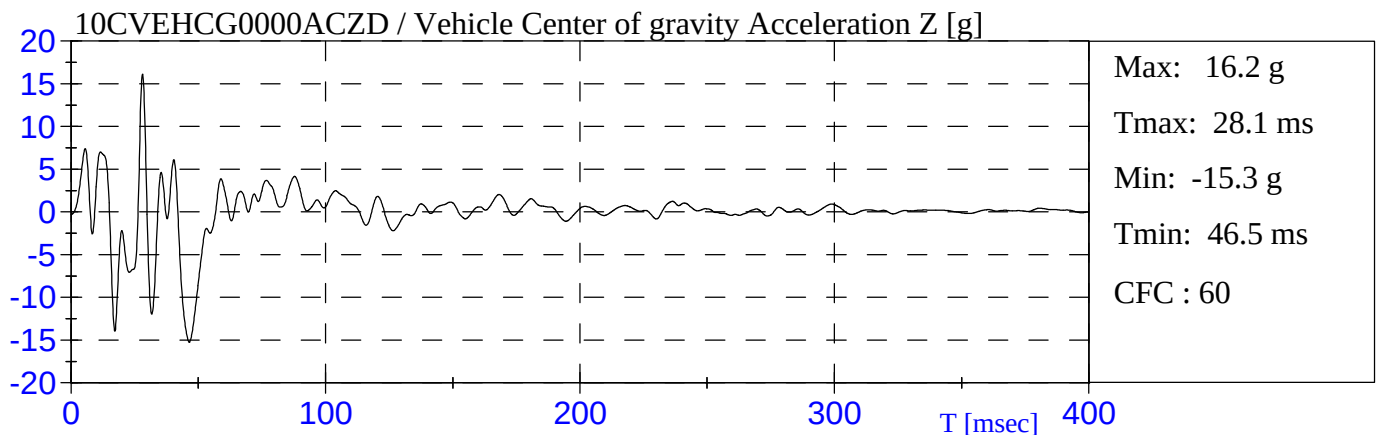
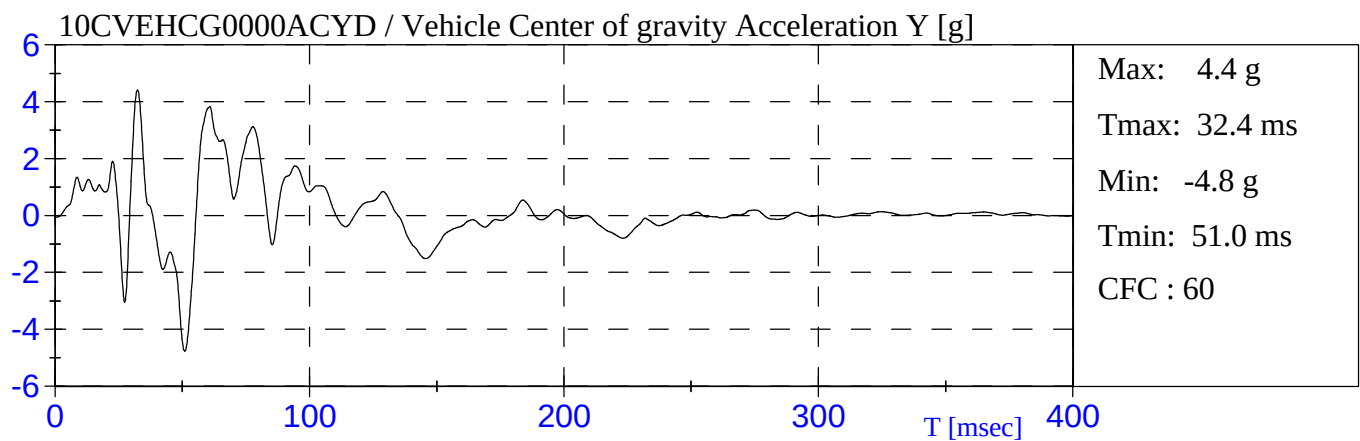
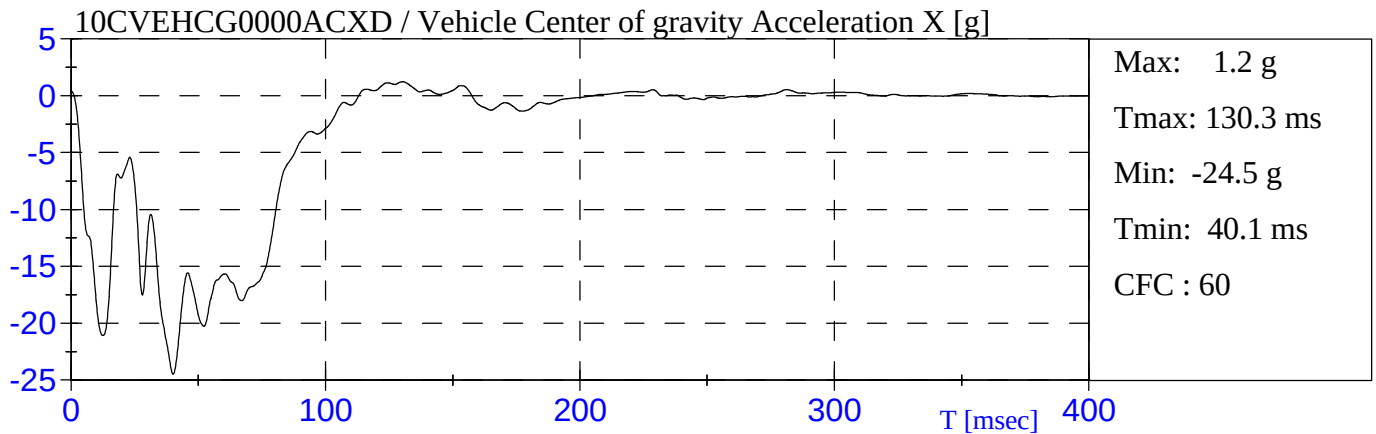


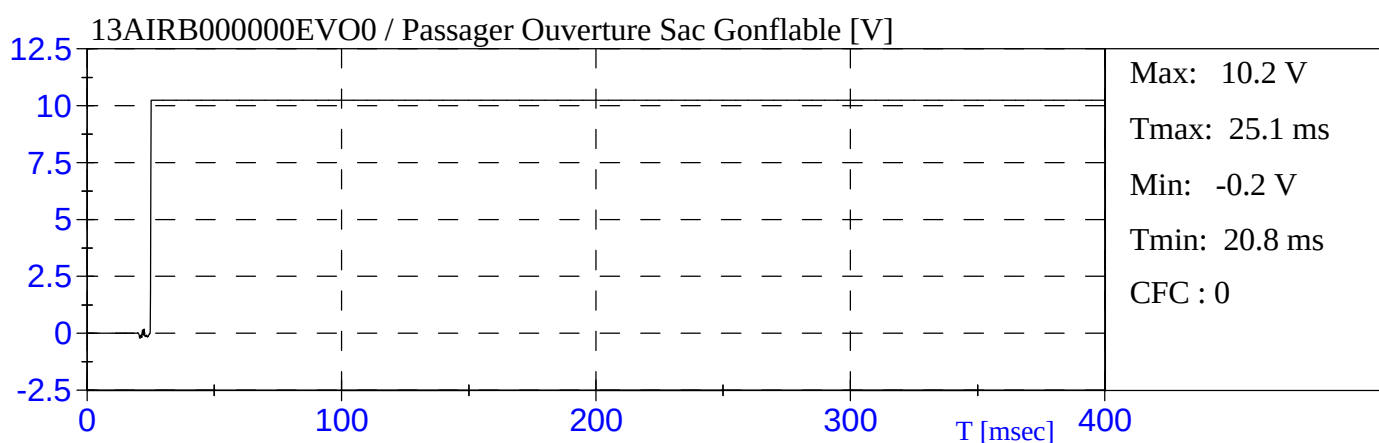
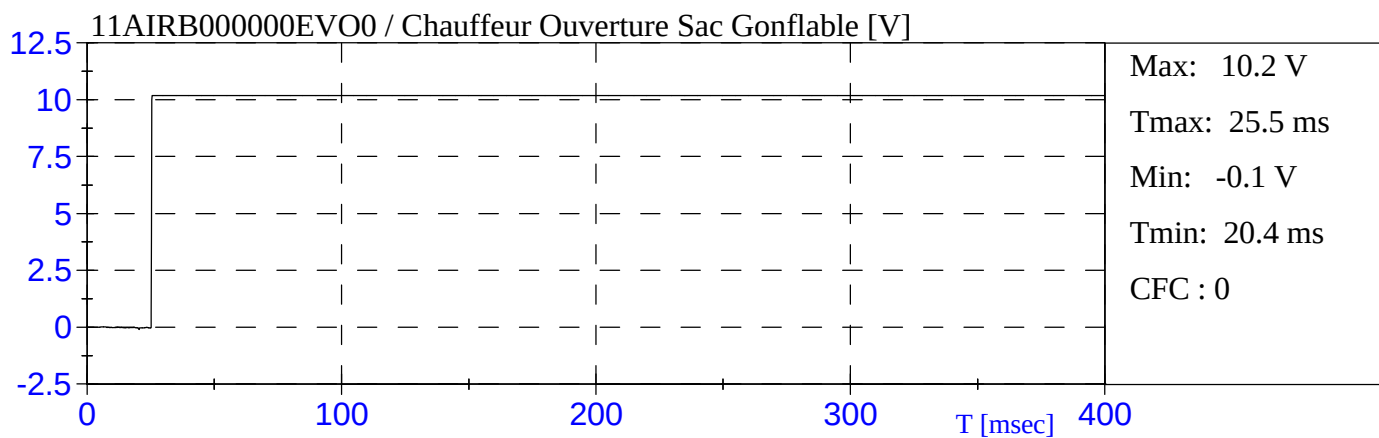


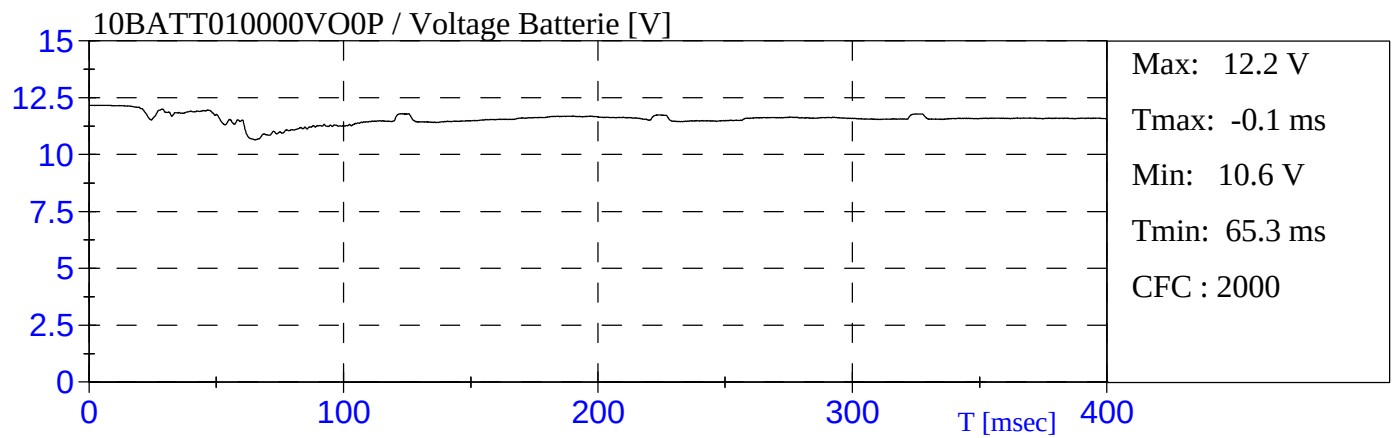


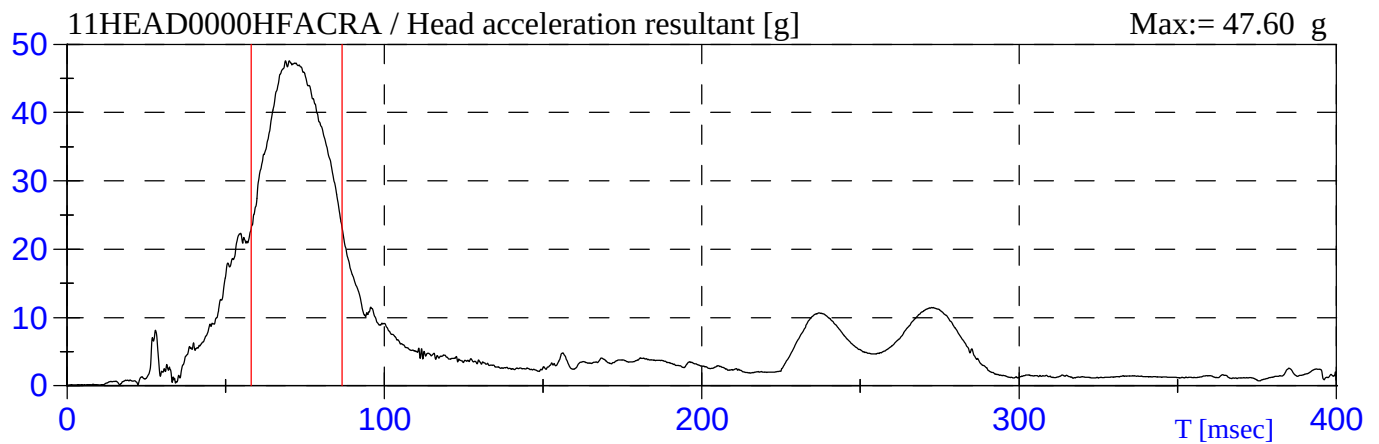










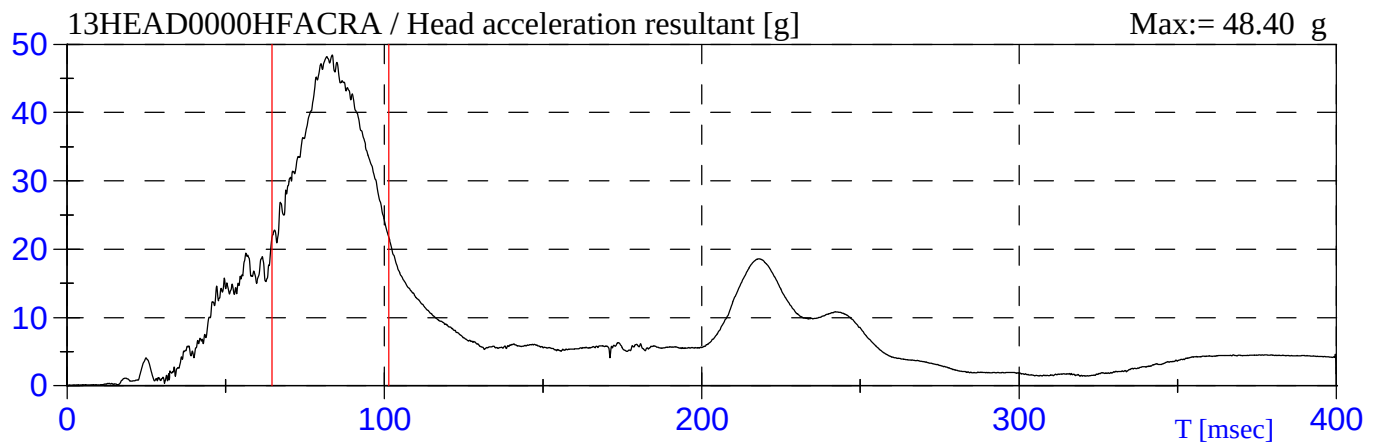


HEAD INJURY CRITERIA (HIC) *

CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 264	HIC(36ms):= 264	HIC(15ms):= 201
T1:= 58.1 ms	T1:= 58.1 ms	T1:= 64.3 ms
T2:= 86.7 ms	T2:= 86.7 ms	T2:= 79.3 ms

* Selon / According To: SAE J1727 96-08

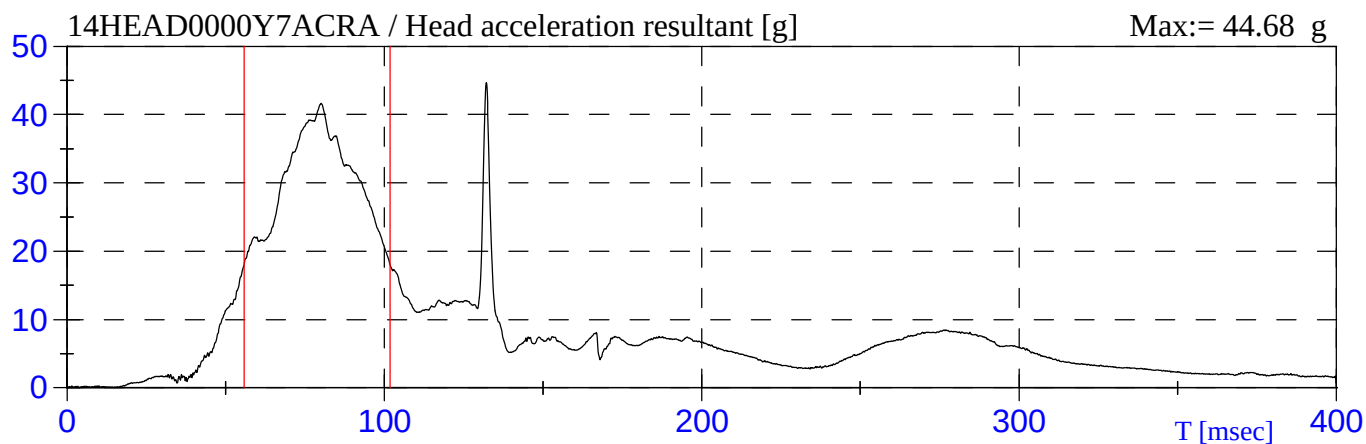


HEAD INJURY CRITERIA (HIC) *

CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 291	HIC(36ms):= 291	HIC(15ms):= 200
T1:= 64.6 ms	T1:= 66.6 ms	T1:= 76.5 ms
T2:= 101.4 ms	T2:= 101.0 ms	T2:= 91.5 ms

* Selon / According To: SAE J1727 96-08

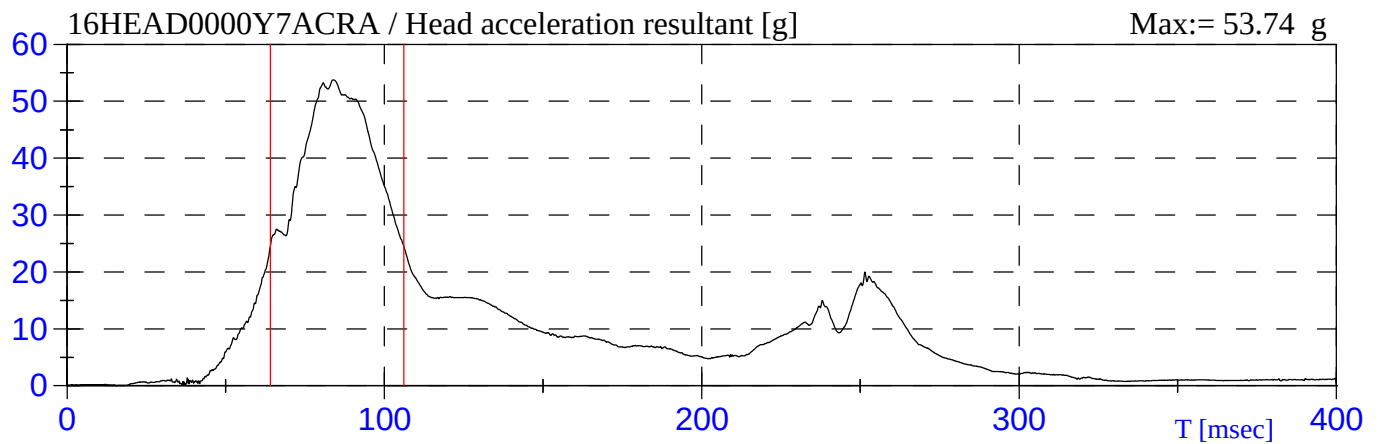


HEAD INJURY CRITERIA (HIC) *

CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 227	HIC(36ms):= 218	HIC(15ms):= 133
T1:= 55.9 ms	T1:= 63.1 ms	T1:= 71.1 ms
T2:= 101.9 ms	T2:= 99.1 ms	T2:= 86.1 ms

* Selon / According To: SAE J1727 96-08

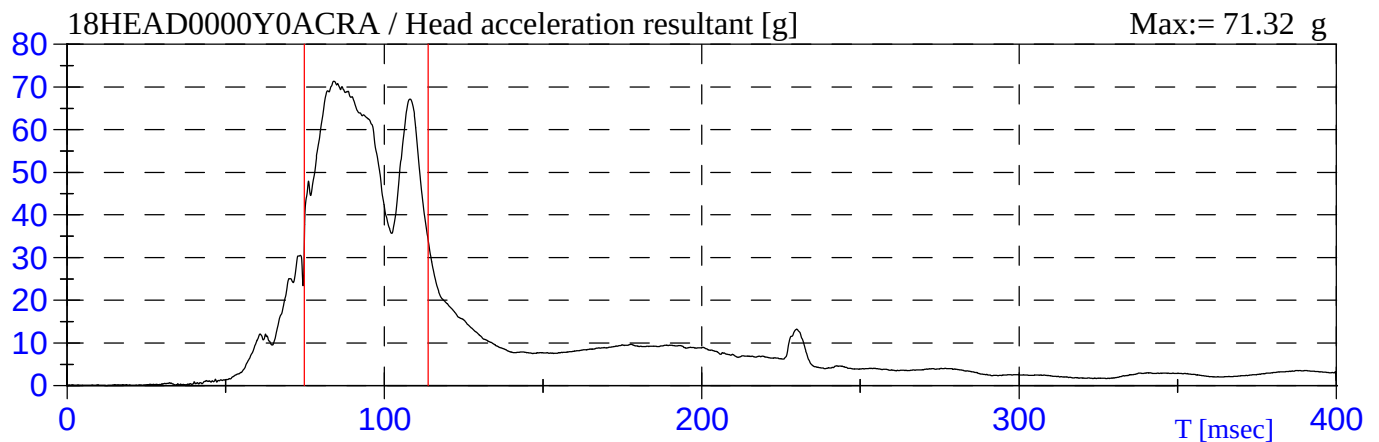


HEAD INJURY CRITERIA (HIC) *

CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 447	HIC(36ms):= 442	HIC(15ms):= 284
T1:= 64.1 ms	T1:= 68.9 ms	T1:= 77.9 ms
T2:= 106.1 ms	T2:= 104.9 ms	T2:= 92.9 ms

* Selon / According To: SAE J1727 96-08



HEAD INJURY CRITERIA (HIC) *

CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 951	HIC(36ms):= 932	HIC(15ms):= 554
T1:= 74.8 ms	T1:= 75.8 ms	T1:= 80.4 ms
T2:= 113.8 ms	T2:= 111.8 ms	T2:= 95.4 ms

* Selon / According To: SAE J1727 96-08



Neck Injury Criteria: 11NIJCIP000000YX

$N_{ij}^* = 0.31$

Valeurs critiques
Criticals Values

N _{tf}	N _{te}	N _{cf}	N _{ce}	Tc	4287
				Cc	3880
0.31	0.31	0.04	0.08	Fc	155
				Ec	67

* Selon / According To: Federal Register 5/2000



Neck Injury Criteria: 13NIJCIP000000YX

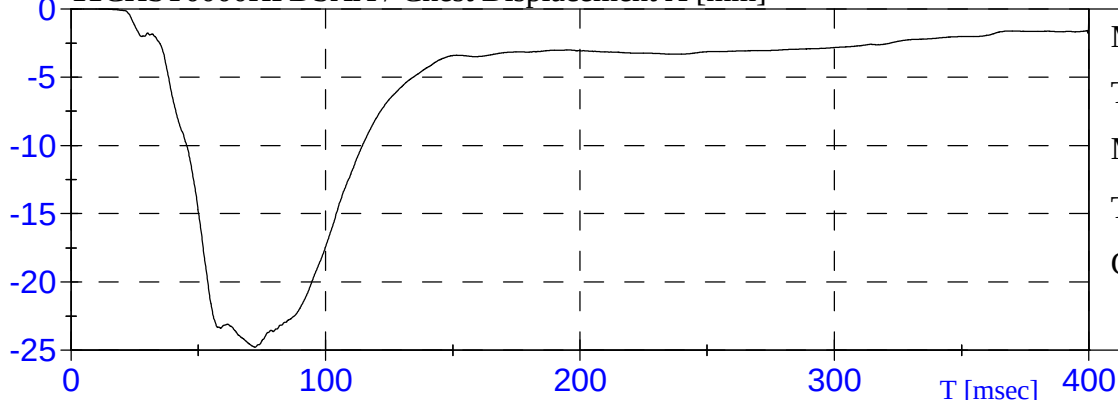
$N_{ij}^* = 0.27$

Valeurs critiques
Criticals Values

N _{tf}	N _{te}	N _{cf}	N _{ce}	Tc	4287
				Cc	3880
0.25	0.27	0.07	0.09	Fc	155
				Ec	67

* Selon / According To: Federal Register 5/2000

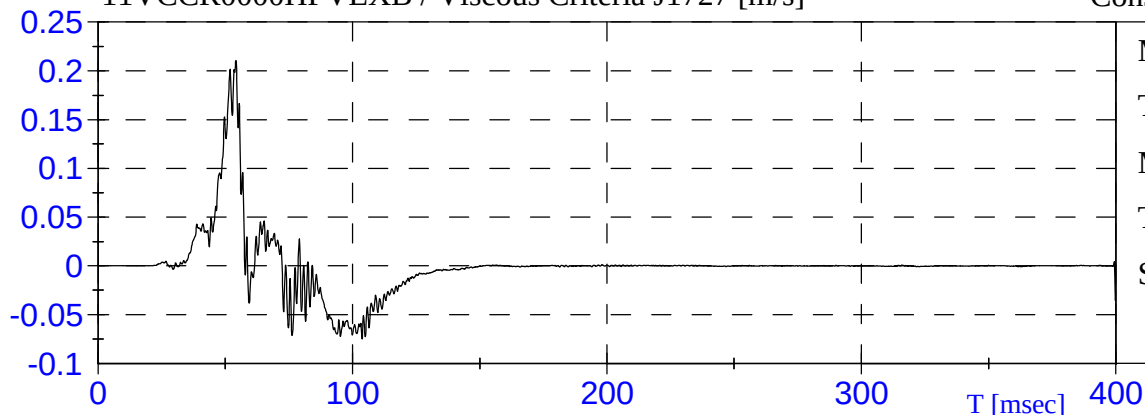
11CHST0000HFDSXA / Chest Displacement X [mm]



Max: 0.0 mm
Tmax: -0.1 ms
Min: -24.8 mm
Tmin: 72.2 ms
CFC : N/A

11VCCR0000HFVEXB / Viscous Criteria J1727 [m/s]

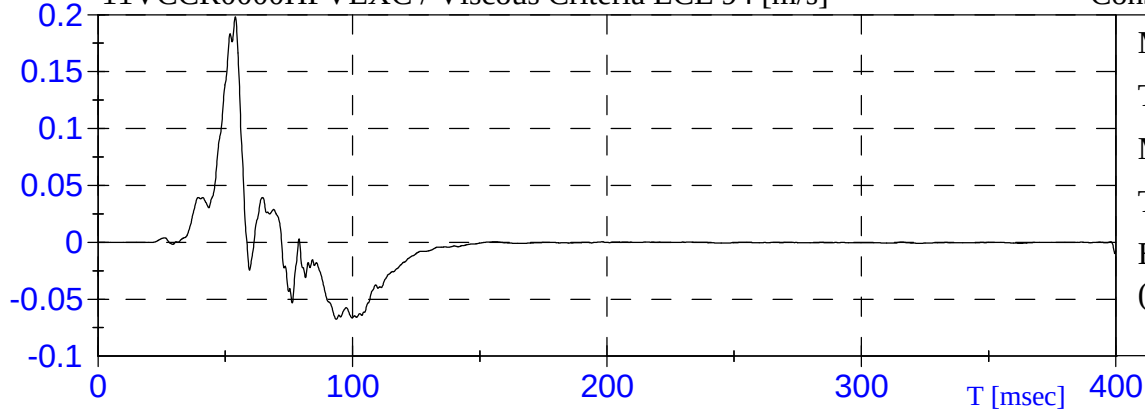
Const.: 187 Fact.: 1.3



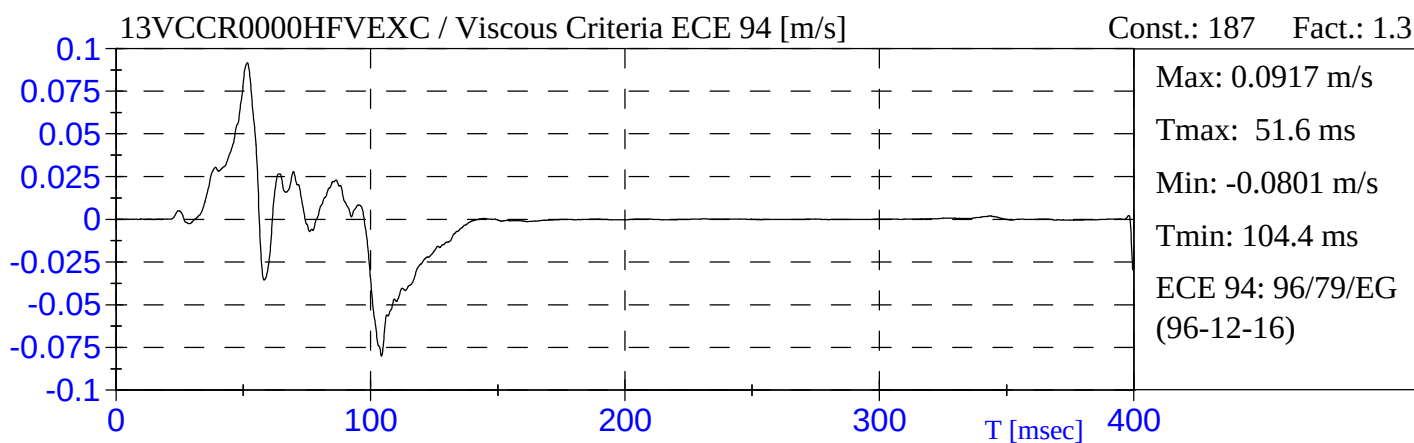
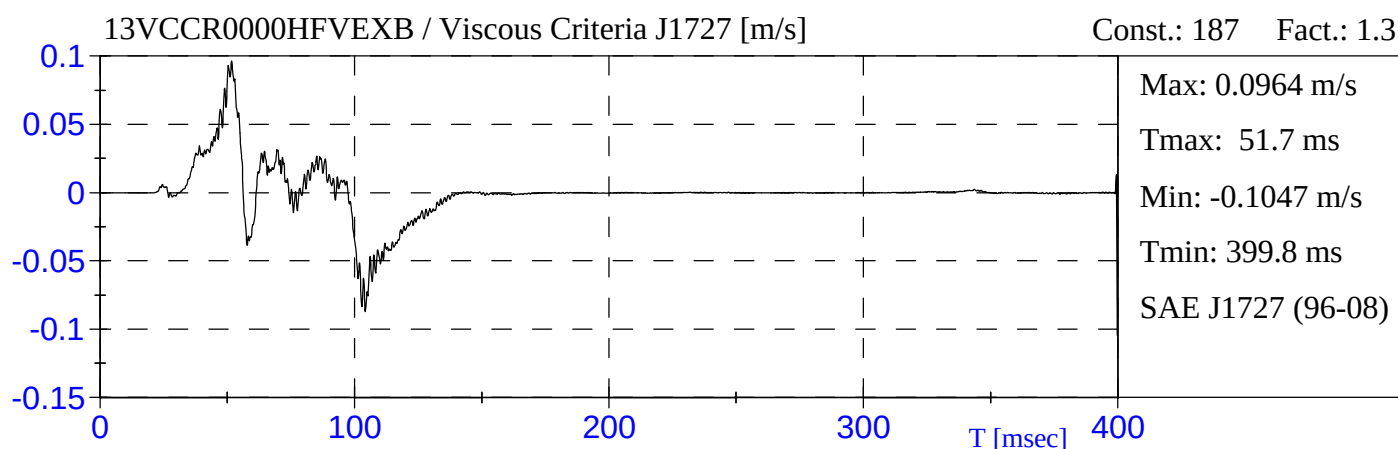
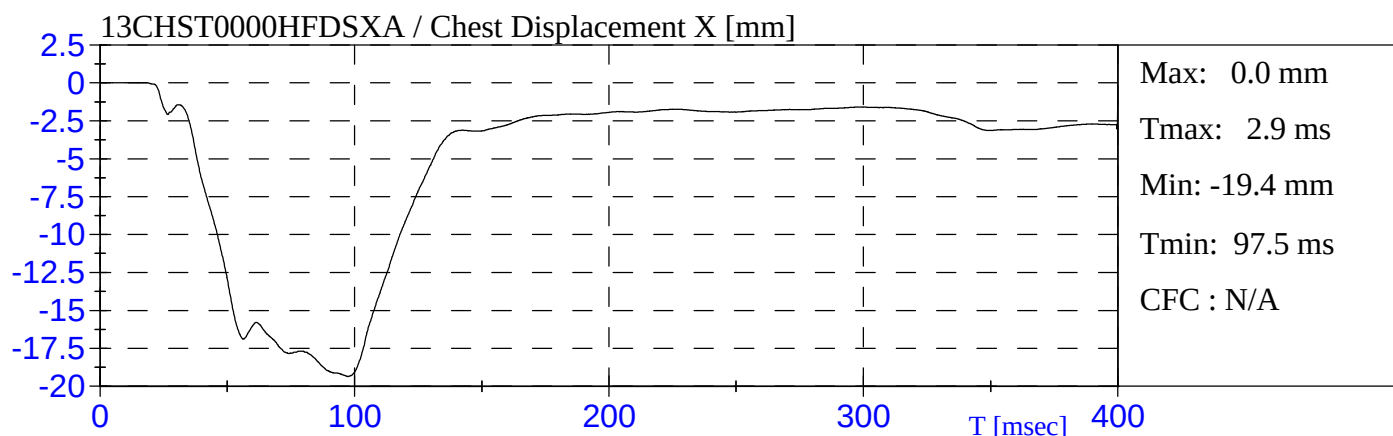
Max: 0.2106 m/s
Tmax: 54.1 ms
Min: -0.0750 m/s
Tmin: 103.7 ms
SAE J1727 (96-08)

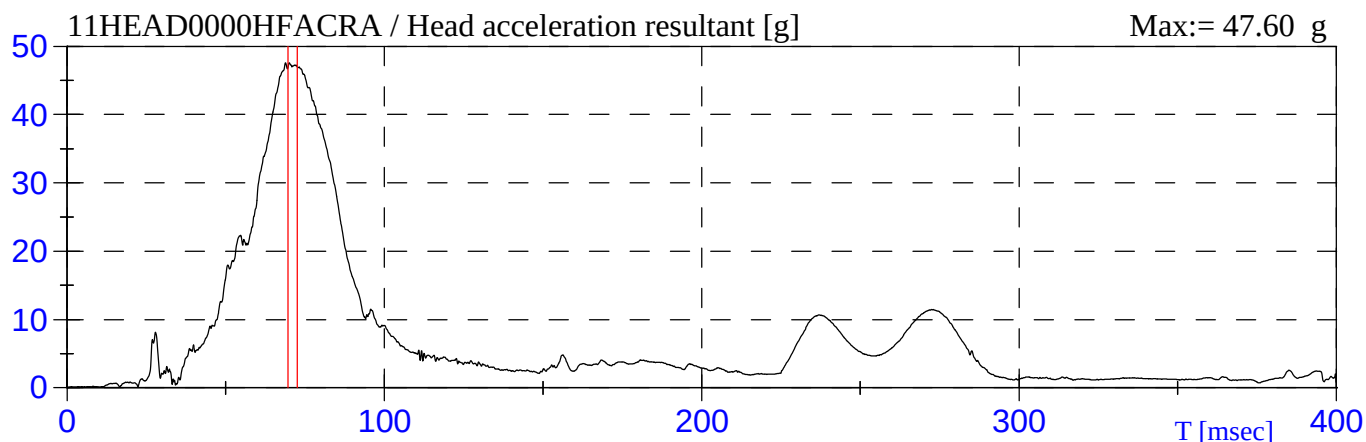
11VCCR0000HFVEXC / Viscous Criteria ECE 94 [m/s]

Const.: 187 Fact.: 1.3



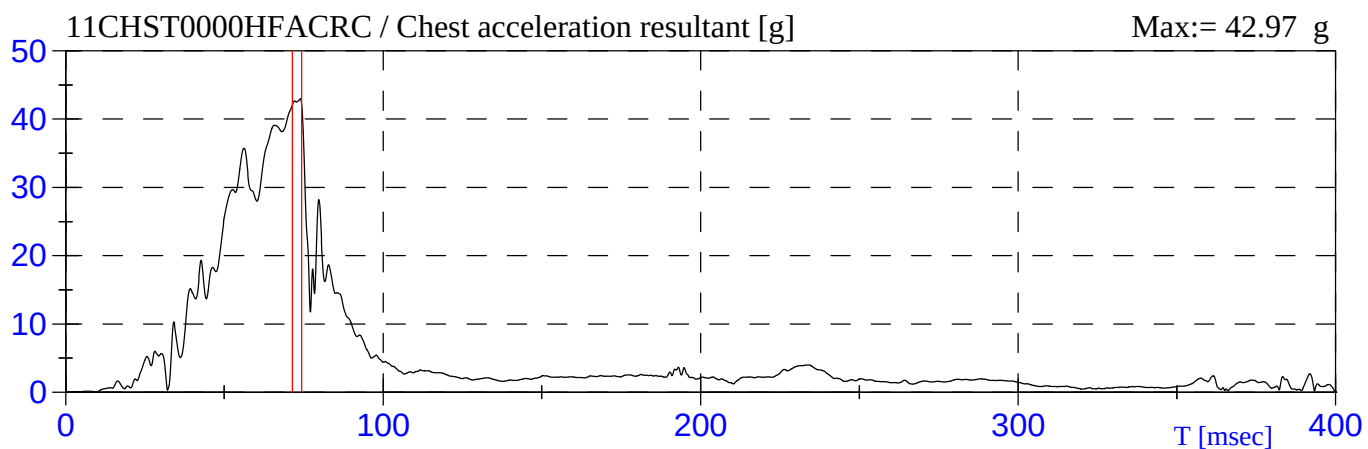
Max: 0.1981 m/s
Tmax: 53.9 ms
Min: -0.0675 m/s
Tmin: 93.6 ms
ECE 94: 96/79/EG
(96-12-16)





CLIP 3ms *

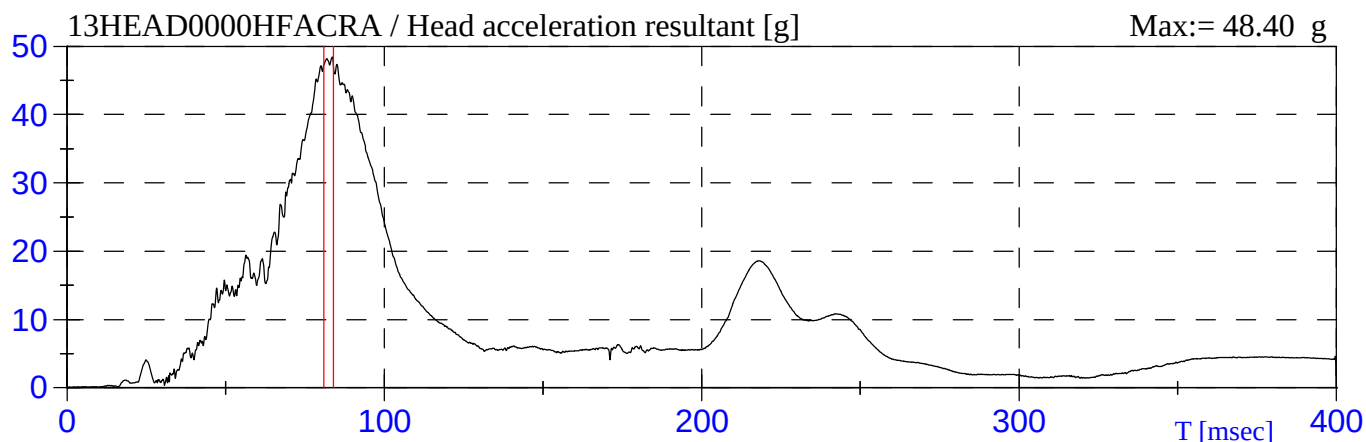
Acc. := 46.96 g	T1:= 69.6 ms	T2:= 72.6 ms
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CLIP 3ms *

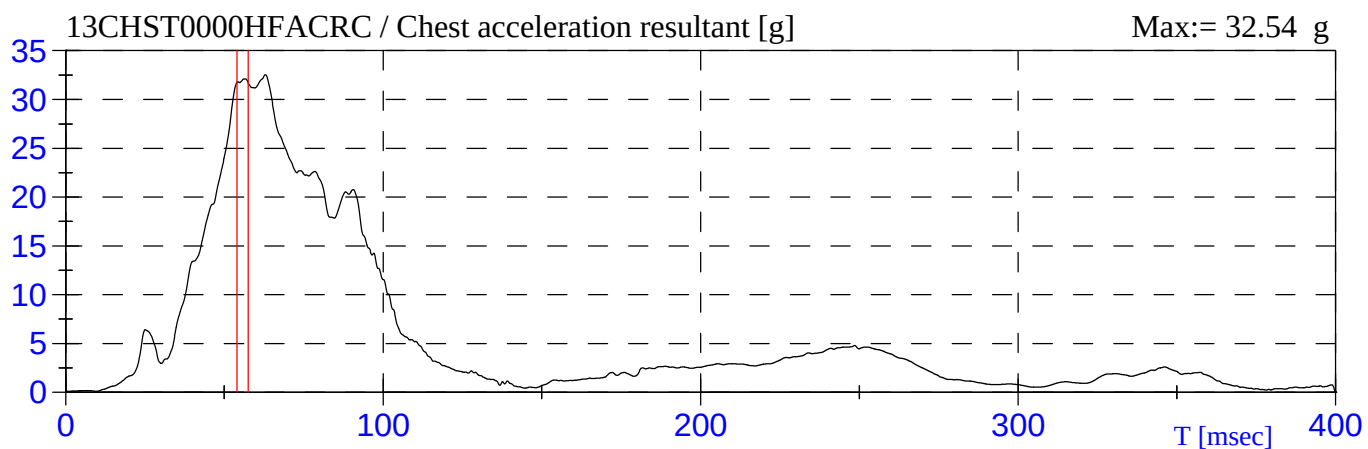
Acc. := 42.12 g	T1:= 71.4 ms	T2:= 74.4 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



CLIP 3ms *

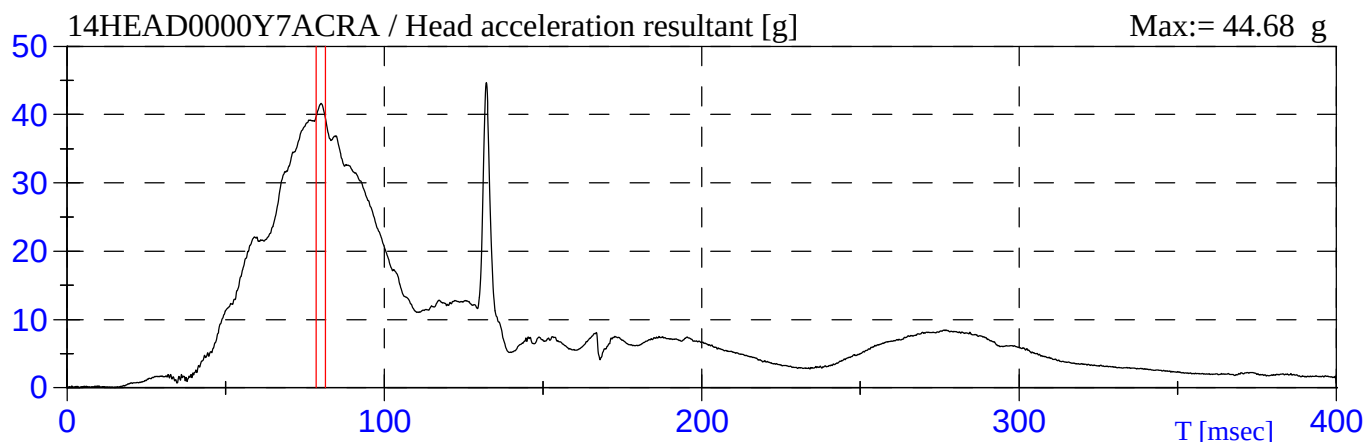
Acc. := 47.23 g	T1:= 81.0 ms	T2:= 84.0 ms
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CLIP 3ms *

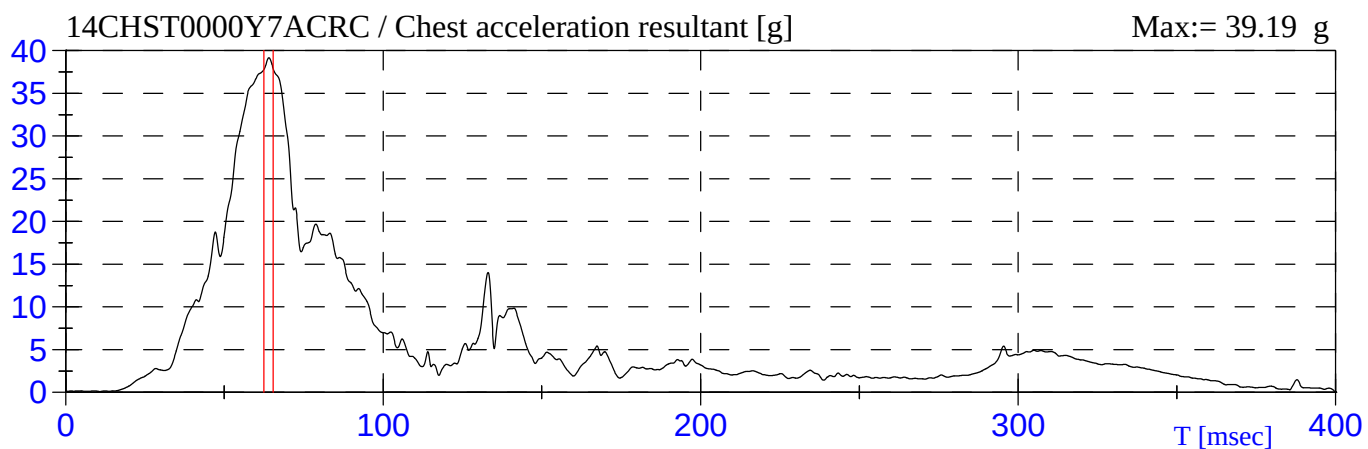
Acc. := 31.75 g	T1:= 53.9 ms	T2:= 57.5 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



CLIP 3ms *

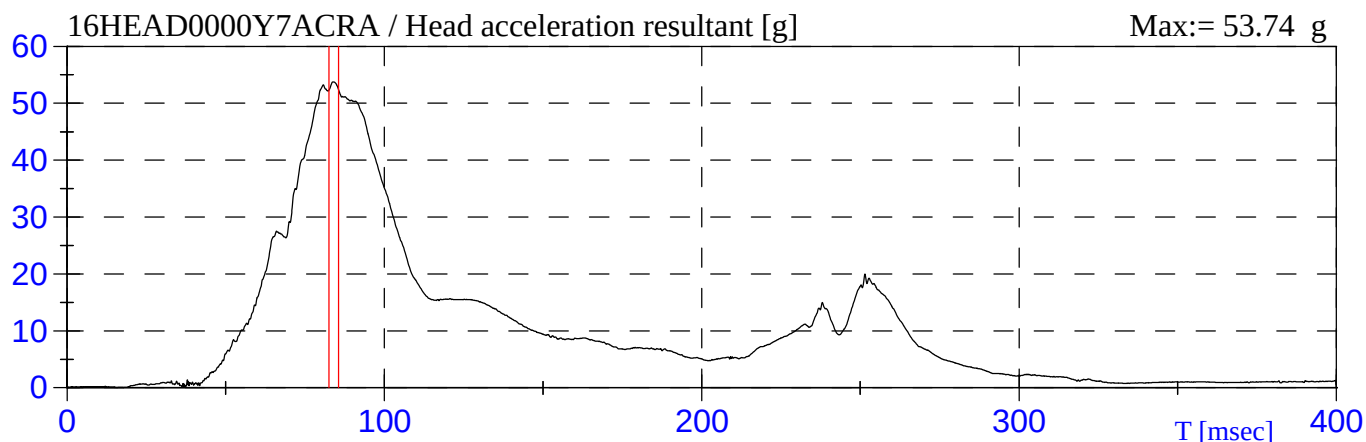
Acc. := 39.60 g	T1:= 78.4 ms	T2:= 81.4 ms
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CLIP 3ms *

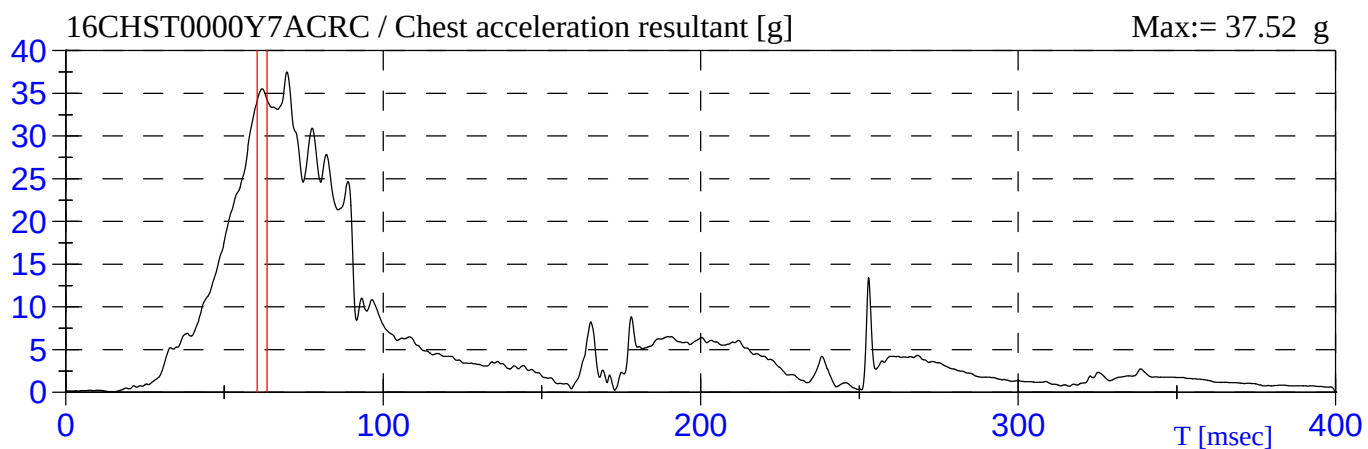
Acc. := 37.81 g	T1:= 62.5 ms	T2:= 65.5 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



CLIP 3ms *

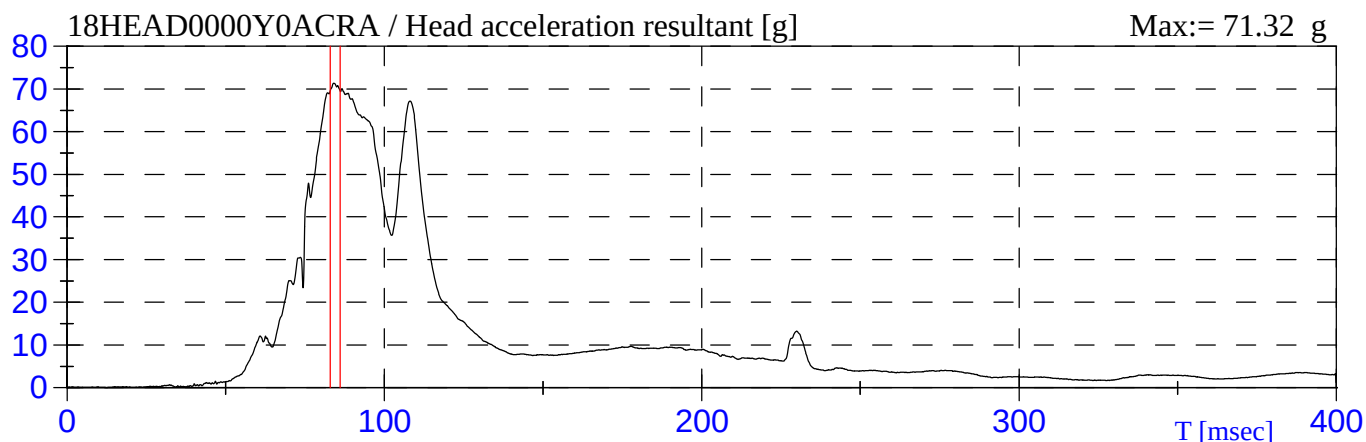
Acc. := 52.29 g	T1:= 82.6 ms	T2:= 85.6 ms
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CLIP 3ms *

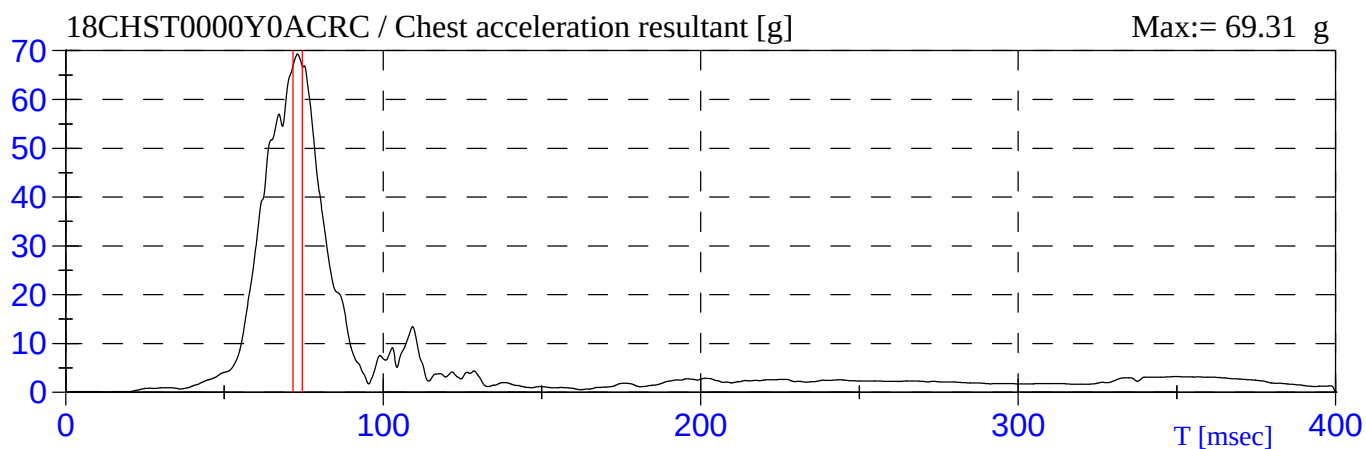
Acc. := 34.26 g	T1:= 60.4 ms	T2:= 63.4 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



CLIP 3ms *

Acc. := 69.57 g	T1:= 83.0 ms	T2:= 86.0 ms
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CLIP 3ms *

Acc. := 66.84 g	T1:= 71.6 ms	T2:= 74.6 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



COMMENTAIRES / COMMENTS

18NECKLO00Y0FOXA: N'est pas valide à partir de 40.2 ms.

Is not valid from 40.2 ms.

18NECKLO00Y0FOYA: N'est pas valide entre 41.1 ms et 42.4 ms & entre 205.6 ms et 209.6 ms.

Is not valid between 41.1 ms and 42.4 ms & between 205.6 ms and 209.6 ms.

18NECKLO00Y0FOZA: N'est pas valide entre 41.1 ms et 42.4 ms & entre 205.6 ms et 209.6 ms.

Is not valid between 41.1 ms and 42.4 ms & between 205.6 ms and 209.6 ms.

APPENDICE /APPENDIX C

**DONNÉES DES TEMPÉRATURES
TEMPERATURE DATA**

Temperature TC05-211

