

V3105

RAPPORT D'ESSAI - TEST REPORT

COLLISION FRONTALE DE RECHERCHE RESEARCH FRONTAL IMPACT

VEHICULE D'ESSAI / TEST VEHICLE FORD EXPEDITION 1999 TC # 99-108

FACE DÉFORMABLE / DEFORMABLE FACE ÉTUDE DE BLESSURES AVEC COUSSINS GONFLABLES AIR BAG AGGRESSIVENESS STUDY PHASE II
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Préparé par :
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N° de contrat : **99-5001**
Rapport N° : **RR 99-234**

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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For :
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SAFETY AND SECURITY
Research Engineering and
Vehicle Testing
Ottawa (Ontario)

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	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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VÉHICULE D'ESSAI - TEST VEHICLE

Année du modèle - Model Year 1999	Fabricant - Manufacturer FORD MOTOR CO. U.S.A.	Modèle - Model Expedition XLT
Type de carrosserie - Body Style Fourgonnette / Utility vehicle	Boîte de vitesse - Transmission Type Automatique / Automatic	Moteur - Engine 4.6 l
Date de fabrication - Date of Manufacture 09/98	Cylindres - Cylinders 8 cyl.	N° d'ident. du véhicule - Vehicle Ident. No. 1FMRU1860XLA23776
Lecture de l'odomètre - Odometer Reading 59 km	Nombre de places assises désignées Number of Designated Seating Positions 8	Numéro d'ident. PMG - PMG Ident. Number UN9-635
PNBV - GVWR 3166 kg	PNBE (Avant) - GAWR (Front) 1587 kg	PNBE (Arrière) - GAWR (Rear) 1769 kg

CONFIGURATION D'ESSAI - TEST CONFIGURATION

Type d'essai - Test type Véh. vs barrière fixe - Veh. vs fixed barrier	Vitesse d'impact** Impact velocity** 47.5 km/h	Angle d'impact Impact angle 0 °	Masse du véhicule d'essai Test vehicle mass 2680.2 kg
Cousins gonflables (Frontaux) - Air bags (Frontal) Activés-Activated ☒ Désactivés-Deactivated ☐ Normal ☐ Puiss. réduite-Depowered ☐ Second or New Generation-Seconde ou Nouvelle Génération ☒ Autre (spécifier) - Other (specify) ☐			
Cousins gonflables (Latéraux) - Air bags (Lateral) Activés-Activated ☐ Désactivés-Deactivated ☐ Normal ☐ Puiss. réduite-Depowered ☐ Second or New Generation-Seconde ou Nouvelle Génération ☐ Autre (spécifier) - Other (specify) N/A ☒			
Description et position du mannequin (Conducteur) Dummy description and position (Driver) DESCRIPTION ☒ 50% ☐ POSITION avancée / near ☐ 5% ☒ mi-course / mid-travel ☐ autre / other ☐ autre / other		Description et position du mannequin (Passager avant) Dummy description and position (Front Passenger) DESCRIPTION ☒ 50% ☐ POSITION avancée / near ☐ 5% ☒ mi-course / mid-travel ☐ autre / other ☐ autre / other	
Description du mannequin (Passager arrière gauche) Dummy description (Left Rear Passenger) ☐ 50% ☒ N/A ☐ 5% ☐ 18 mois ☐ 9 mois ☐ 3 ans ☐ 6 ans		Description du mannequin (Passager arrière droit) Dummy description (Right Rear Passenger) ☐ 50% ☐ N/A ☐ 5% ☒ 18 mois ☐ 9 mois ☐ 3 ans ☐ 6 ans	

** Tel que mesuré durant les derniers 3.7 mètres de trajet. / ** As measured over final 3.7 meters of travel.

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		
3166 kg	136 kg		Avt - Fnt	Arr - Rr	Avt - Fnt	Arr - Rr
Nombre d'occupants (places assises désignées) Number of Occupants (Designated Seating Positions)		Divisé Divided	☐	☒	Dossier ajustable Adjustable Seat Back	☒
Avant - Front 2 Arrière - Rear 2X3 Total 8		Baquet Bucket	☒	☐	Dossier non-ajustable Non-adjustable Seat Back	☒
Pression à froid - Cold Tire Pressure					Dimension - Size	
Avant - Front 207 kPa		Arrière - Rear 241 kPa		Secours - Spare N/A kPa		P255/70R16

Essai réalisé selon la procédure de PMG : Collision frontale de recherche, version 2, révision 13 novembre 1998.
Test performed according to PMG procedure: Research frontal impact, version 2, revised November 13th, 1998.

Préparé par : Prepared by : Jean Melançon	Date : 17-03-99
Vérifié par : Verified by : Alain Bussièrès	Date : 17-03-99
Rapport approuvé par : Report approved by : Alain Bussièrès	Date : 17-03-99
Rapport accepté par le client : Report accepted by the client :	Date :

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PREMIÈRE PESÉE : VÉHICULE TEL QUE LIVRÉ (AVEC LIQUIDES AU MAXIMUM)
FIRST WEIGHT : VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS)

Avant gauche - Left front 645.2 kg	Avant droit - Right front 604.4 kg	Masse avant totale - Total front weight 1249.6 kg
Arrière gauche - Left rear 581.1 kg	Arrière droit - Right rear 572.6 kg	Masse arrière totale - Total rear weight 1153.7 kg
Masse totale côté gauche - Total left side weight 1226.3 kg	Masse totale côté droit - Total right side weight 1177.0 kg	Masse totale - Total weight 2403.3 kg

TROISIÈME PESÉE : VÉHICULE PRÊT POUR L'ESSAI
THIRD WEIGHT : VEHICLE READY FOR TEST

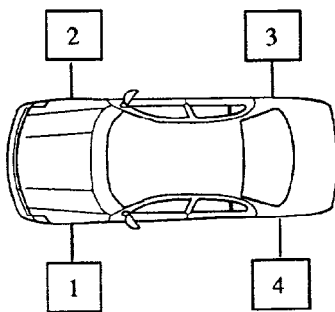
Avant gauche - Left front 676.5 kg	Avant droit - Right front 639.6 kg	Masse avant totale - Total front weight 1316.1 kg
Arrière gauche - Left rear 689.8 kg	Arrière droit - Right rear 674.3 kg	Masse arrière totale - Total rear weight 1364.1 kg
Masse totale côté gauche - Total left side weight 1366.3 kg	Masse totale côté droit - Total right side weight 1313.9 kg	Masse totale - Total weight 2680.2 kg

ATTITUDE DU VÉHICULE / VEHICLE ATTITUDE

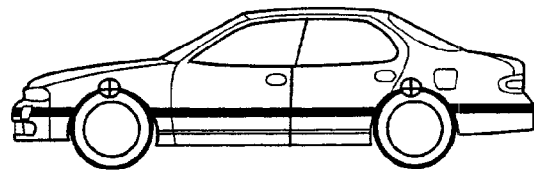
		Attitude tel que livré Attitude on delivery	Attitude chargé Attitude loaded	Attitude tel que testé Attitude as tested
1	Roue avant gauche* Left front wheel*	950 mm	944 mm	948 mm
2	Roue avant droite* Front right wheel*	961 mm	958 mm	957 mm
3	Roue arrière droite* Rear right wheel*	926 mm	900 mm	899 mm
4	Roue arrière gauche* Rear left wheel*	923 mm	900 mm	898 mm

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

Vue de plan / Plan view



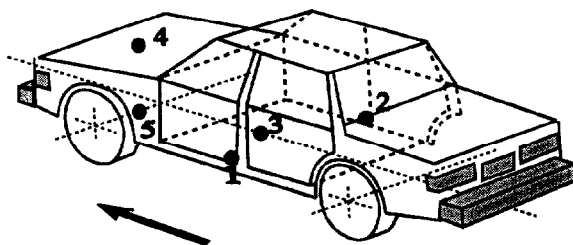
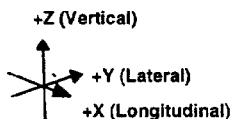
Vue de côté / Side view



⊕ Points de mesure / Mesure points

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EMPLACEMENT DES ACCÉLÉROMÈTRES
ACCELEROMETER LOCATIONS

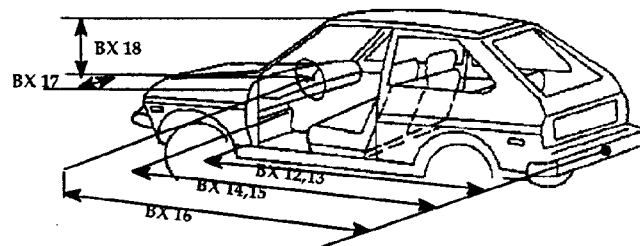
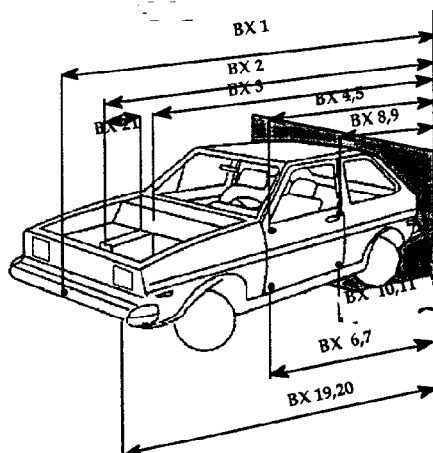


Direction de l'impact du véhicule d'essai
Test Vehicle Impact Direction

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		
		X	Y	Z
#1	Seuil de la porte gauche @ pilier "B" Left door sill @ pillar "B"	2770	-681	650
#2	Seuil de la porte droite @ pilier "B" Right door sill @ pillar "B"	2684	635	669
#3	Centre de gravité Centre of gravity	2517	-20	695
#4	Le dessus du moteur Top of engine	974	142	1051
#5	Le dessous du moteur Bottom of engine	840	44	466

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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 supérieur avant porte avant droite
Rear surface of front superior part of right front door
- 5 - Surface arrière à la partie supérieur avant porte avant gauche
Rear surface of front superior part of left front door
- 6 - Surface arrière à la partie inférieur avant porte avant droite
Rear surface of front inferior part of right front door
- 7 - Surface arrière à la partie inférieur avant porte avant gauche
Rear surface of front inferior part of left front door
- 8 - Surface arrière à la partie supérieur arrière porte avant droite
Rear surface of rear superior part of right rear door
- 9 - Surface arrière à la partie supérieur arrière porte avant gauche
Rear surface of rear superior part of left rear door
- 10 - Surface arrière à la partie inférieur arrière porte avant droite
Rear surface of rear inferior part of right rear door
- 11 - Surface arrière à la partie inférieur arrière porte avant gauche
Rear surface of rear inferior part of left rear door
- 12 - Surface arrière à la partie inférieur du pilier "A" droit
Rear surface of rear inferior part of right pillar "A"
- 13 - Surface arrière à la partie inférieur 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**		BX*	AX**
1	5185	4696	12	3522	3507
2	4245	4128	13	3501	3491
3	3969	3888	14	3778	3738
4	3552	3537	15	3875	3840
5	3559	3552	16	3120	3094
6	3502	3497	17	382	392
7	3515	3520	18	512	534
8	2501	2494	19	5036	4551
9	2514	2508	20	5055	4561
10	2504	2502	21	263	274
11	2501	2503			

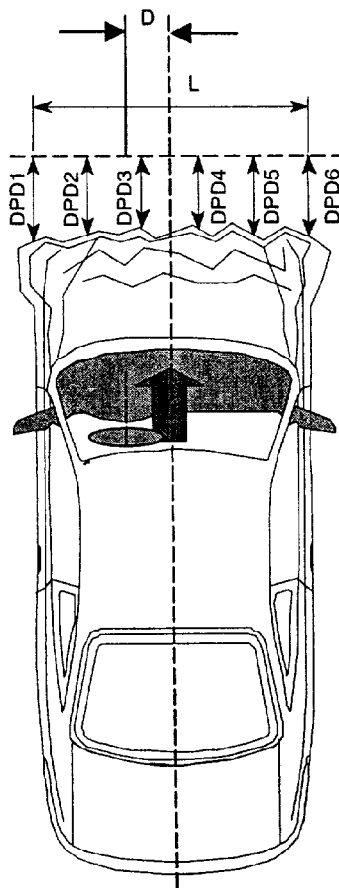
* BX : Mesures du véhicule avant-essai. / Pre-test vehicle measurements data.

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

REMARQUES / COMMENTS :

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MESURES DES DPD / DPP'S MEASUREMENTS



DPD 1:

DPD 2:

DPD 3:

DPD 4:

DPD 5:

DPD 6:

MESURE L:

MESURE D:

AVANT ESSAI PRE-TEST	APRÈS ESSAI POST-TEST
200	595
58	583
7	569
14	582
74	582
247	681
	1632
	0

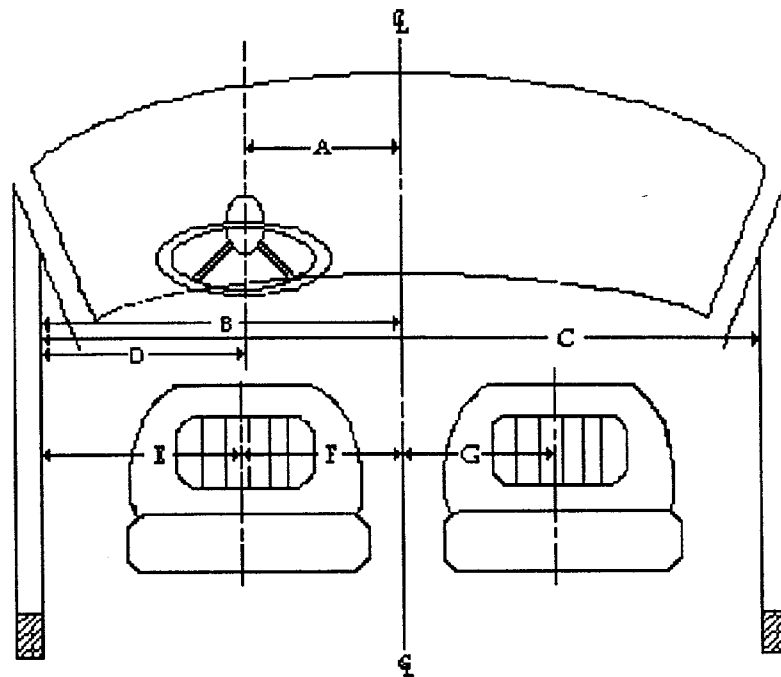
L : Longueur de la région endommagée
Length of damaged region

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

REMARQUES / COMMENTS :

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POSITION DES SIÈGES AVANT
FRONT SEAT POSITION



Code	Description	mm	Code	Description	mm
A	Centre du volant à la ligne de centre du véhicule Steering wheel center to center line of car	473	E	Seuil de la fenêtre au centre du siège (conducteur) Window edge to seat midline (driver)	467
B	Seuil de fenêtre à la ligne de centre du véhicule Window edge to center line of the vehicle	913	F	Centre du siège à la ligne de centre du véhicule (conducteur) Seat midline to center line of vehicle (driver)	446
C	Fenêtre à fenêtre Window to window	1864	G	Centre du siège à la ligne de centre du véhicule (passager) Seat midline to center line of vehicle (passenger)	425
D	Centre du volant au seuil de la fenêtre Steering wheel center to window edge	440			

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: Sièges avec ajustement avant/arrière conventionnel (élect. cond. seul.). Dossier ajustable. Ceinture baudrier ajustable (5 crans). Appuie-tête intégré. Ajustement lombaire. Volant ajustable. Ajustement élect. en hauteur du coussin du siège conducteur seulement.

Seats with conventionnal fore/aft adjustment (elect. driver only). Adjustable seat back. Adjustable upper torso belt (5 notches). Integrated headrest. Adjustable steering wheel. Driver's seat cushion height adjustment (elect).

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

Type de ceinture 3 points passive active automatique / automatic motorisée / motorised
Belt system ☒ ☐ ☒ ☐ ☐

Localisation du siège Av-G / F-L Av-D / F-R Arr-G / R-L Arr-D / R-R
Seat location ☒ ☐ ☐ ☐

Espacement du genou gauche Espacement du genou droit
Left knee spacing 103 mm Right knee spacing 103 mm

Essai no: / Trial no:	1	2	3
Angle du dossier BTD Back pan angle	20.2 deg.	19.7 deg.	19.3 deg.
Angle de la cuvette BTD Seat pan angle	15.5 deg.	15.8 deg.	16.5 deg.
Angle du pied gauche / left Foot angle droit / right	121 deg. 121 deg.	120 deg. 120 deg.	120 deg. 120 deg.
Angle du genou gauche / left Knee angle droit / right	100 deg. 100 deg.	97 deg. 98 deg.	98 deg. 99 deg.
Mesure sous-abdominale gauche / left Lap belt score droit / right	39 mm / 0 mm 40 mm / 0 mm	38 mm / 0 mm 40 mm / 0 mm	38 mm / 0 mm 40 mm / 0 mm
Ceinture en contact gauche / left Belt in contact droit / right	oui/yes oui/yes	oui/yes oui/yes	oui/yes oui/yes
Mesure ceinture baudrier Sternum Upper torso belt score Clavicule	178 mm / - * 124 mm / 0 mm	172 mm / - * 117 mm / 0 mm	174 mm / - * 119 mm / 0 mm
Ceinture en contact Clavicule Belt in contact	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 : 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.

Siège à la position mi-course. Ceinture baudrier à la mi-hauteur. Coussin du siège à la mi-hauteur. Lombarde relâché.
Seat at mid-travel position. Upper torso belt at mid-height position. Seat cushion at mid-height position. Lumbar retracted.

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

Type de ceinture 3 points passive active automatique / automatic motorisée / motorised
Belt system ☒ ☐ ☒ ☐ ☐

Localisation du siège Av-G / F-L Av-D / F-R Arr-G / R-L Arr-D / R-R
Seat location ☐ ☒ ☐ ☐

Espacement du genou gauche Espacement du genou droit
Left knee spacing 107 mm Right knee spacing 105 mm

Essai no: / Trial no:	1	2	3
Angle du dossier BTD Back pan angle	19.8 deg.	19.4 deg.	19.6 ¹ / ₂ deg.
Angle de la cuvette BTD Seat pan angle	16.6 deg.	17.3 deg.	17.5 deg.
Angle du pied gauche / left Foot angle droit / right	117 deg. 121 deg.	117 deg. 122 deg.	116 deg. 120 deg.
Angle du genou gauche / left Knee angle droit / right	96 deg. 99 deg.	97 deg. 98 deg.	94 deg. 98 deg.
Mesure sous-abdominale gauche / left Lap belt score droit / right	38 mm / 0 mm 39 mm / 0 mm	38 mm / 0 mm 39 mm / 0 mm	36 mm / 0 mm 36 mm / 0 mm
Ceinture en contact gauche / left Belt in contact droit / right	oui/yes oui/yes	oui/yes oui/yes	oui/yes oui/yes
Mesure ceinture baudrier Sternum Upper torso belt score Clavicule	172 mm / - * 116 mm / 0 mm	172 mm / - * 114 mm / 0 mm	170 mm / - * 113 mm / 0 mm
Ceinture en contact Clavicule Belt in contact	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 : 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.

Siège à la position mi-course. Ceinture baudrier à la mi-hauteur. Lombaraire relâché.
Seat at mid-travel position. Upper torso belt at mid-height position. Lumbar retracted.

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**DÉTERMINATION DU POINT "H" AVEC LE MANNEQUIN "3-D", MESURES PROVENANT DU BRAS ARTICULÉ MÉCANIQUE
SEAT "H" POINT DETERMINED WITH THE H-POINT MACHINE, MEASURES FROM AN ARTICULATED MECHANICAL ARM**

DESCRIPTION / DESCRIPTION	CONDUCTEUR / DRIVER			PASSAGER / PASSENGER			PASSAGER ARRIÈRE REAR PASSENGER		
Type de siège / Seat type	BAQUET/BUCKET			BAQUET/BUCKET					
Nombre de crans d'ajustement du siège * Number of notches for adjustable seat *	Électrique / Electrical			10 de/of 19 crans/notches			de/of crans/notches		
Nombre de crans d'ajustement du dossier * Number of notches for adjustable seat back *	7ème/7th crans/notches			7ème/7th crans/notches			- crans/notches		
Axes	X	Y	Z	X	Y	Z	X	Y	Z
Loquet de porte / Door latch	2620	-912	928	2625	874	932			
Point-H / H-Point	2383	-527	921	2395	518	943			
Rotule / Knee joint	1964	-671	1045	1978	661	1051			

* La position la plus avancée est au 1^{er} cran / * The foremost position is at the 1st notch.

Ajustement du 3D / 3D adjustment

**MESURES DE RÉFÉRENCE DU MANNEQUIN "3-D"
REFERENCE MEASUREMENTS OF "3-D" MACHINE**

50 %

50 %

50 %

DESCRIPTION / DESCRIPTION	CONDUCTEUR / DRIVER	PASSAGER / PASSENGER	PASSAGER ARRIÈRE REAR PASSENGER
Espacement du genou gauche Left knee spacing	214 mm	141 mm	
Espacement du genou droit Right knee spacing	153 mm	212 mm	
Cheville à cheville (c-c) Ankle to ankle (a-a)	351 mm	333 mm	
Angle du dossier du "3-D" Back pan angle	21.2 deg	20.3 deg	
Angle de la cuvette de siège du "3-D" Seat pan angle	15.7 deg	14.8 deg	
Angle du genou gauche Left knee angle	108 deg	111 deg	
Angle du genou droit Right knee angle	112 deg	111 deg	
Angle de la cheville gauche Left ankle angle	117 deg	105 deg	
Angle de la cheville droite Right ankle angle	87 deg	115 deg	

Remarques – Comments : Siège à la position mi-course. Coussin du siège du conducteur à la position la plus basse. Lombaire relâché.
Seat at mid-travel position. Driver's seat cushion at the lowest position. Lumbar retracted.

Le mannequin 3D a été installé selon la procédure suivante :
"Anthropomorphic test dummy seating procedure for frontal impact test"
version 3, 10/23/85.
The 3D machine was installed as per the following procedure :
"Anthropomorphic test dummy seating procedure for frontal impact test"
version 3, 10/23/85.

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POSITIONNEMENT DES MANNEQUINS / MEASUREMENTS OF DUMMY POSITIONS

		MESURES / MEASUREMENTS :					
Conducteur/Driver : 							

Remarques – Comments : Sièges du conducteur et du passager à la position mi-course. Ceinture baudrier à la mi-hauteur. Coussin du siège du conducteur à la position la plus basse. Lombaire relâché. Volant à la mi-hauteur.
Driver and passenger seats at mid-travel position. Upper torso belt at mid-height position. Driver's seat cushion at the lowest position. Lumbar retracted. Steering wheel at mid-height position.

Mannequins positionnés selon la méthode d'essai 208 "Système de retenue des occupants en cas de collision frontale", révisé en décembre 1996.

Dummy positioning as per procedure test method 208 "Occupants restraint systems in frontal impact", revised in December 1996.

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.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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POSITIONNEMENT DES MANNEQUINS / MEASUREMENTS OF DUMMY POSITIONS

Passager arrière gauche : Rear left passenger :		MESURES / MEASUREMENTS : Toutes les mesures sont en mm / All measurements are in mm			
Angle du pelvis - Pelvic angle : N/A° Angle transversal - Transversal angle : N/A° Angle de la tête - Head angle : N/A° Angle du coussin - Skew angle : N/A°		Passager arrière gauche Rear left passenger		Passager arrière droit Rear right passenger	
Ajustement du siège : Seat adjustment :		Ajustement du siège : Seat adjustment :		Ajustement du siège : Seat adjustment :	
N/A crans/notches		N/A crans/notches		N/A crans/notches	
Ajustement du dossier : Seat back adjustment :		Ajustement du dossier : Seat back adjustment :		Ajustement du dossier : Seat back adjustment :	
N/A crans/notches		N/A crans/notches		N/A crans/notches	
Passager arrière droit : Rear right passenger :		X	Y	Z	
Angle du pelvis - Pelvic angle : N/A° Angle transversal - Transversal angle : N/A° Angle de la tête - Head angle : N/A° Angle du coussin - Skew angle : N/A°					
Mouvement du lacet / Yaw movement :					
Cible de tête / Head target :		3576	-518	1398	
Point-H / H-Point :					
Rotule / Knee joint :					

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

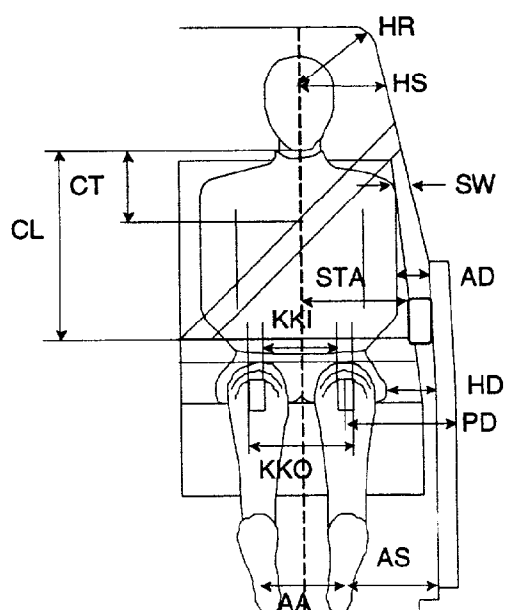
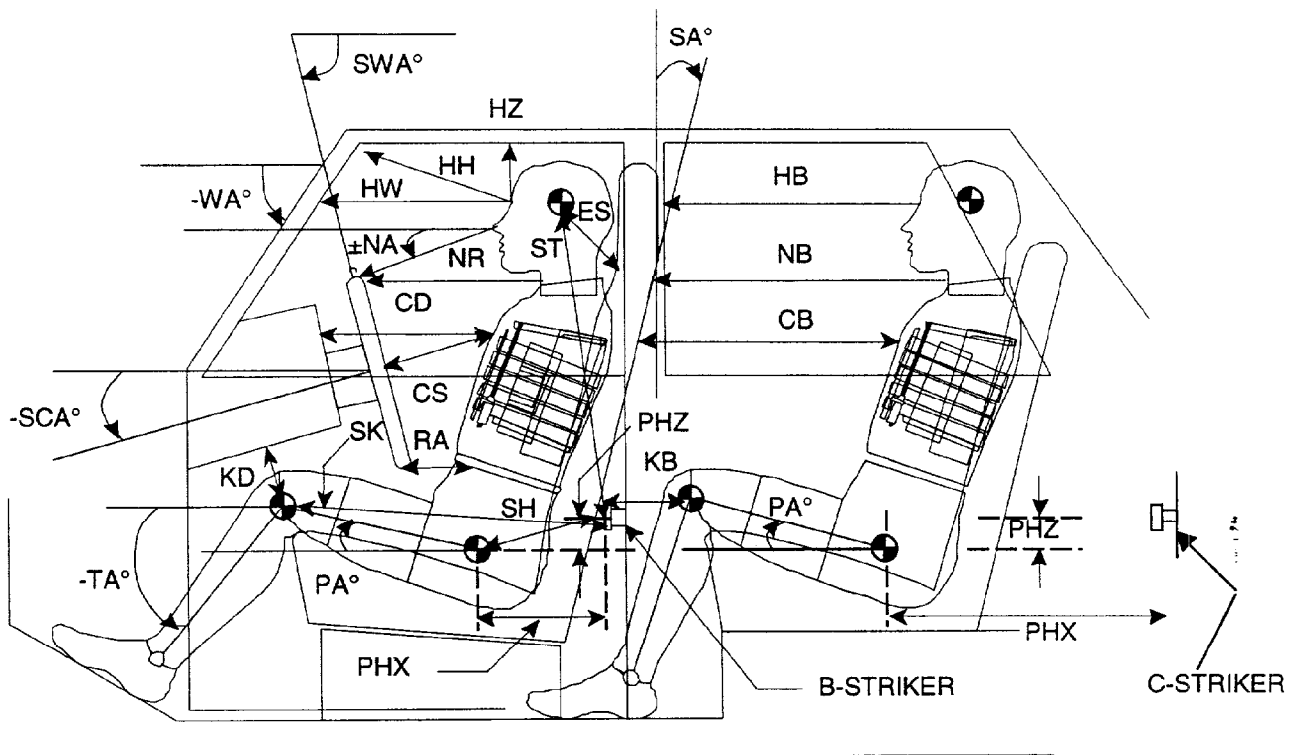
Reference point : Transversal center of the vehicle, at the foremost point and at ground level. As per SAE J182a.

Passager arrière gauche : Rear left passenger :		Hybrid III 18 mois, assis dans un siège pour enfant faisant face vers l'avant. Hybrid III 18 month, seated in a child's car seat facing front.	
Manufacturier du siège : Seat manufacturer :		Cosco	
Modèle du siège : Seat model :		Touriva	
No. de série du siège : Seat serial number :		02C94LEX	
Date de fabrication du siège : Seat fabrication date :		97-11-17	

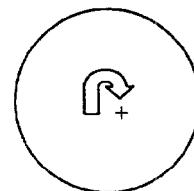
Passager arrière droit : Rear right passenger :		Hybrid III 3 ans, assis dans un siège pour enfant faisant face vers l'avant. Hybrid III 3 years, seated in a child's car seat facing front.	
Manufacturier du siège : Seat manufacturer :		Evenflo	
Modèle du siège : Seat model :		Horizon	
No. de série du siège : Seat serial number :		4201D9CP1	
Date de fabrication du siège : Seat fabrication date :		98-11-23	

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COTES DE LOCALISATION DES MANNEQUINS
DUMMY LOCATION DATA



référence :



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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	375	260		
Genou à genou (plaque) Intérieur / Interior Knee to knee (plate) Extérieur / Exterior	KKI	190	130		
	KKO	330	270		
De la cheville jusqu'au seuil de porte (horizontalement) Ankle to door sill (horizontal)	AS	135	160		
Centre du genou au tableau de bord ou siège horizontalement (minimum) Knees centre to dash or seat back horizontal (minimum)	KDL	75	110		
	KDR	95	113		
Sternum au tableau de bord (horizontalement) Chest to dash (horizontal)	CD		530		
Milieu du sternum au centre du moyeu du volant ou siège avant Mid sternum to steering hub center or front seat	CS/CB	300			
Milieu du front jusqu'au pare-brise (horizontalement) Mid forehead to windshield (horizontal)	HW	650	604		
Milieu du front jusqu'au haut du pare-brise Mid forehead to windshield header	HH	405	410		
Nez à la jante du volant de direction (haut) ou siège avant Nose to steering wheel rim (top) or front seat	NR/HB	382			
Milieu du front jusqu'au début du toit Mid forehead to edge roof	HR	265	240		
Haut de l'oreille au haut du siège avant Ear top to front seat top	ES	255	255		
Menton au haut de la ceinture sous-abdominale (verticalement) Chin to lap belt upper edge (vertical)	CL	418	427		
Menton au haut de la ceinture baudrier (verticalement) Chin to thorax belt upper edge (vertical)	CT	120	130		
Milieu du front à la fenêtre latérale (horizontalement) Mid forehead to side window (horizontal)	HS	325	305		
La rotule à la porte (horizontalement) Patella to door (horizontal)	PD	195	200		
Du point-H à la porte (horizontalement) H-point to door (horizontal)	HD	175	160		
Du milieu du bras à la porte (horizontalement) Mid upper arm to door (horizontal)	AD	140	130		
Cou jusqu'au volant ou tableau de bord (horizontalement) ou siège avant Neck to steering wheel or dash board (horizontal) or front seat	NB	462	690		
Épaule à la fenêtre de côté Shoulder to side window	SW	210	207		
Abdomen à l'appui-bras Abdomen to armrest	STA	155	145		
Milieu du front au toit (verticalement) Mid forehead to roof (vertical)	HZ	265	250		
Tête au loquet (plan (x,z)) Striker to head ((x,z) plan)	ST	658	672		
Abdomen à la jante du volant de direction (bas) Steering wheel rim to abdomen (bottom)	RA	204			
Genou au loquet (plan (x,z)) Striker to knee ((x,z) plan)	SK	638	626		
Point-H au loquet (plan (x,z)) Striker to H-Point ((x,z) plan)	SH	245	227		
Point-H au loquet en X (horizontalement) Striker to H-Point in X (horizontal)	PHX	244	227		
Point-H au loquet en Z (verticalement) Striker to H-Point in Z (vertical)	PHZ	18	7		

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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	70.0°			
Angle du pare-brise Windshield angle	-WA	-34.0°			
Angle de la colonne de direction Steering column angle	-SCA	-19.0°			
Angle du tibia gauche Left tibial angle	-TA	-43.0°	-41.5°		
Angle du tibia droit Right tibial angle	-TA	-41.0	-40.0		
Angle pelvis Pelvic angle	+PA	20.5°	21.3°		
Angle du nez à la jante de direction (haut) Nose to steering wheel rim (top) angle	±NA	-8.0°			
Angle du dossier Seat back angle	+SA	21.1°	21.3°		
Angle ST (horizontalement) ST angle (horizontal)	+ST-A	78.5°	80.8°		
Angle SK (horizontalement) SK angle (horizontal)	±SK-A	6.4°	6.3°		
Angle SH (horizontalement) SH angle (horizontal)	-SH-A	-4.2°	1.8°		

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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**MESURES DU VÉHICULE, POINT "H" (MANNEQUIN 3D) ET MANNEQUIN DAE
VEHICLE, H-POINT MANIKIN AND TEST DUMMY MEASUREMENTS**

Mannequin 3D Point "H" - H-Point Manikin

Conducteur / Driver 50%

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Point "H" extérieur mesure initiale - H-Point, outboard initial measurement	2382	-527	921
Point "H" extérieur mesure finale - H-Point, outboard final measurement	2383	-527	921
Rotule, extérieure - Knee pivot, outboard	1964	-671	1045
Cheville, extérieure - Ankle pivot, outboard	1726	-667	702
Talon du pied en contact avec sol - Accomodation heel point (AHP)	1777	-663	577
Plante du pied en contact avec sol - Accomodation ball of foot point (ABFP)	1568	-709	632
Ligne médiane du véhicule - Vehicle centreline		0	
Centre du moyeu latéral - Lateral hub centre location (W20)		-473	
Support poids du sternum, extérieur - Torso weigh hanger, outboard	2514	-612	1252
Ligne médiane du coussin du siège (avant/milieu/arr.) - Seat cushion centreline (front/mid/rear)		-431/-446/-422	
Ligne médiane du dossier du siège (avant/milieu/arr.) - Seat back centreline(front/mid/rear)		-425/-451/-432	
Hauteur Point "H" - H-Point height ($H_{30} = Z_{H-POINT} - Z_{AHP}$)		344	
Position du siège vs sa position la plus reculée - Seat position vs its rearmost position		101	
Angle dossier du siège - Seat back angle (deg) (L40)		21.2°	
Angle du coussin du siège - Skew angle		1.5°	
Diamètre extérieur du volant - Steering wheel dia., outside (W9)		389	

Véhicule et Mannequin - Vehicle and Dummy

Hybrid III 50% mâle (Conducteur) / Hybrid III 50% male (driver)

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Boulon siège avant, extérieur - Front seat bolt, outboard	2153	-641	616
Jante du volant, centre haut - Steering wheel rim, top centre	1998	-479	1468
Jante du volant, centre bas - Steering wheel rim, bottom centre	2127	-469	1100
Jante du volant, centre gauche - Steering wheel rim, left centre	2063	-663	1282
Jante du volant, centre droit - Steering wheel rim, right centre	2062	-274	1289
Moyeu du volant, centre haut - Steering wheel hub, top centre	2011	-470	1335
Moyeu du volant, centre - Steering wheel hub, centre	2083	-467	1251
Moyeu du volant, centre bas - Steering wheel hub, bottom centre	2033	-465	1167
Position du siège vs sa position la plus reculée - Seat position vs its rearmost position		101	
Angle de dossier du siège - Seat back angle (deg)		21.1°	
Genou au tableau de bord, minimum - Knee to dash, minimum	G/L : 75		D/R : 95
Menton au haut du moyeu du volant - Chin to steering wheel hub top		393	

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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MESURES DU VÉHICULE, POINT "H" (MANNEQUIN 3D) ET MANNEQUIN DAE (suite)
VEHICLE, H-POINT MANIKIN AND TEST DUMMY MEASUREMENTS (cont'd)

Description et emplacement du Mannequin

ATD description and location :

Hybrid III 50% mâle (Conducteur) / Hybrid III 50% male (driver)

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Centre de gravité de la tête, extérieur - Head CG, outboard	2489	-522	1573
Base du nez - Glabella (root of nose)	2405	-447	1587
Menton - Chin (bottom)	2402	-446	1471
Jonction menton et cou - Chin / neck junction	2422	-446	1459
Thorax au niveau des côtes supérieures - Chest at upper rib level	2370	-454	1277
Thorax au niveau des côtes inférieures - Chest at lower rib level	2342	-446	1161
Boulon supérieur avant de l'épaule, ext. - Shoulder bolt, top front outboard	2519	-641	1321
Boulon supérieur avant de l'épaule, int. - Shoulder bolt, top front inboard	2525	-265	1311
Boulon du coude, extérieur - Elbow bolt, outboard	2348	-670	1123
Boulon du coude, intérieur - Elbow bolt, inboard	2348	-210	1116
Boulon du poignet, extérieur - Wrist bolt, outboard	2132	-678	1253
Boulon du poignet, intérieur - Wrist bolt, inboard	2132	-294	1240
Point d'articulation de la hanche, extérieur - Hip point, outboard	2443	-607	962
Boulon du genou gauche, côté gauche - Knee bolt, left leg, left side	1986	-618	998
Boulon de la cheville gauche, côté gauche - Ankle bolt, left leg, left side	1711	-609	787
Point du talon gauche - Heel point, left leg	1720	-615	586
Plante du pied gauche vs plancher - Ball of foot at toeboard contact, left leg	1522	-679	660
Boulon du genou droit, côté gauche - Knee bolt, right leg, left side	1982	-365	996
Boulon de la cheville droite, côté gauche - Ankle bolt, right leg, left side	1714	-317	774
Point du talon droit - Heel point, right leg	1656	-332	582
Plante du pied droit vs plancher - Ball of foot at toeboard contact, right leg	1539	-347	769
Espacement de genoux (centre) - Knee spacing (centre)		260	
Ajustement du support de cou - Neck bracket adjustment (deg.)			

Remarques – Comments :

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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MESURES DU VÉHICULE, POINT "H" (MANNEQUIN 3D) ET MANNEQUIN DAE
VEHICLE, H-POINT MANIKIN AND TEST DUMMY MEASUREMENTS
Mannequin 3D Point "H" - H-Point
Passager avant /Front passenger 50 %

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Point "H" extérieur mesure initiale - H-Point, outboard initial measurement	2395	518	942
Point "H" extérieur mesure finale - H-Point, outboard final measurement	2395	518	943
Rotule, extérieure - Knee pivot, outboard	1978	661	1051
Cheville, extérieure - Ankle pivot, outboard	1740	627	706
Talon du pied en contact avec sol - Accomodation heel point (AHP)	1788	611	583
Plante du pied en contact avec sol - Accomodation ball of foot point (ABFP)	1578	654	638
Ligne médiane du véhicule - Vehicle centreline		0	
Support poids du sternum, extérieur - Torso weigh hanger, outboard	2520	597	1276
Ligne médiane du coussin du siège (avant/milieu/arr.) - Seat cushion centreline (front/mid/rear)		431/425/422	
Ligne médiane du dossier du siège (avant/milieu/arr.) - Seat back centreline (front/mid/rear)		425/430/432	
Hauteur Point "H" - H-Point height ($H_{30} = Z_{H-POINT} - Z_{AHP}$)		360	
Position du siège vs sa position la plus reculée - Seat position vs its rearmost position		90	
Angle dossier du siège - Seat back angle (deg) (L40)		20.3°	
Angle du coussin du siège - Skew angle		0°	

Véhicule et Mannequin - Vehicle and Dummy
Hybrid III 50% mâle (Passager) / Hybrid III 50% male (passenger)

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Boulon siège avant, extérieur - Front seat bolt, outboard	2168	593	620
Position du siège vs sa position la plus reculée - Seat position vs its rearmost position		90	
Angle dossier du siège - Seat back angle		21.3°	
Genou au tableau de bord, minimum - Knee to dash, minimum	G/L : 110		D/R : 113
Menton au tableau de bord - Chin to dash		646	

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MESURES DU VÉHICULE, POINT "H" (MANNEQUIN 3D) ET MANNEQUIN DAE (suite)
VEHICLE, H-POINT MANIKIN AND TEST DUMMY MEASUREMENTS (cont'd)

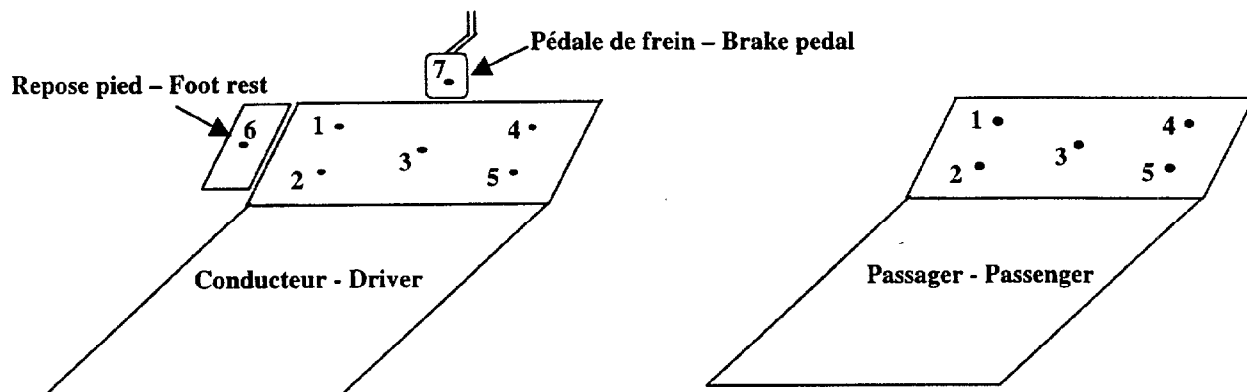
Description et emplacement du Mannequin
ATD description and location:

Hybrid III 50 % mâle (Passager) / Hybrid III 50 % male (passenger)

DESCRIPTION	X(mm)	Y(mm)	Z(mm)
Centre de gravité de la tête, extérieur - Head CG, outboard	2517	501	1595
Base du nez - Glabella (root of nose)	2430	428	1611
Menton - Chin (bottom)	2426	426	1493
Jonction menton et cou - Chin / neck junction	2443	421	1483
Thorax au niveau des côtes supérieures - Chest at upper rib level	2392	421	1294
Thorax au niveau des côtes inférieures - Chest at lower rib level	2364	426	1184
Boulon supérieur avant de l'épaule, ext. - Shoulder bolt, top front outboard	2545	609	1325
Boulon supérieur avant de l'épaule, int. - Shoulder bolt, top front inboard	2536	242	1331
Boulon du coude, extérieur - Elbow bolt, outboard	2481	673	1069
Boulon du coude, intérieur - Elbow bolt, inboard	2479	171	1077
Boulon du poignet, extérieur - Wrist bolt, outboard	2237	615	1031
Boulon du poignet, intérieur - Wrist bolt, inboard	2236	225	1028
Point d'articulation de la hanche, extérieur - Hip point, outboard	2467	582	989
Boulon du genou gauche, intérieur - Knee bolt, left leg, right side	2002	563	1002
Boulon de la cheville gauche, intérieur - Ankle bolt, left leg, right side	1732	526	788
Point du talon gauche - Heel point, left leg	1731	521	581
Plante du pied gauche vs plancher - Ball of foot at toeboard contact, left leg	1542	585	680
Boulon du genou droit, intérieur - Knee bolt, right leg, right side	2002	372	1005
Boulon de la cheville droite, intérieur - Ankle bolt, right leg, right side	1736	344	785
Point du talon droit - Heel point, right leg	1732	366	584
Plante du pied droit vs plancher - Ball of foot at toeboard contact, right leg	1541	396	690
Espacement de genoux (centre) - Knee spacing (centre)		200	
Ajustement du support de cou - Neck bracket adjustment (deg.)			

Remarques – Comments :

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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MESURES PLANCHER / FOOTWELL MEASUREMENTS


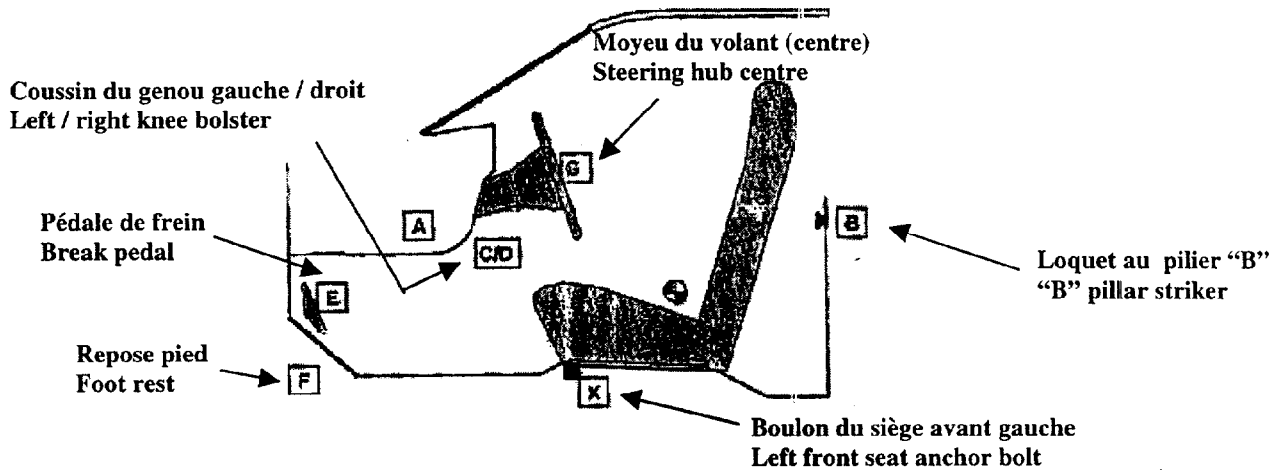
N° Cible	AVANT ESSAI	APRÈS ESSAI	
Target No.	PRE-TEST	POST-TEST	Δ mm
1	x	1444	1455
	y	-615	-604
	z	661	683
2	x	1576	1584
	y	-592	-584
	z	594	615
3	x	1522	1529
	y	-458	-448
	z	617	636
4	x	1439	1465
	y	-347	-336
	z	655	697
5	x	1576	1590
	y	-299	-288
	z	586	606
6	x	1571	1576
	y	-712	-704
	z	629	650
7	x	1600	1641
	y	-485	-440
	z	771	817

N° Cible	AVANT ESSAI	APRÈS ESSAI	
Target No.	PRE-TEST	POST-TEST	Δ mm
1	x	1467	1501
	y	317	308
	z	699	728
2	x	1600	1609
	y	306	295
	z	599	611
3	x	1525	1532
	y	454	444
	z	632	645
4	x	1460	1466
	y	586	573
	z	665	680
5	x	1598	1605
	y	634	624
	z	596	611

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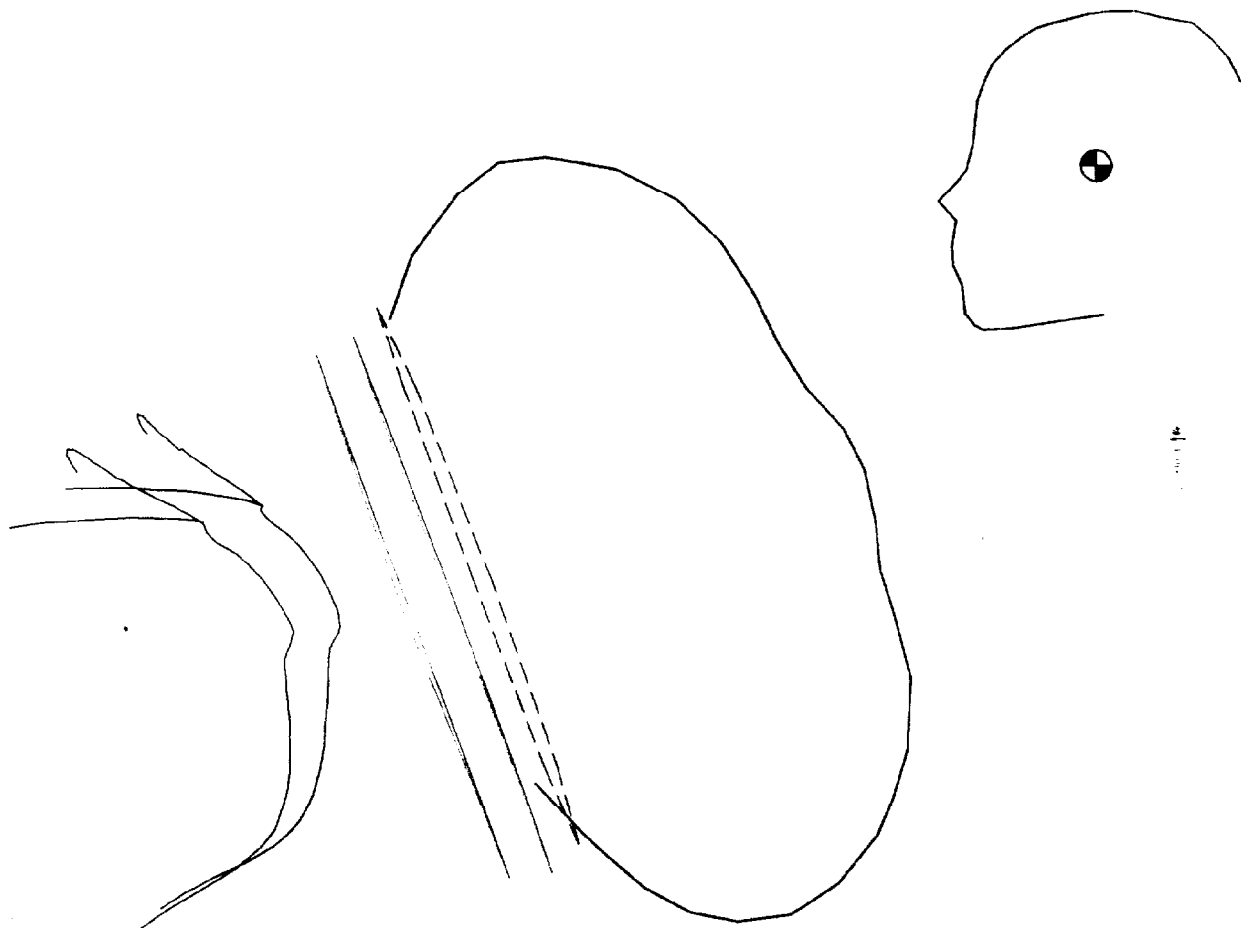
Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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PÉNÉTRATION DE L'HABITACLE DU CONDUCTEUR (Distances en mm)
DRIVER COMPARTMENT INTRUSION (Distances in mm)

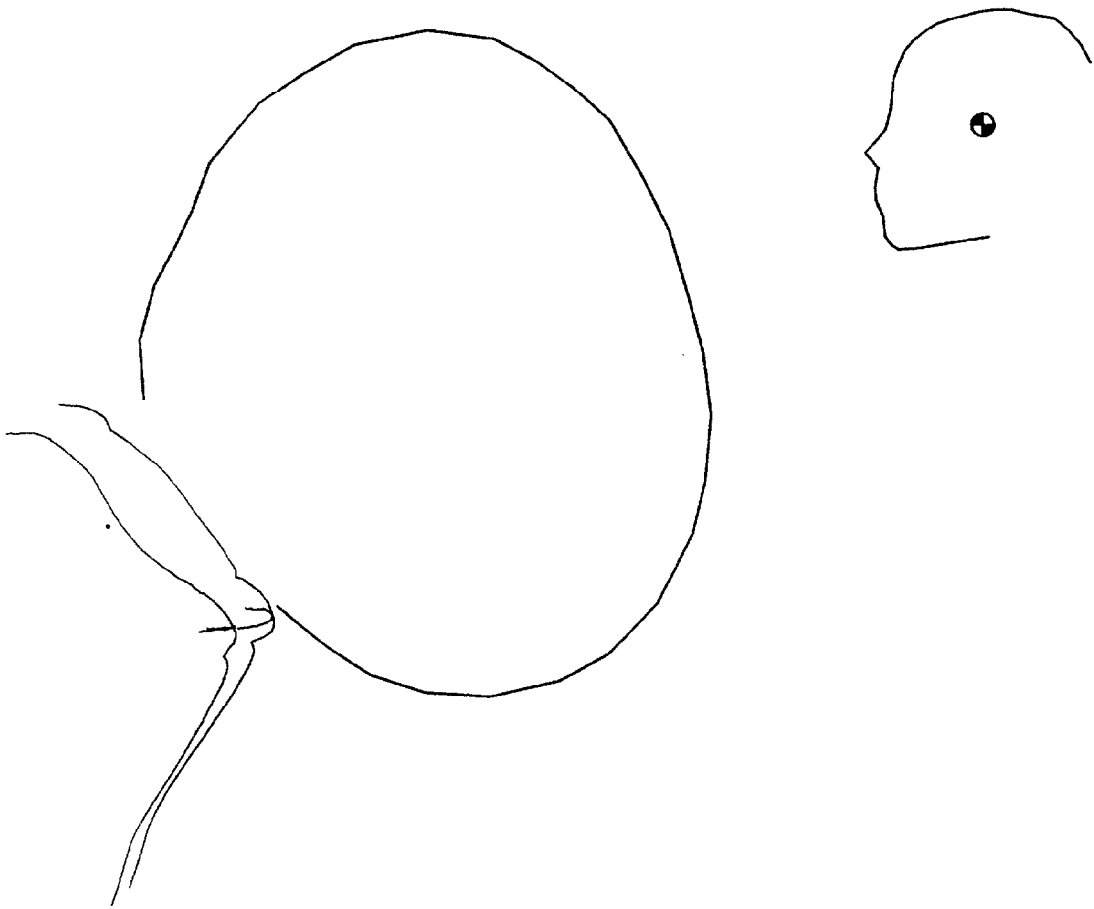


Habitacle du conducteur
Driver's compartment

	DESCRIPTION	Avant essai / Pre-test			Après essai / Post-test		
		X	Y	Z	X	Y	Z
A	Ouverture de porte Door opening	1898	-912	1254	1904	-933	1263
B	Loquet au pilier "B" "B" pillar striker	2620	-912	928	2616	-914	928
C	Coussin du genou gauche Left knee bolster	1865	-580	1077	1880	-592	1099
D	Coussin du genou droit Right knee bolster	1850	-335	1087	1878	-349	1101
E	Pédale de frein Break pedal	1600	-485	771	1641	-440	817
F	Repose pied Foot rest	1571	-712	629	1576	-704	650
G	Moyeu du volant (centre) Steering hub (centre)	2083	-467	1251	2104	-481	1267
X	Boulon du siège avant gauche Left front seat anchor bolt	2153	-641	616	2160	-637	593



	PRE-TEST	POST-TEST	No. TC. : 99-108
DASHBOARD / TABLEAU DE BORD	_____	_____	FORD EXPEDITION
MODULE	_____	_____	DRIVER'S SIDE / COTÉ CONDUCTEUR
STEERING WHEEL / VOLANT	_____	_____	Project / Projet : 99-5001
AIRBAG / COUSSIN GONFLABLE	_____	_____	

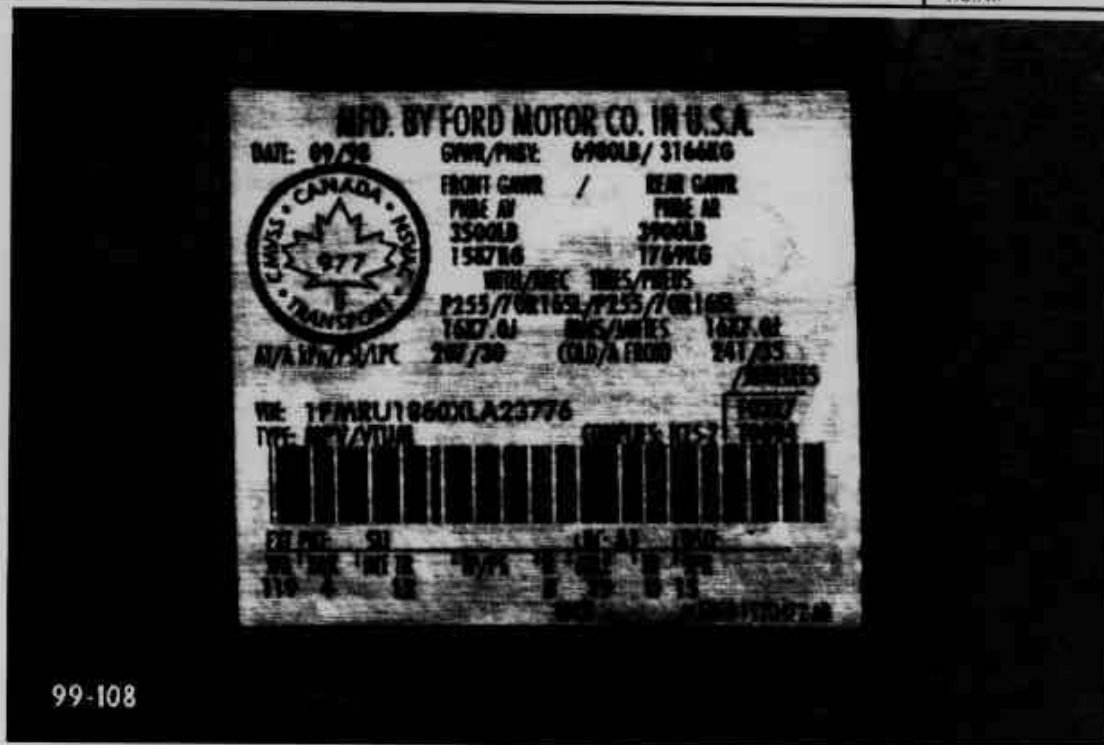


DASHBOARD / TABLEAU DE BORD MODULE STEERING WHEEL / VOLANT AIRBAG / COUSSIN GONFLABLE	PRE-TEST	POST-TEST	No. TC. : 99-108
	_____	_____	FORD EXPEDITION
	_____	_____	PASSENGER'S SIDE / COTE PASSAGER
	_____	_____	Project / Projet : 99-5001

APPENDICE / APPENDIX A

**PHOTOGRAPHIES DE L'ESSAI
TEST PHOTOGRAPHS**

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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1. Étiquette de déclaration de conformité du véhicule d'essai.
Statement of compliance label of the test vehicle.

Identique à la photo 1.
Same as picture 1.

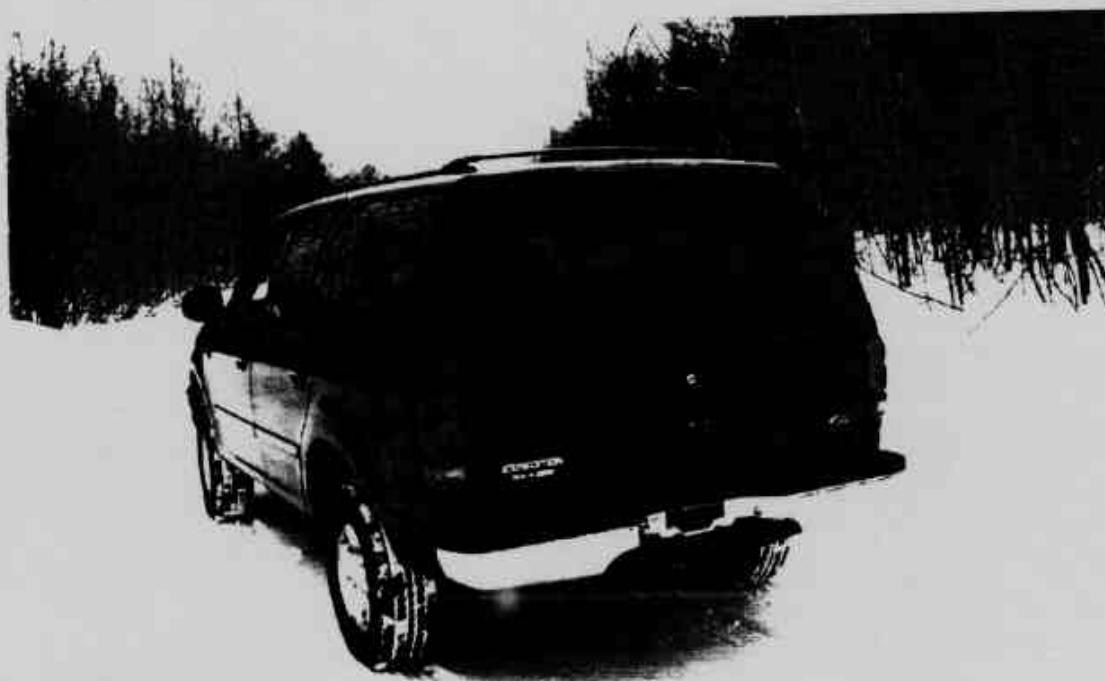
2. Étiquette d'information des pneus.
Tire information label.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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99-108

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



99-108

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

Date de collision Crash date:	1999-03-12	Véhicule Vehicle:	FORD EXPEDITION 1999	T.C. N° T.C. No.:	99-108
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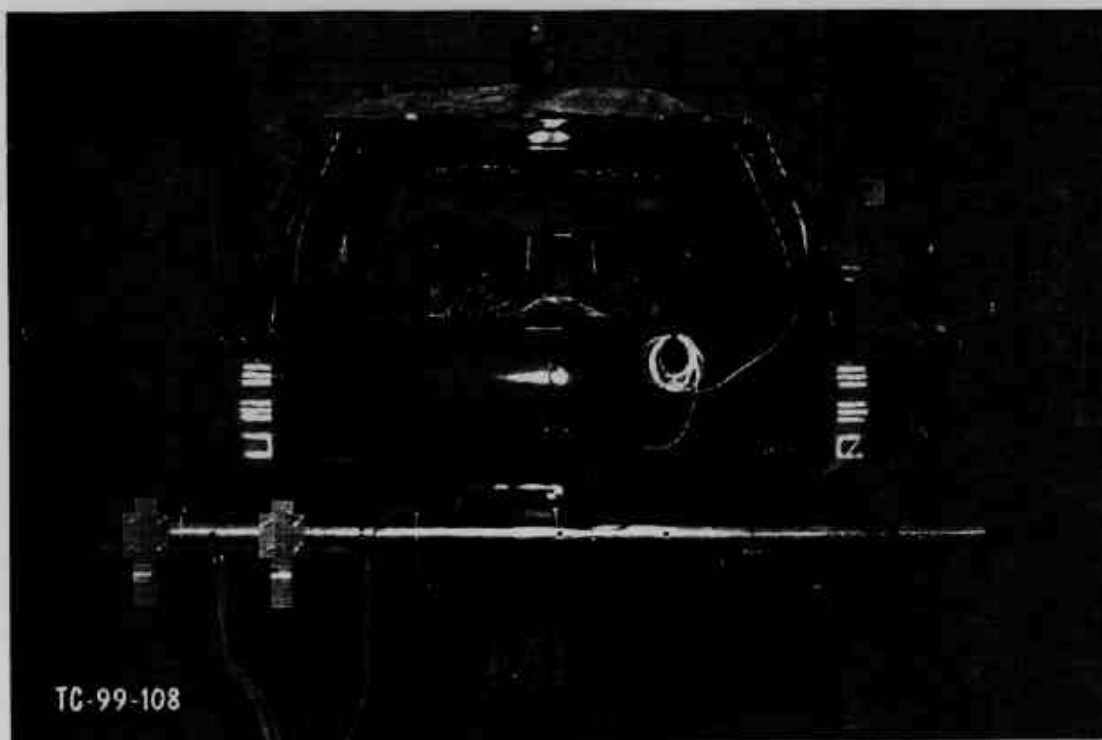


5. Vue générale côté gauche du véhicule d'essai, avant essai.
Left side view of the test vehicle, pre-test.

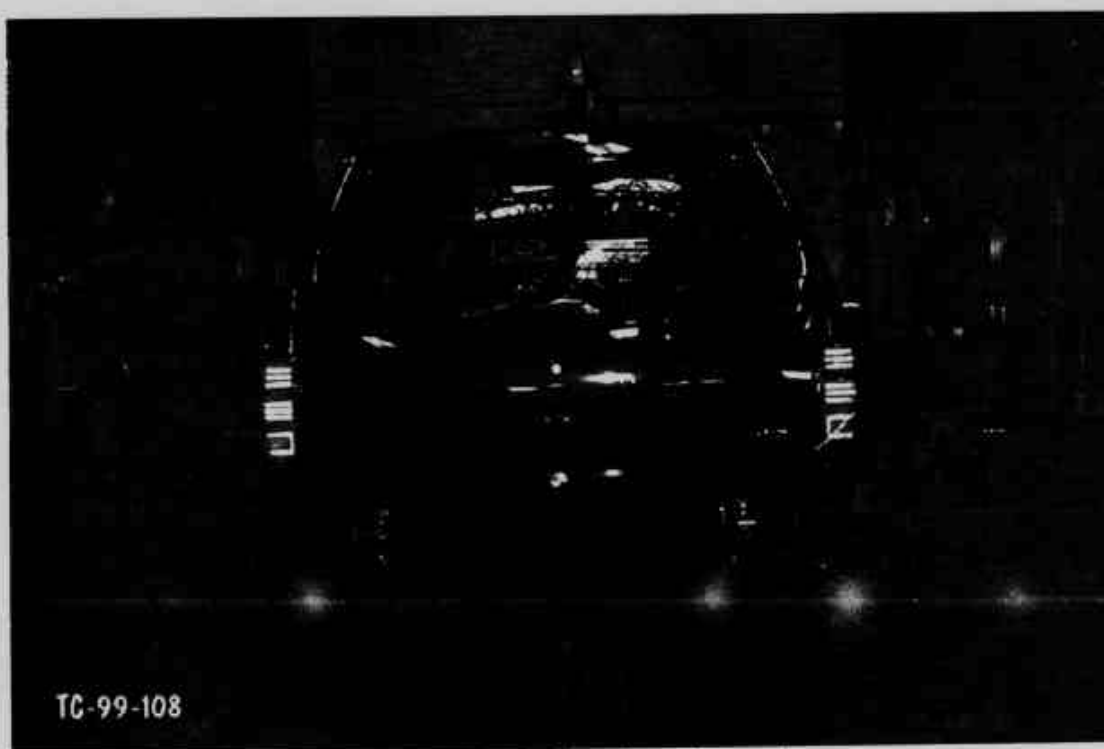


6. Vue générale côté gauche du véhicule d'essai, après essai.
Left side view of the test vehicle, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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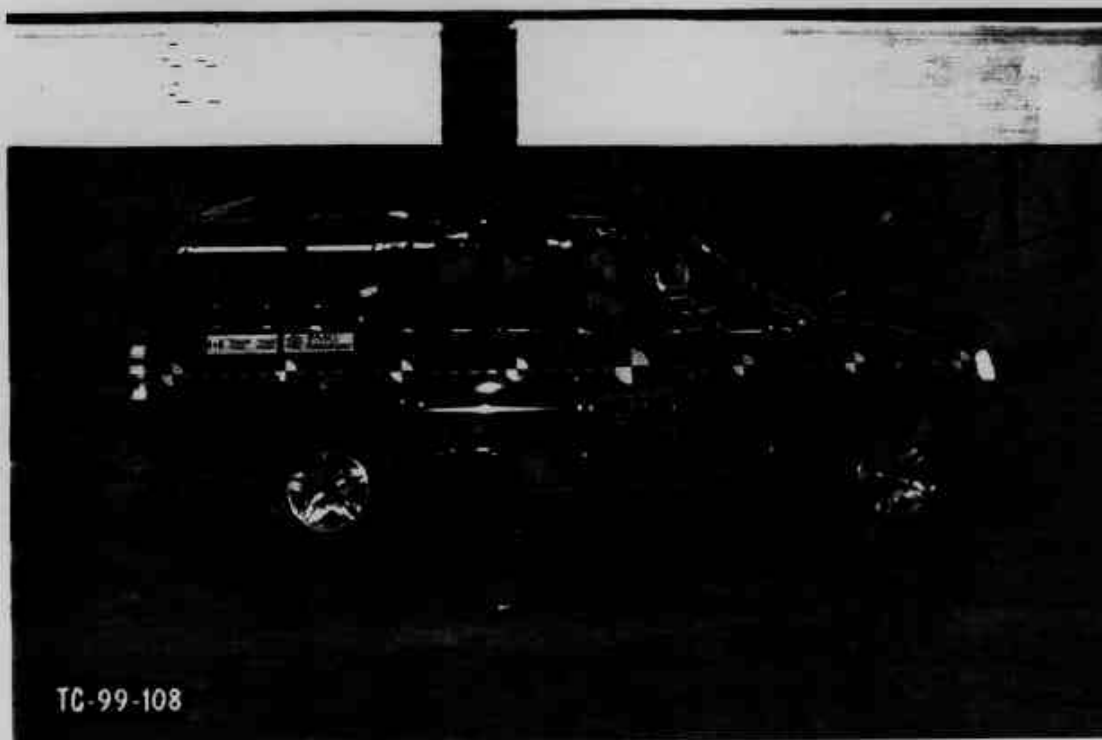


7. Vue arrière du véhicule d'essai, avant essai.
Rear view of the test vehicle, pre-test.

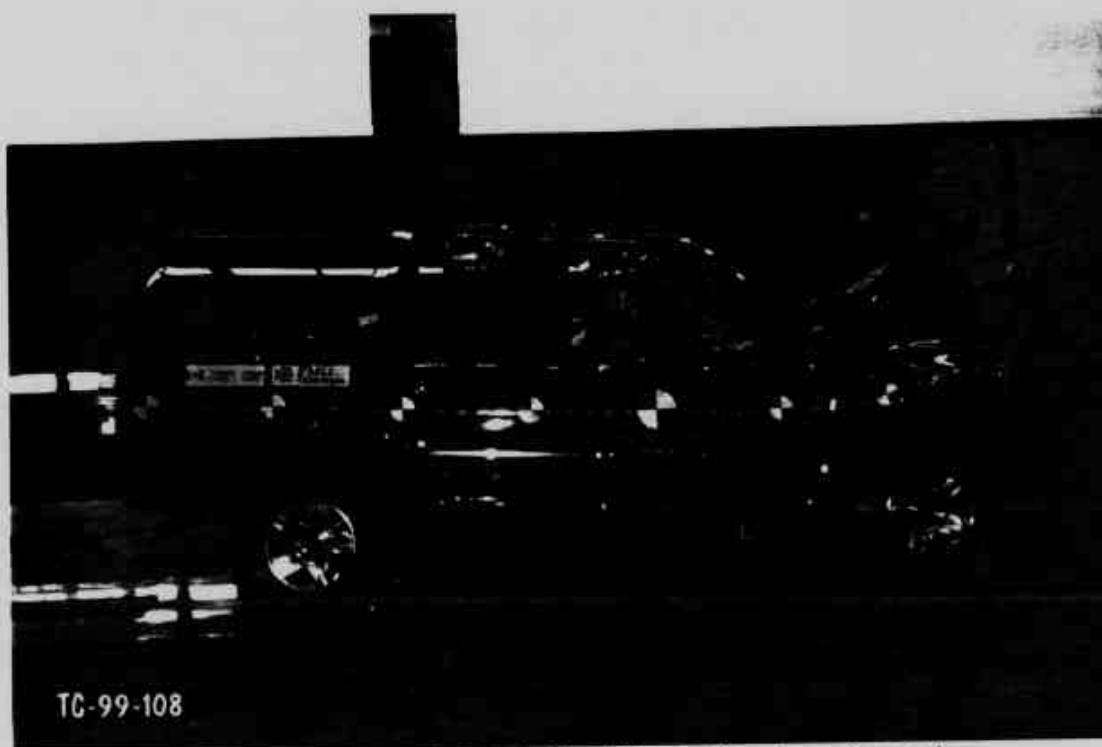


8. Vue arrière du véhicule d'essai, après essai.
Rear view of the test vehicle, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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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.

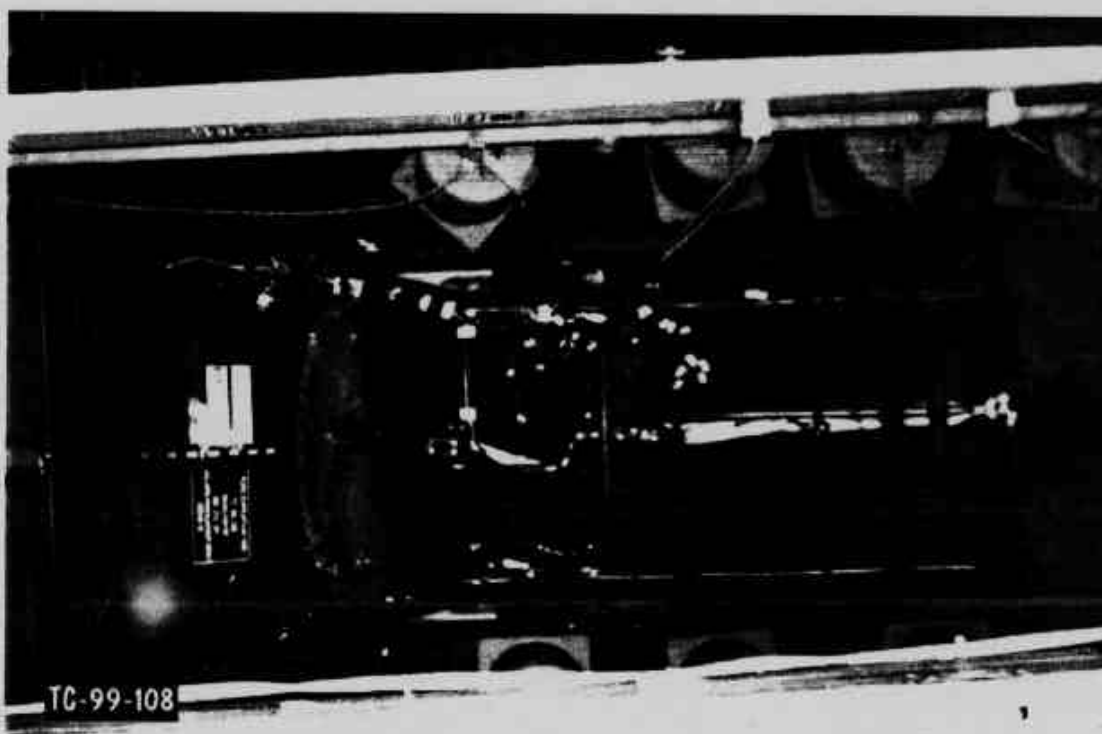


10. Vue générale côté droit du véhicule d'essai, après essai.
General right side view of the test vehicle, post-test.

Date de collision Crash date:	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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11. Vue de plan du véhicule d'essai, avant essai.
Over view of the test vehicle, pre-test.



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

Date de collision Crash date:	1999-03-12	Véhicule Vehicle:	FORD EXPEDITION 1999	T.C. N° T.C. No.:	99-108
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13. Vue avant du véhicule d'essai, avant essai.
Front view of the test vehicle, pre-test.



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

Date de collision
Crash date

1999-03-12

Véhicule
Vehicle

FORD EXPEDITION 1999

T.C. N°
T.C. No.

99-108

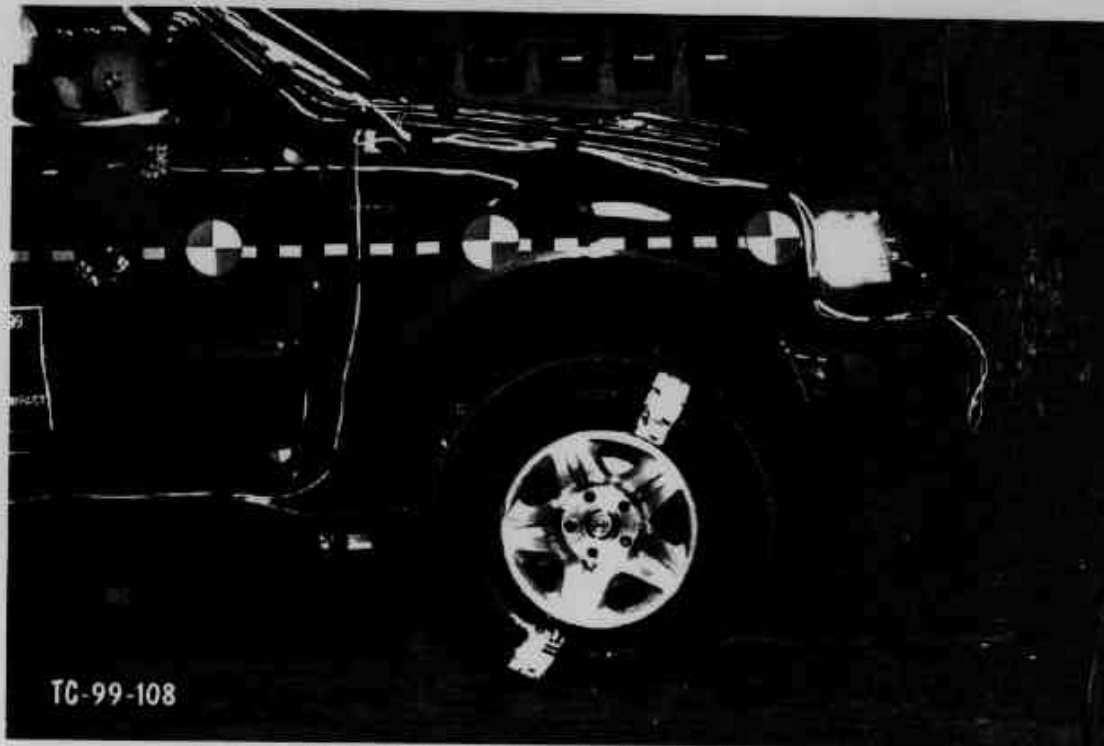


15. Vue côté gauche de l'avant du véhicule d'essai, avant essai.
Left side view of front of test vehicle, pre-test.



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

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C. No	99-108
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17. Vue côté droit de l'avant du véhicule d'essai, avant essai.
Right side view of front of test vehicle, pre-test.

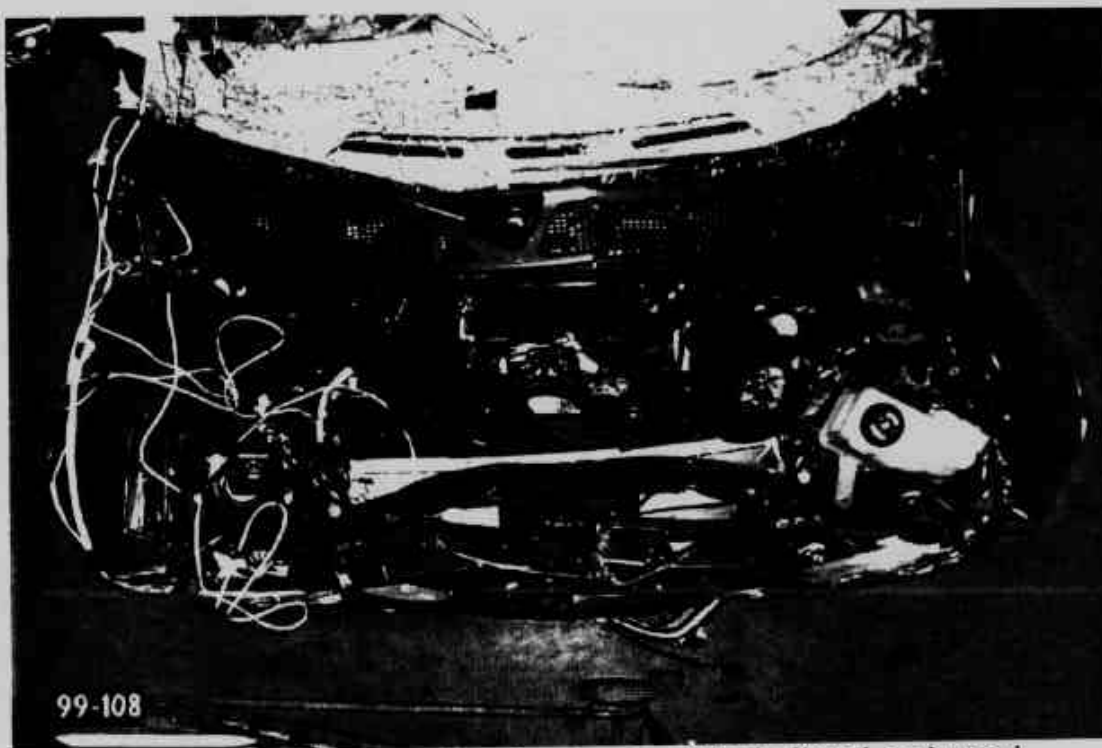


18. Vue côté droit de l'avant du véhicule d'essai, après essai.
Right side view of front of test vehicle, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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19. Vue du compartiment moteur du véhicule d'essai, avant essai.
Engine compartment view of the test vehicle, pre-test.

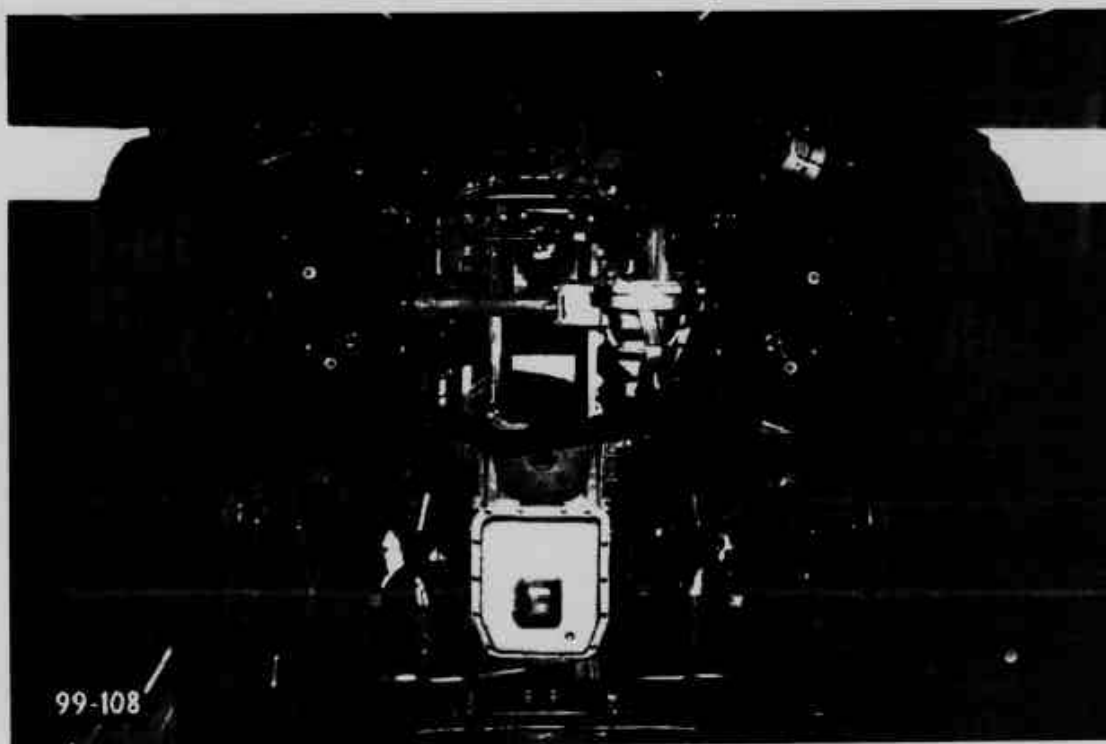


20. Vue du compartiment moteur du véhicule d'essai, après essai.
Engine compartment view of the test vehicle, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C. No	99-108
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21. Vue du dessous du compartiment moteur, avant essai.
Front underbody view of the test vehicle, pre-test.



22. Vue du dessous du compartiment moteur, après essai.
Front underbody view of the test vehicle, post-test.

Date de collision Crash date:	1999-03-12	Véhicule Vehicle:	FORD EXPEDITION 1999	T.C. N° T.C. No:	99-108
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23. Position du conducteur, avant essai.
Driver's position, pre-test.



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

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C.N. T.C.No	99-108
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25. Point de contact de tête du conducteur, après essai.
Driver's head contact point, post-test.



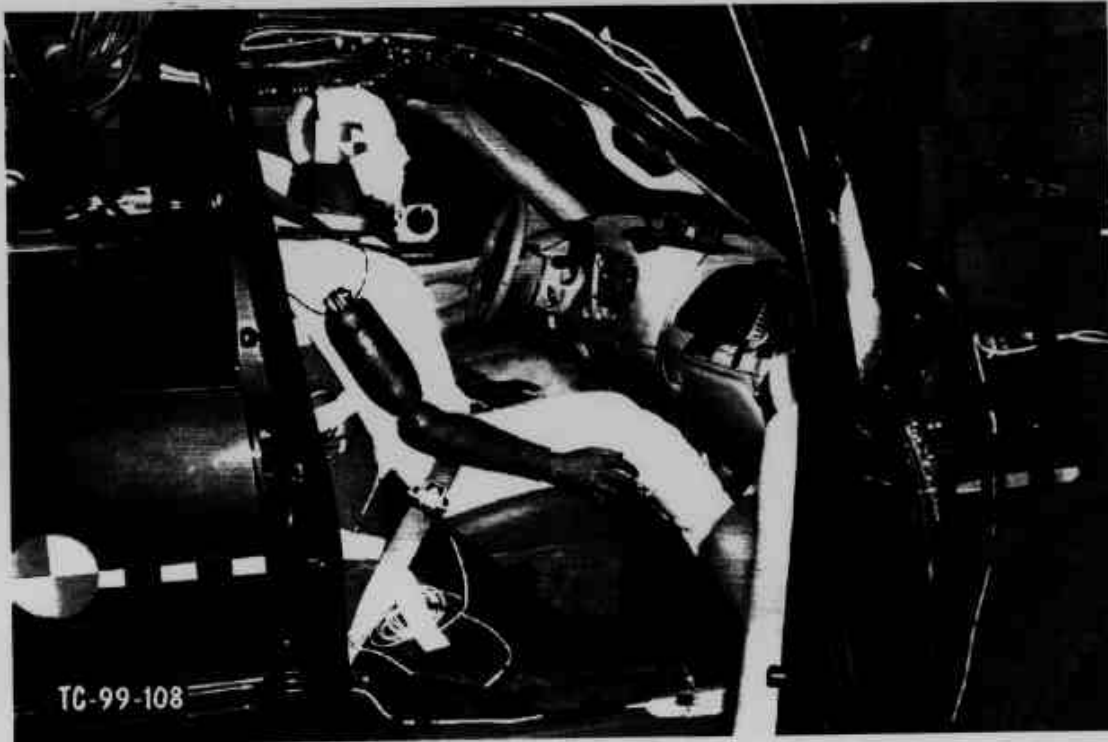
26. Point de contact de tête du conducteur, après essai.
Driver's head contact point, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No.	99-108
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27. Points de contact, genoux du conducteur, après essai.
Driver's knee contact points, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C. No.	99-108
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28. Position du passager, avant essai.
Passenger's position, pre-test.

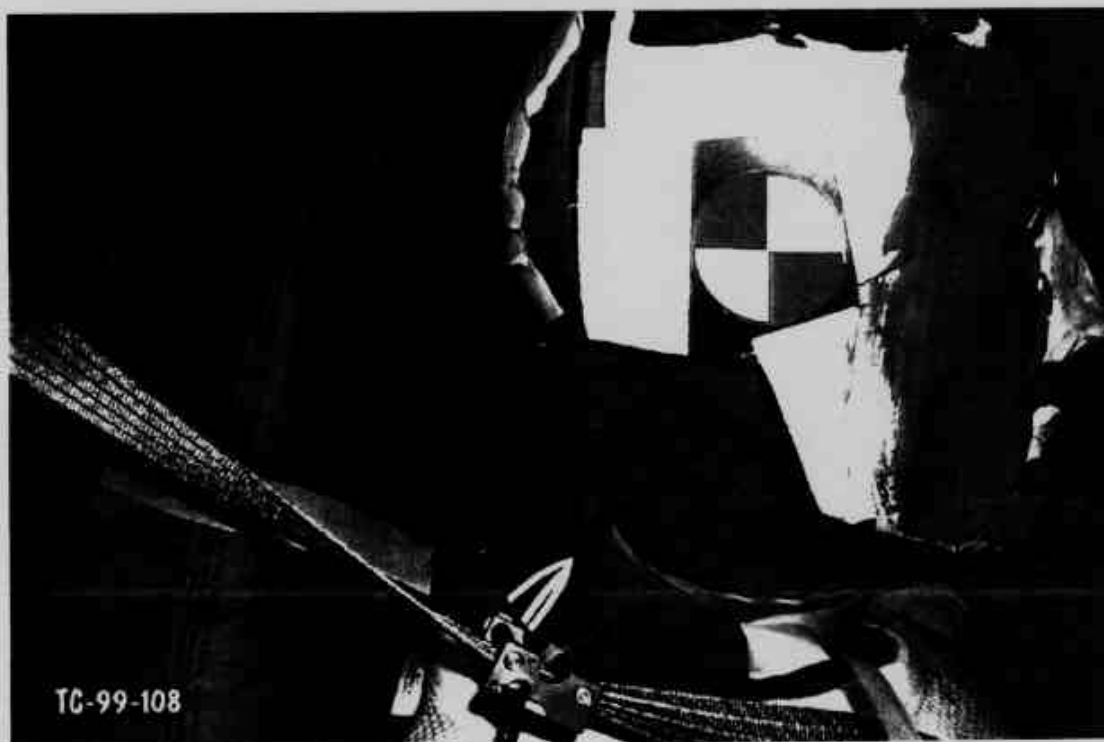


29. Position du passager, après essai.
Passenger's position, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C. No	99-108
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30. Point de contact de tête du passager, après essai.
Passenger's head contact point, post-test.



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

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C. No	99-108
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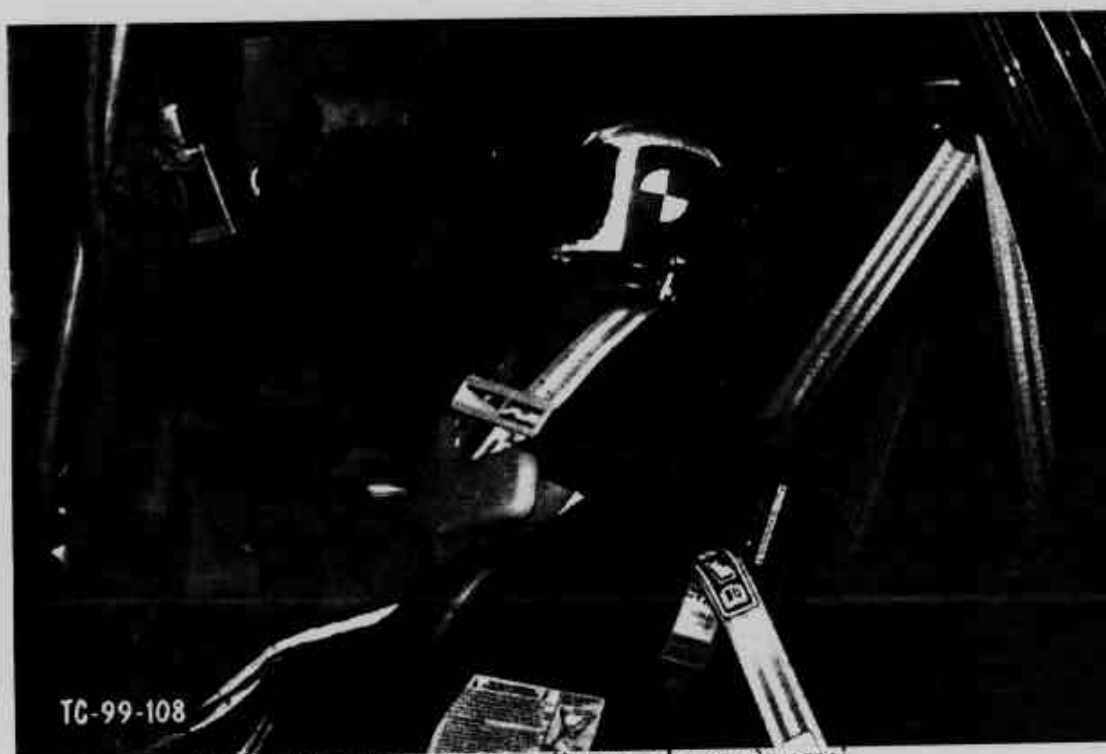


32. Points de contact, genoux du passager, après essai.
Passenger's knee contact points, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C.N. T.C.No.	99-108
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33. Position du passager arrière gauche, avant essai.
Left rear passenger's position, pre-test.



34. Position du passager arrière gauche, après essai.
Left rear passenger's position, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C.N. T.C.No.	99-108
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35. Position du passager arrière droit, avant essai.
Right rear passenger's position, pre-test.



36. Position du passager arrière droit, après essai.
Right rear passenger's position, post-test.

Date de collision Crash date	1999-03-12	Véhicule Vehicle	FORD EXPEDITION 1999	T.C. N° T.C.No	99-108
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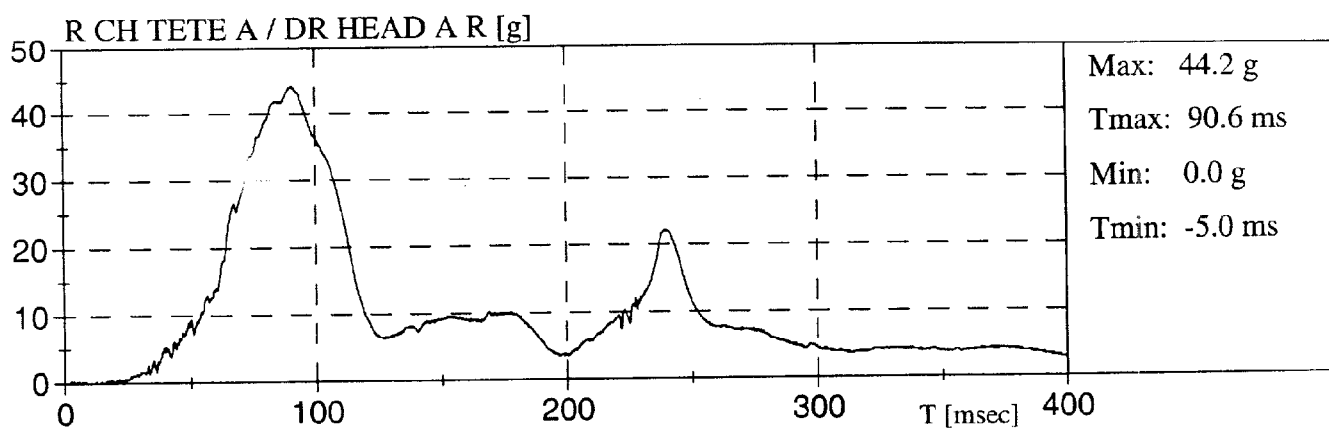
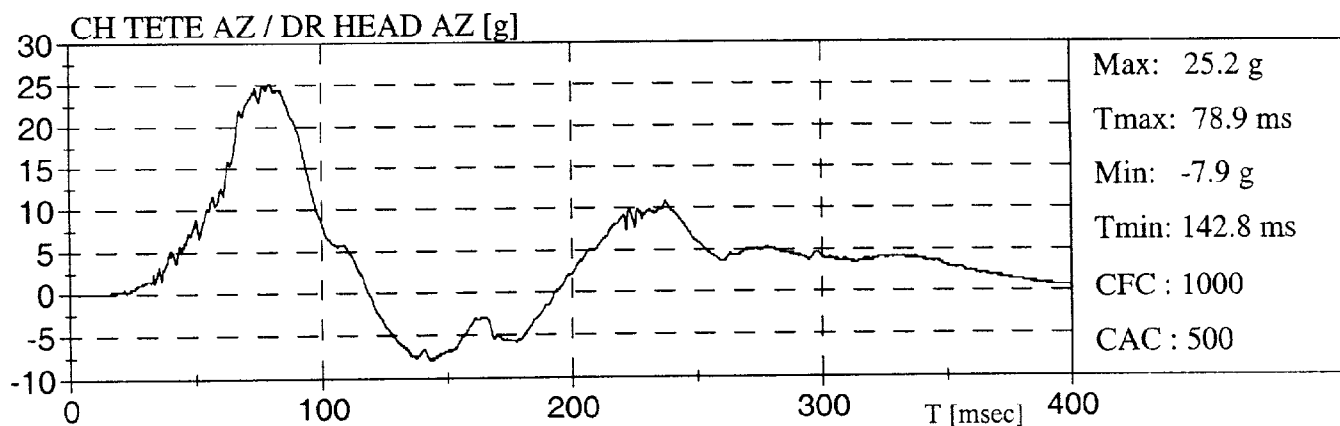
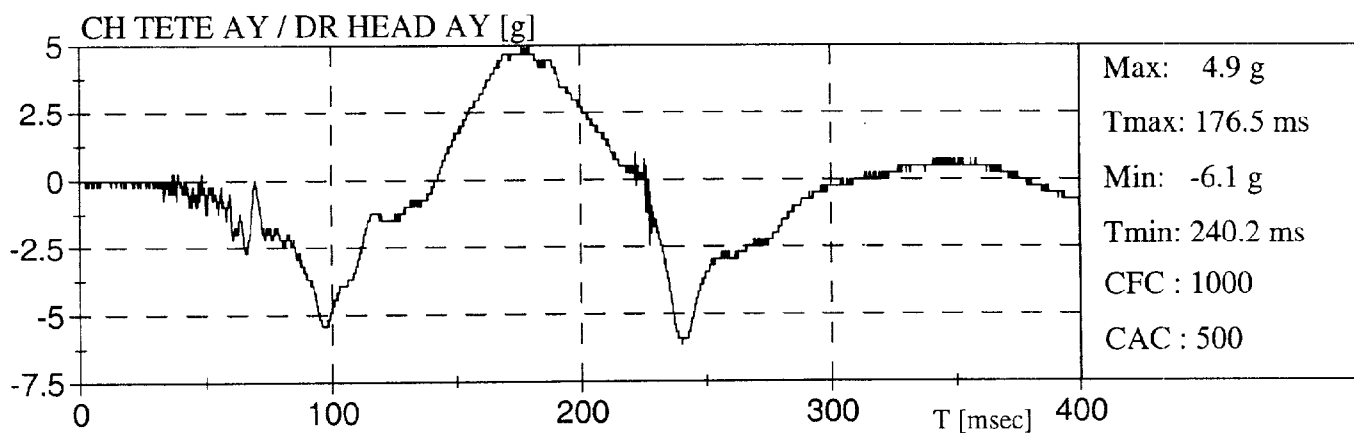
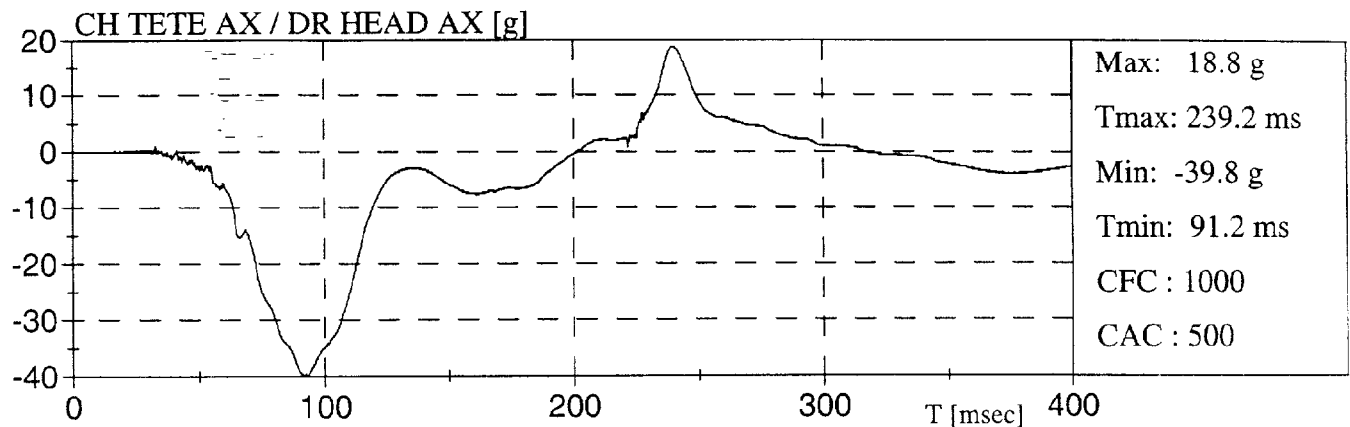
37. Affichage du lecteur de vitesse.
Speed trap reading.

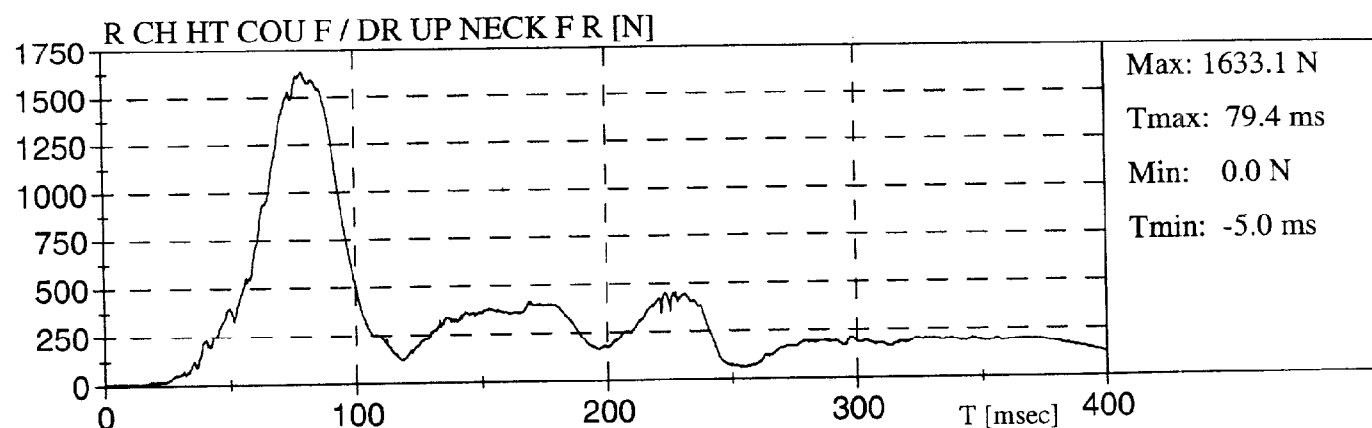
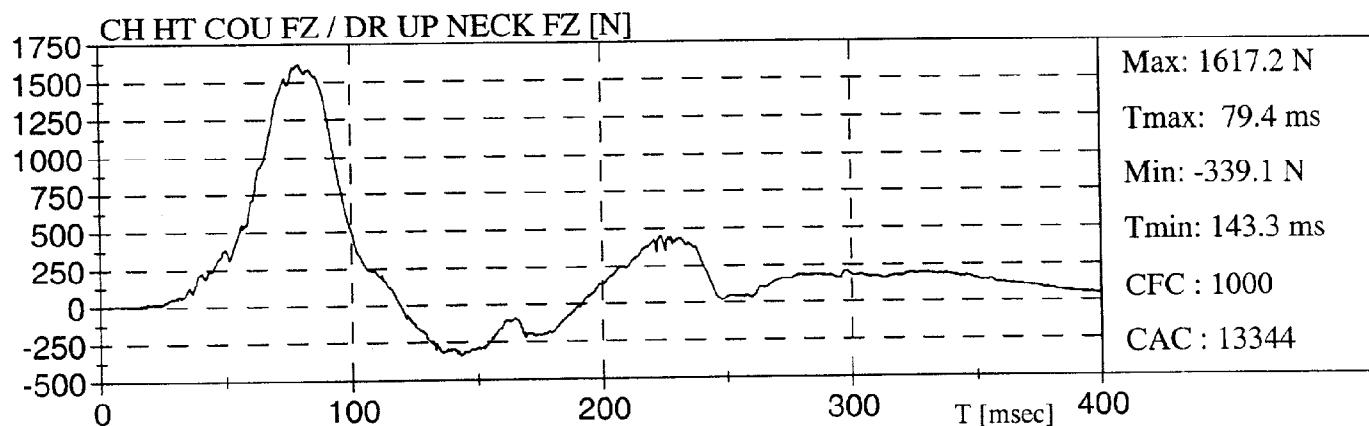
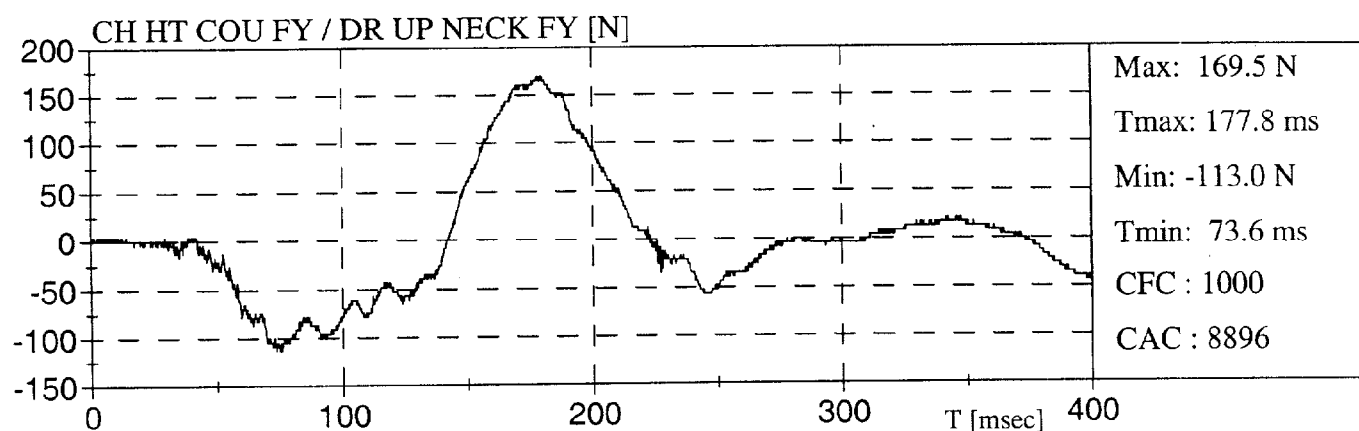
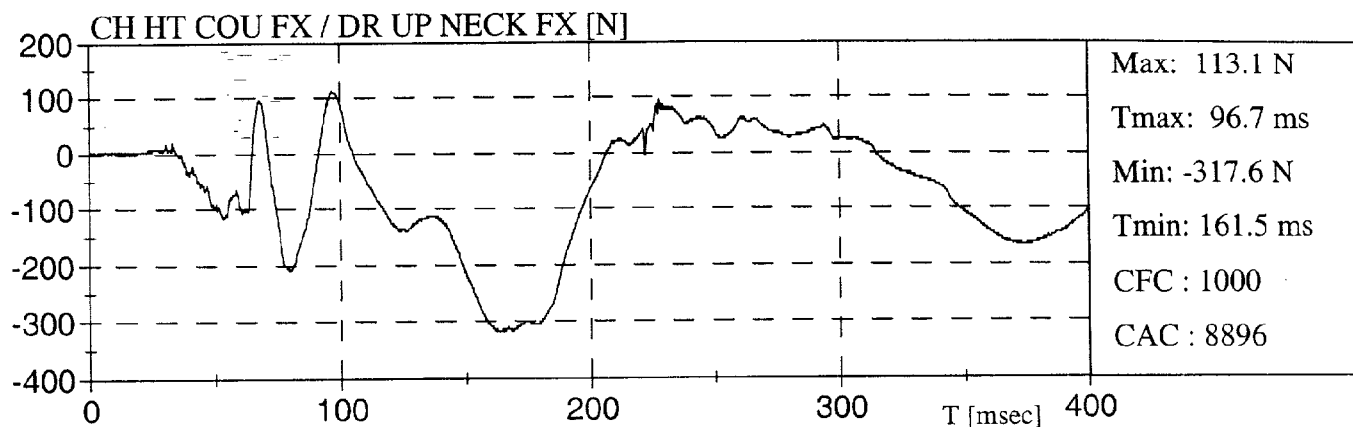
Table 1
Table 2
Table 3

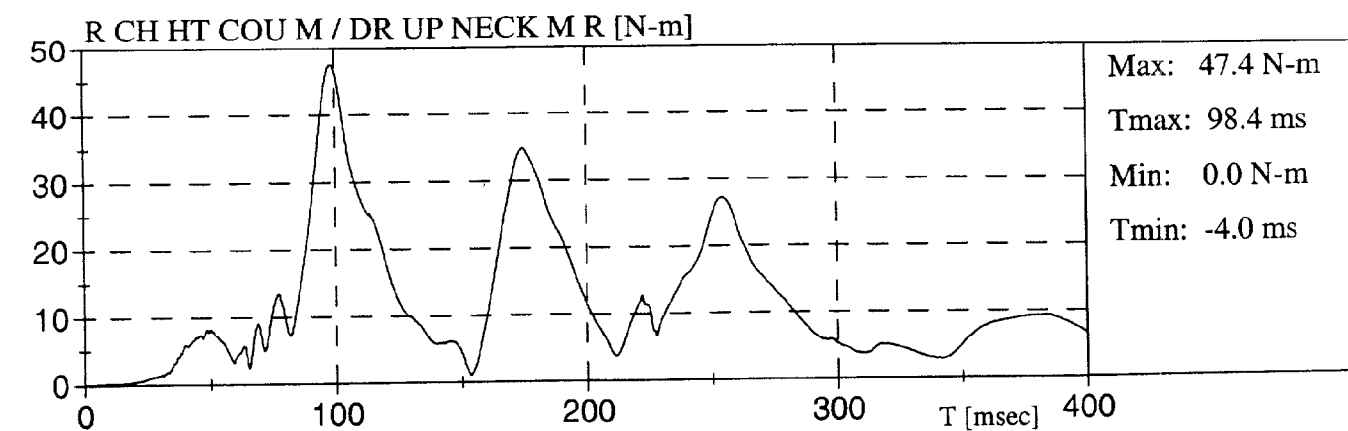
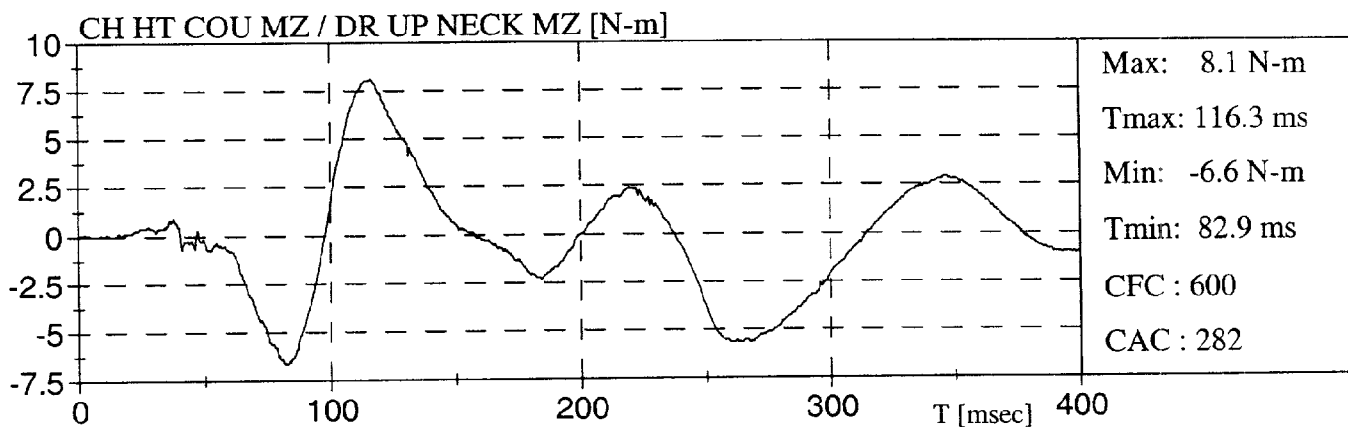
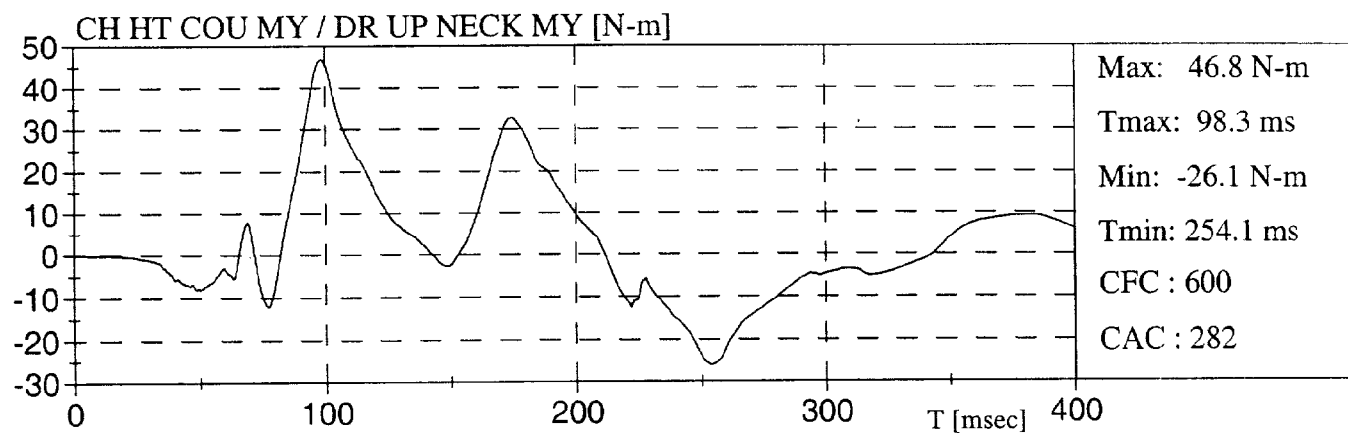
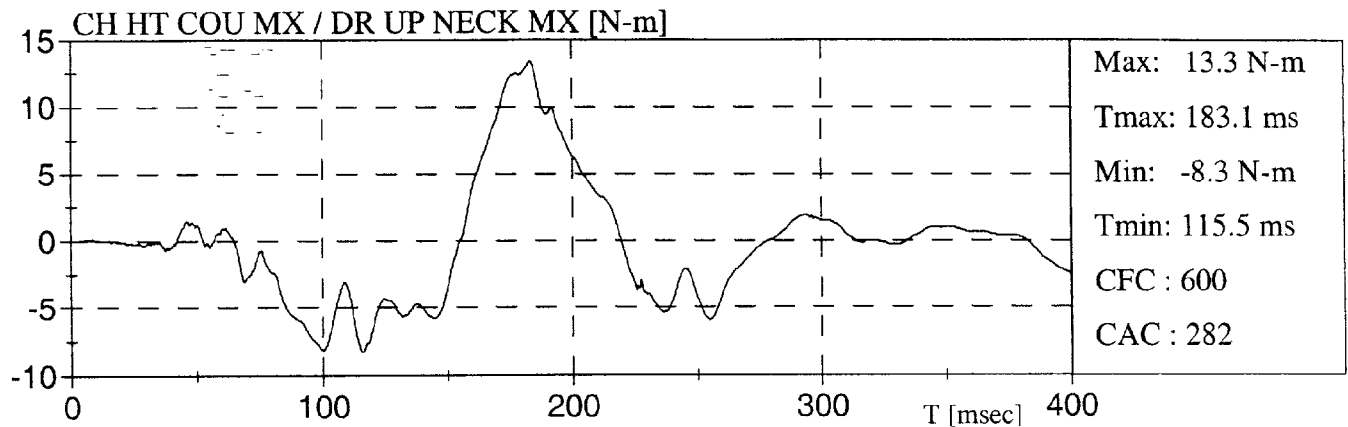
APPENDICE / APPENDIX B

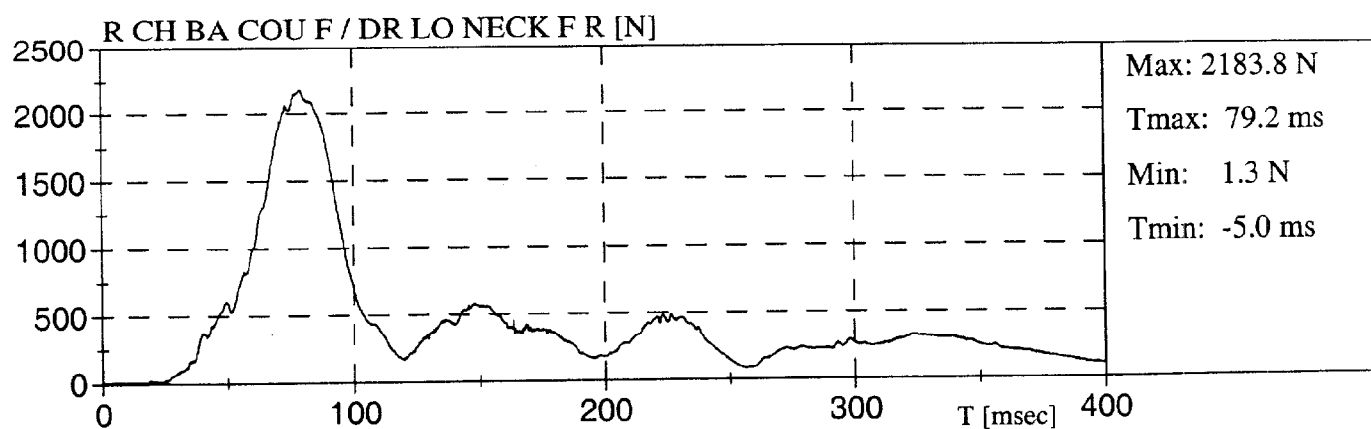
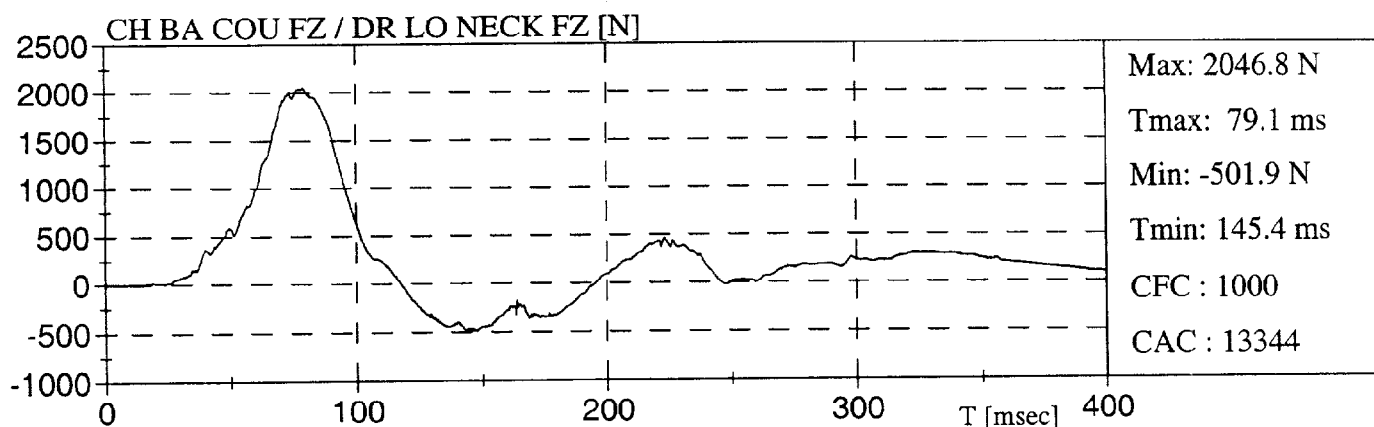
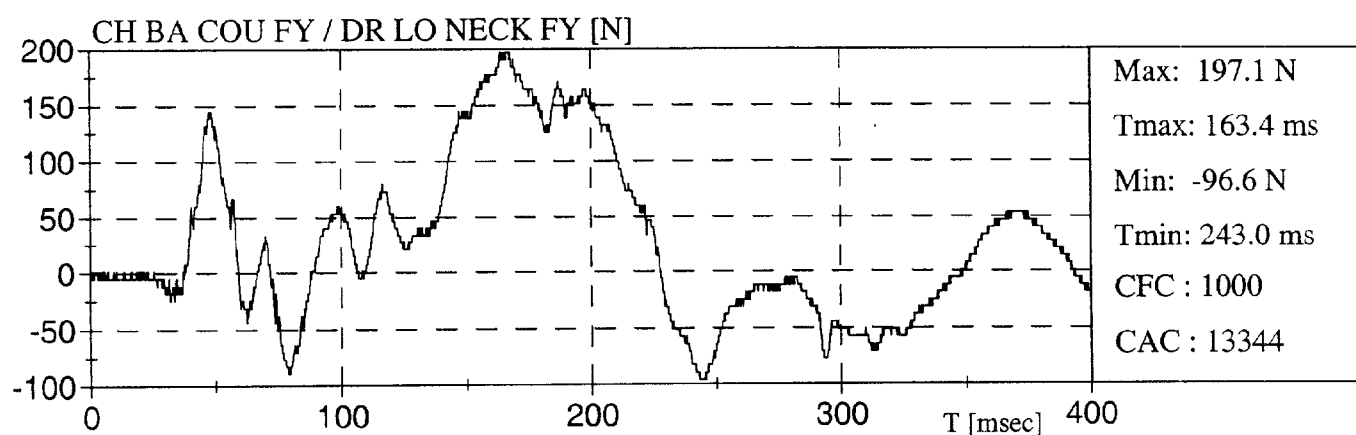
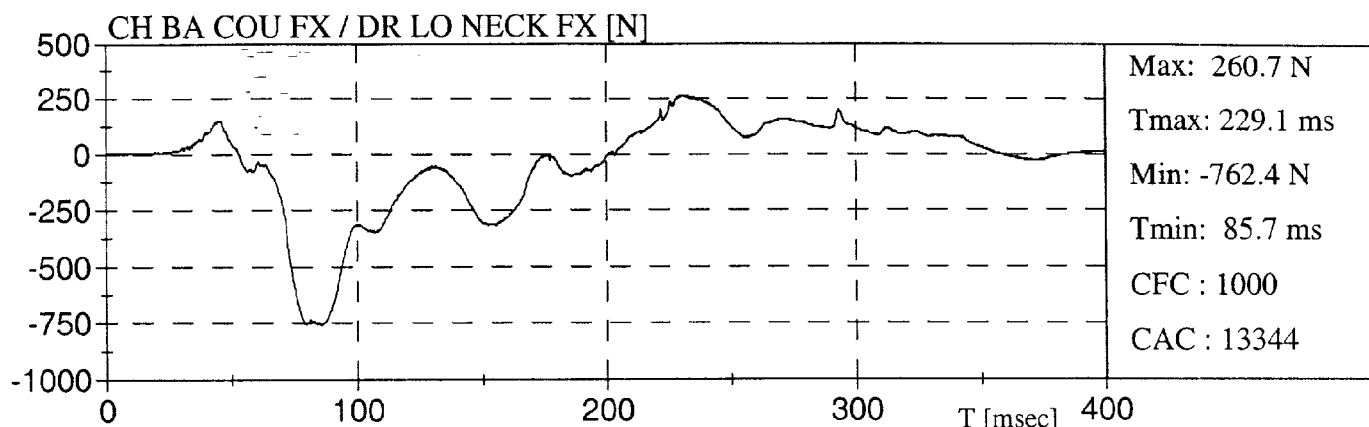
DONNÉES GRAPHIQUES GRAPHICAL DATA

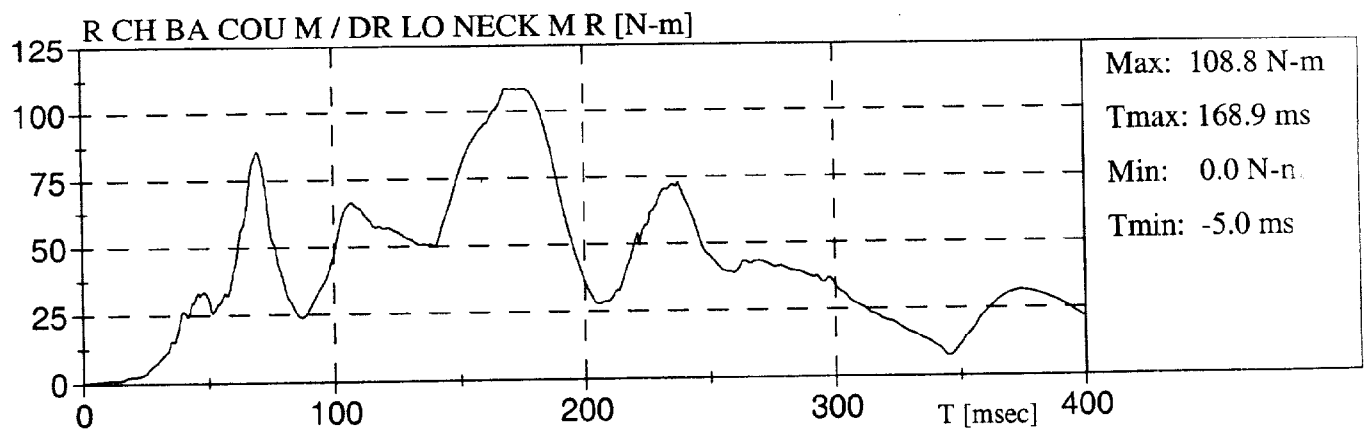
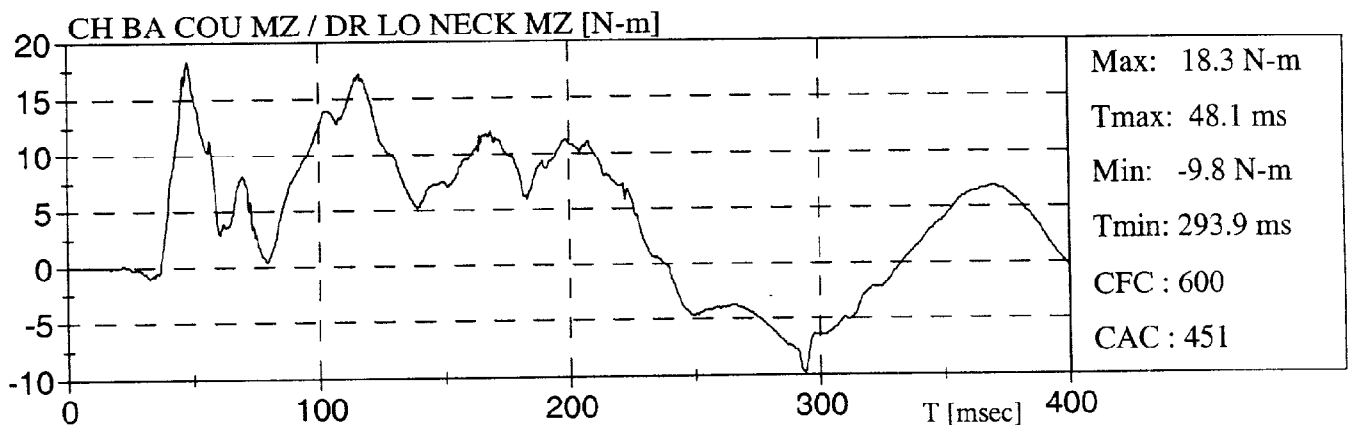
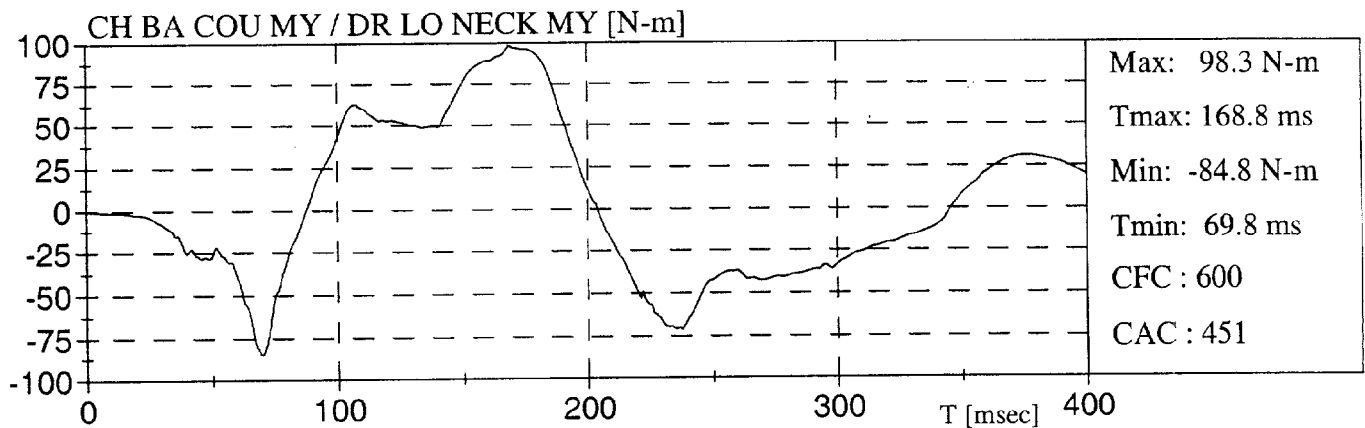
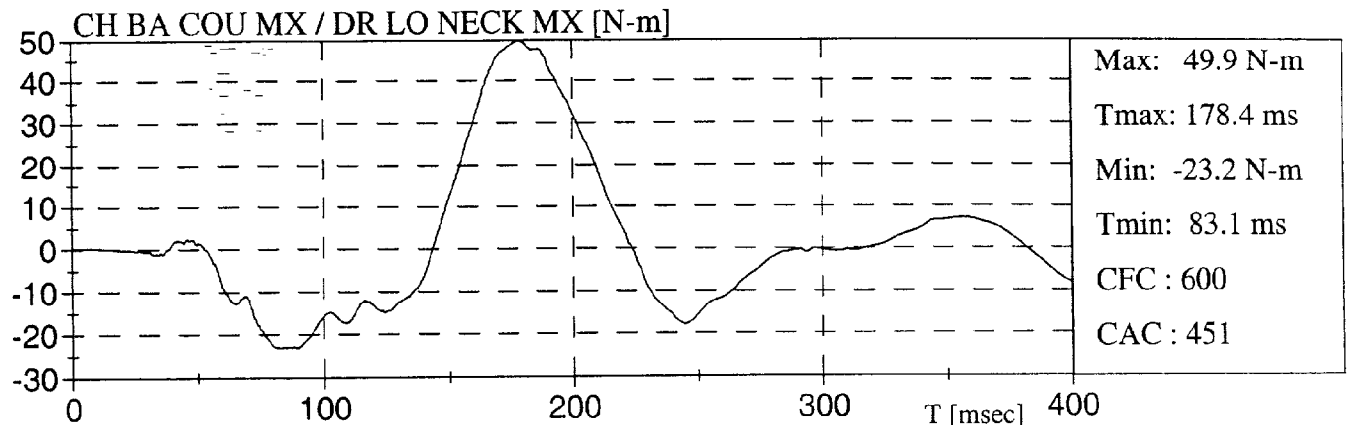
Nom du client Client Name	TRANSPORTS CANADA
Type de véhicule Type of Vehicle	FORD EXPEDITION 99
Numéro de TC Tc Number	TC99-108
Numéro de contrat Contract No	99-5001
Acquisition de données selon Data Acquisition according to	SAE J211/1 MAR 95
Date de l'essai Test date	1999-03-12
Titre du projet Project Title	NSVAC 208 PROTECTION DE L'OCCUPANT EN COLLISION CMVSS 208 OCCUPANT CRASH PROTECTION
MANNEQUIN / DUMMY	
Chauffeur Driver	HYBRID III 50 % M
Passager Passenger	HYBRID III 50 % M
Passager 1 (arrière gauche) Passenger 1 (rear left)	HYBRID III 18M
Passager 2 (arrière droit) Passenger 2 (rear right)	HYBRID III 3Y

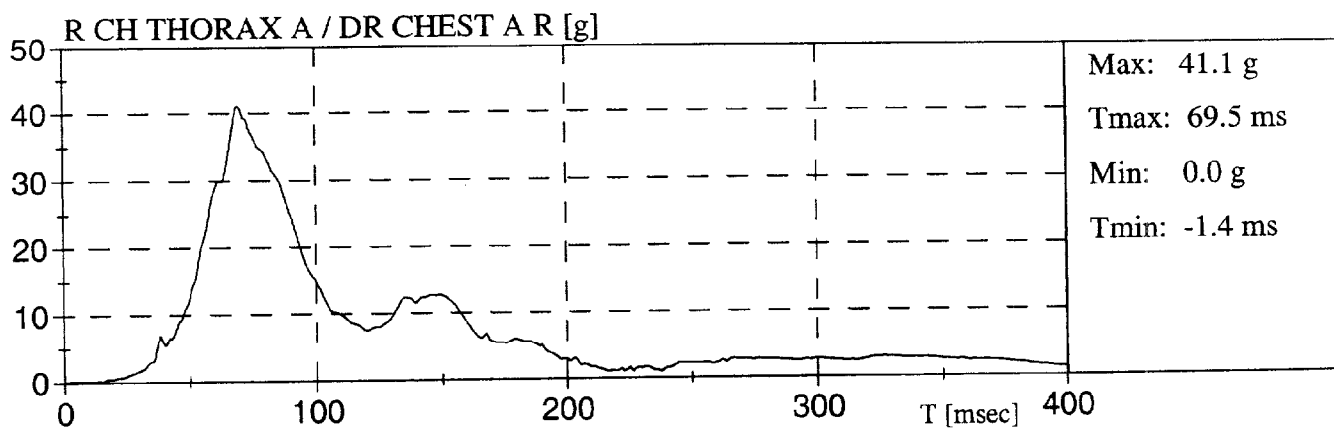
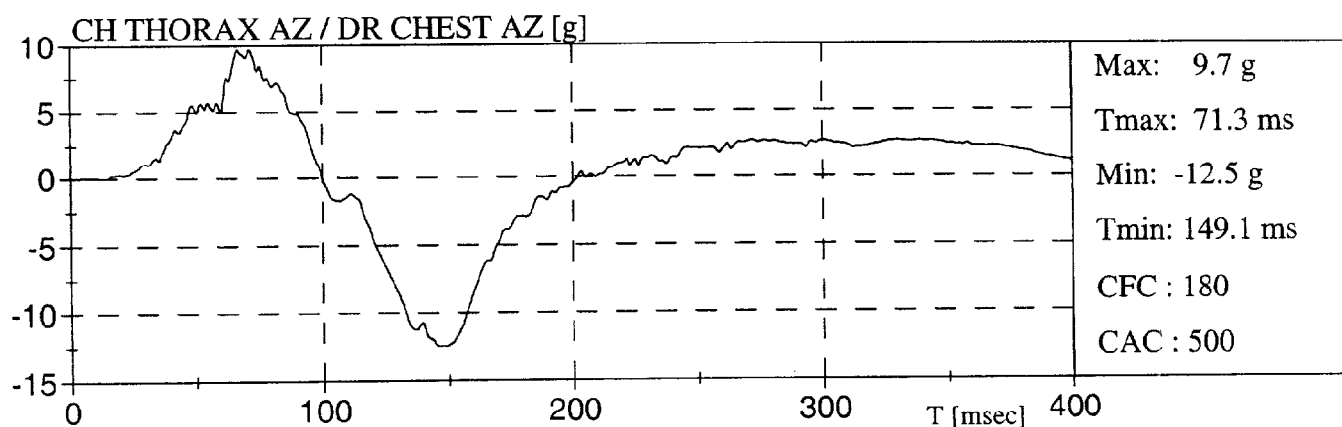
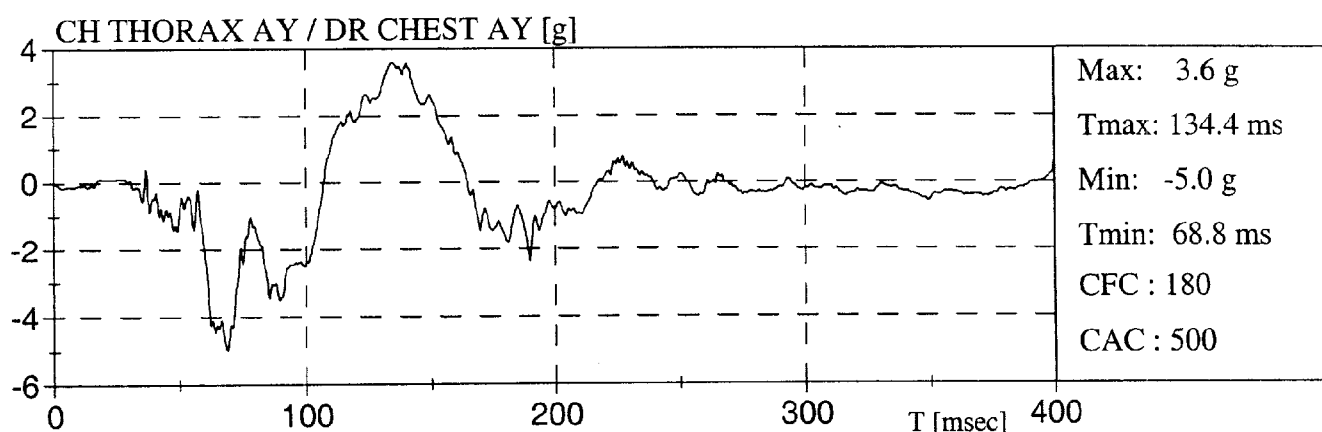
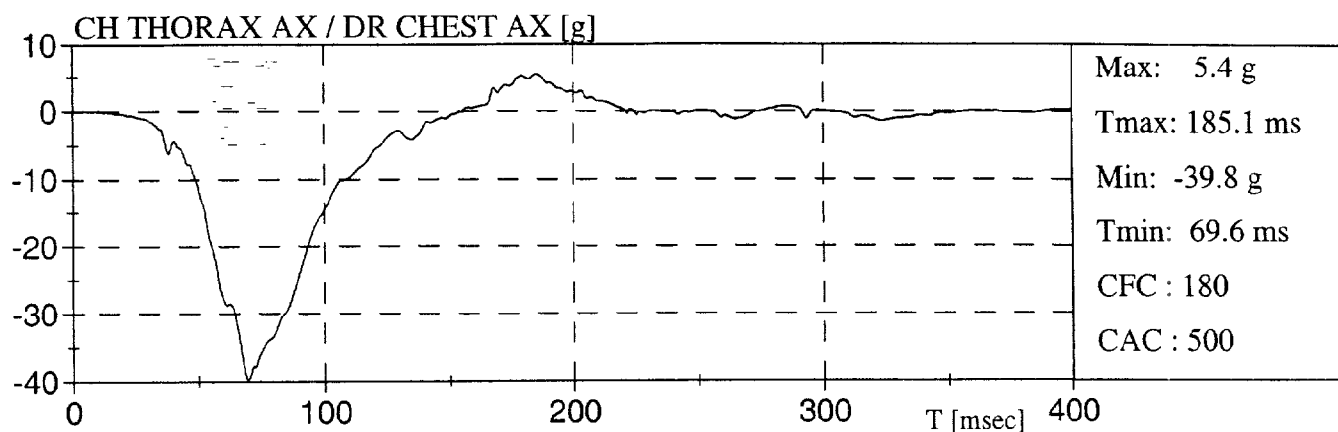


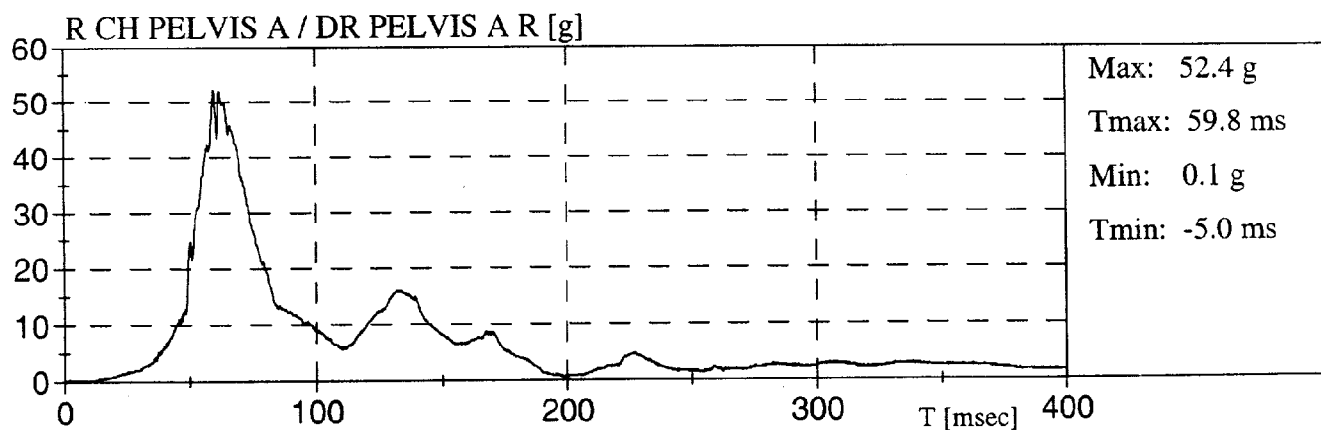
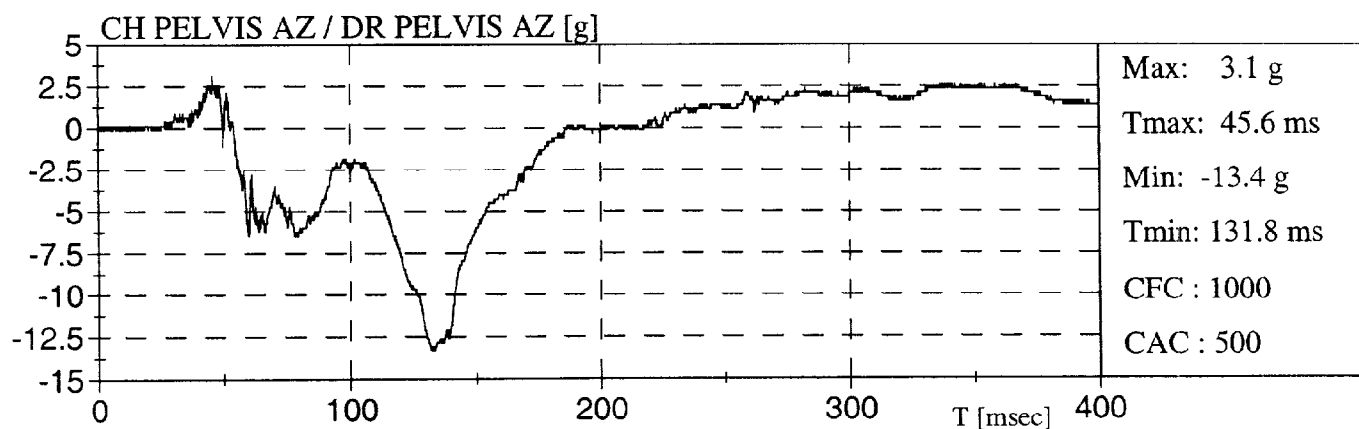
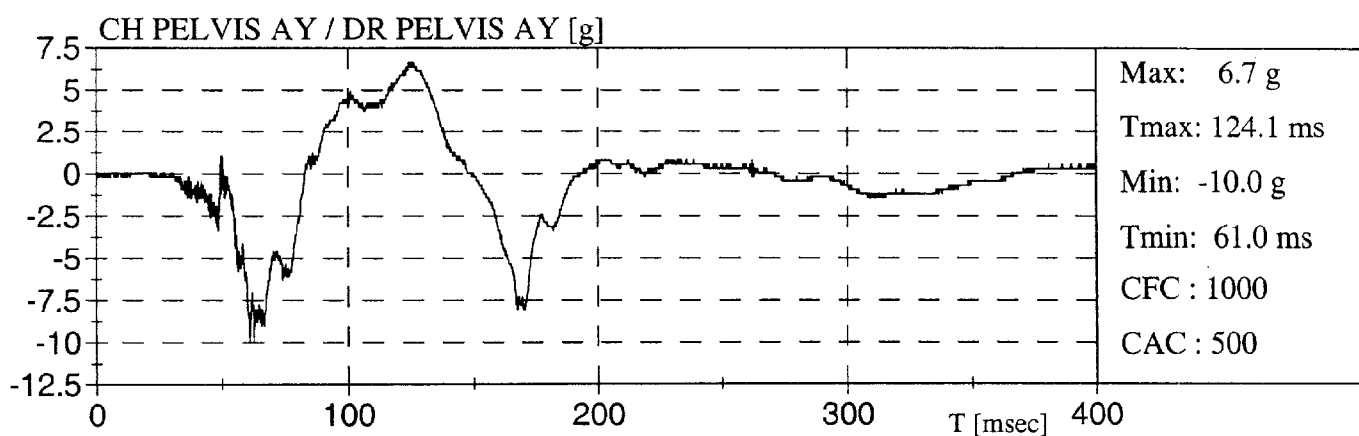
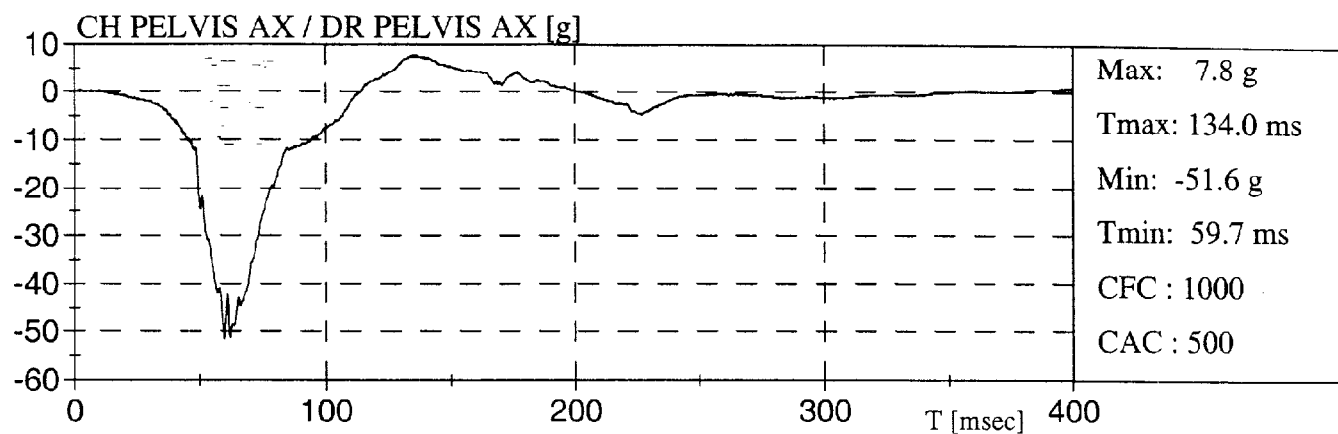


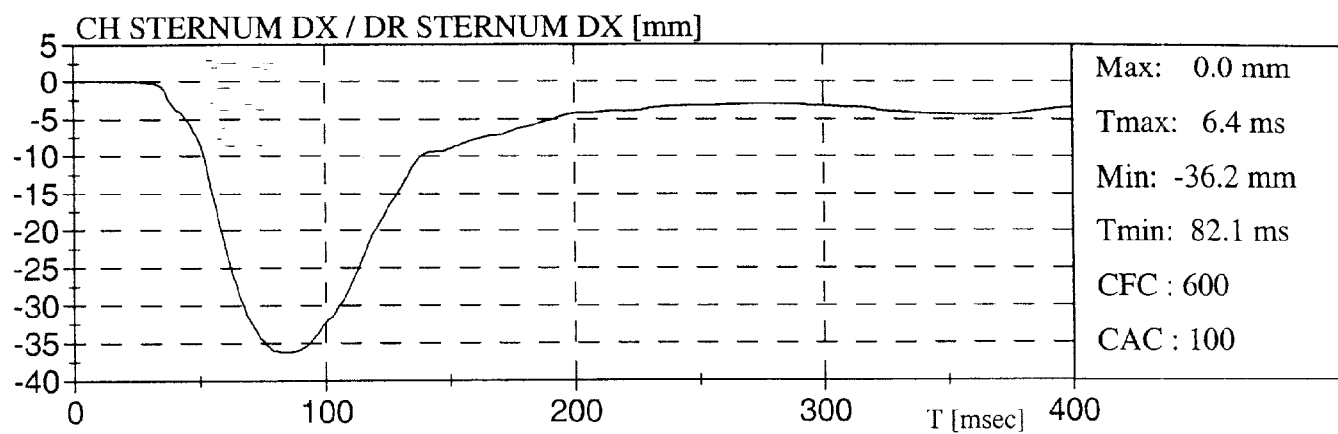


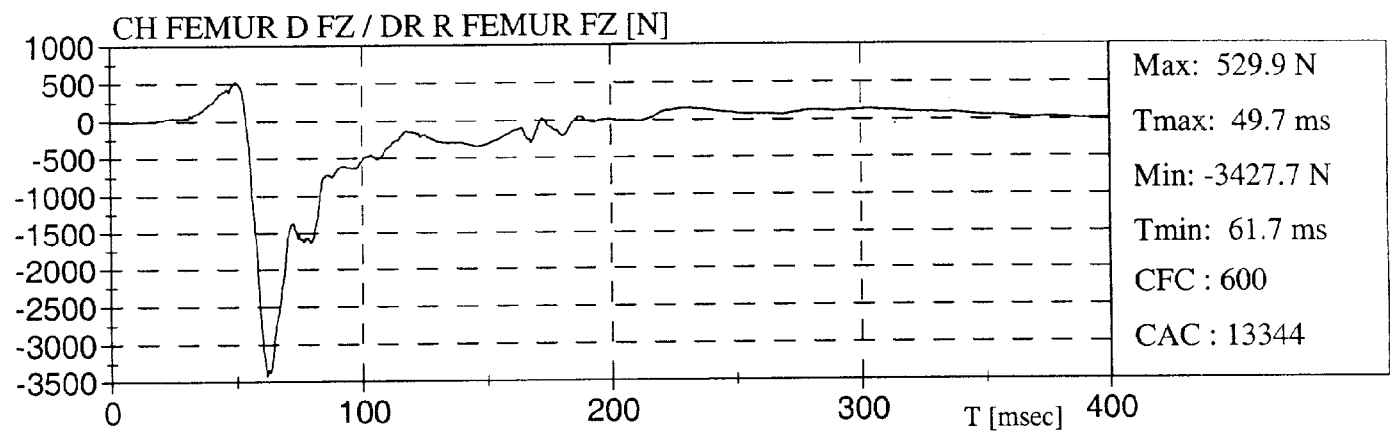
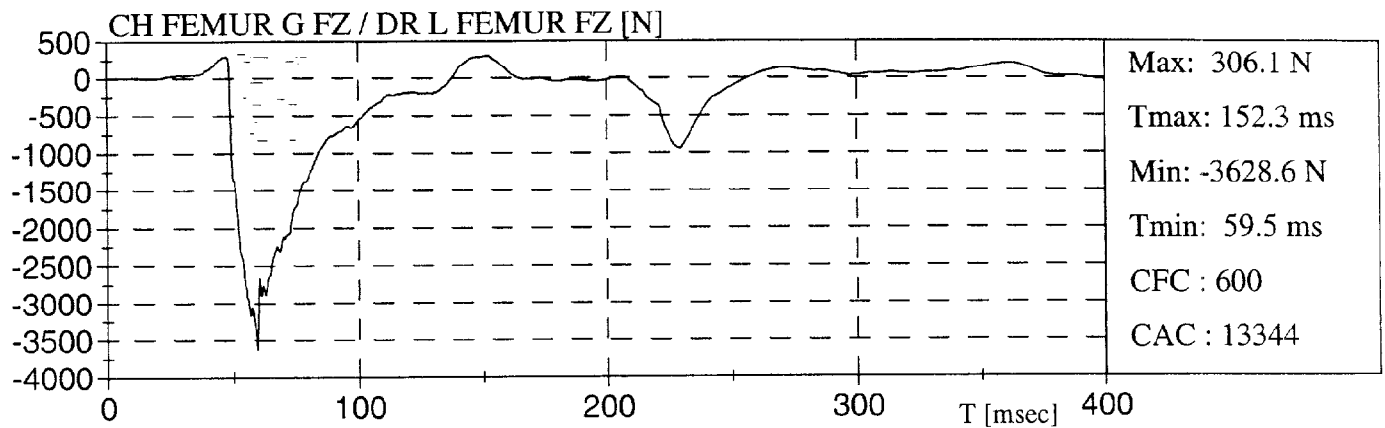


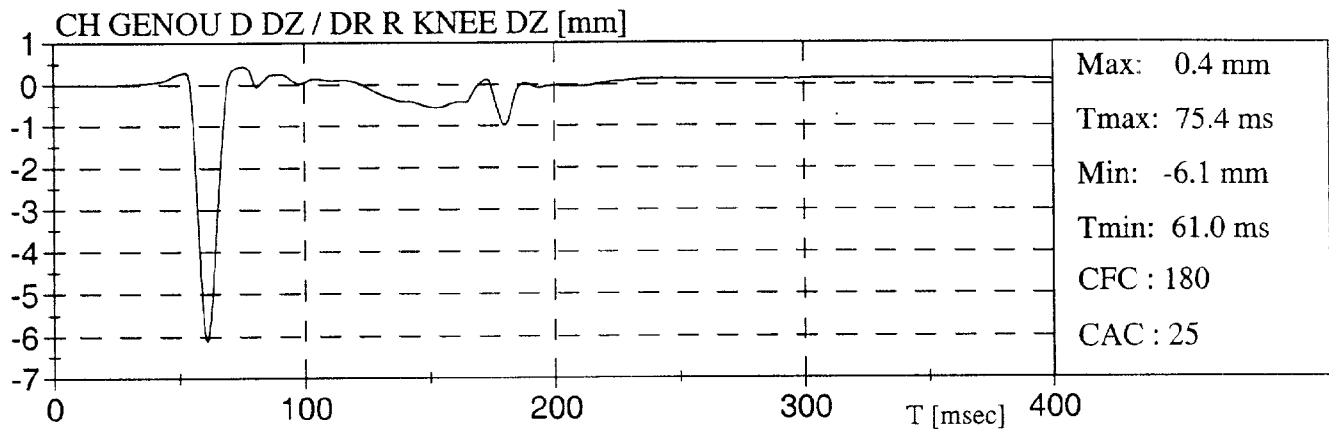
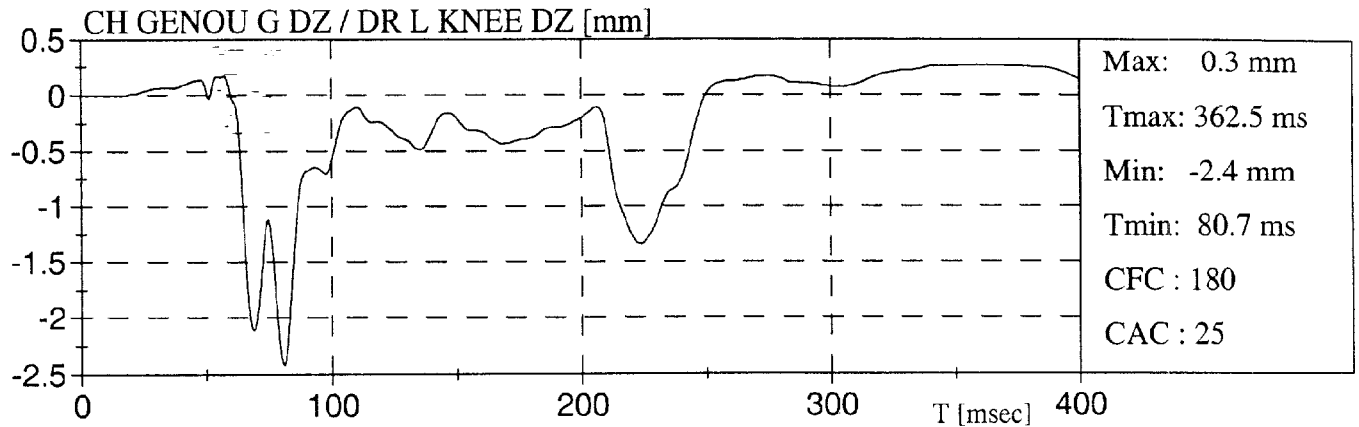


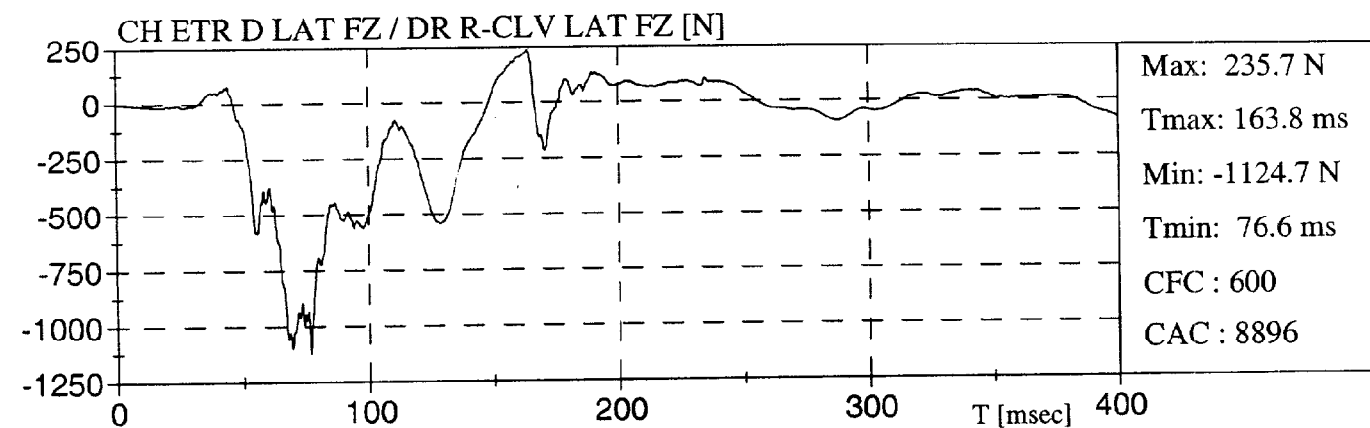
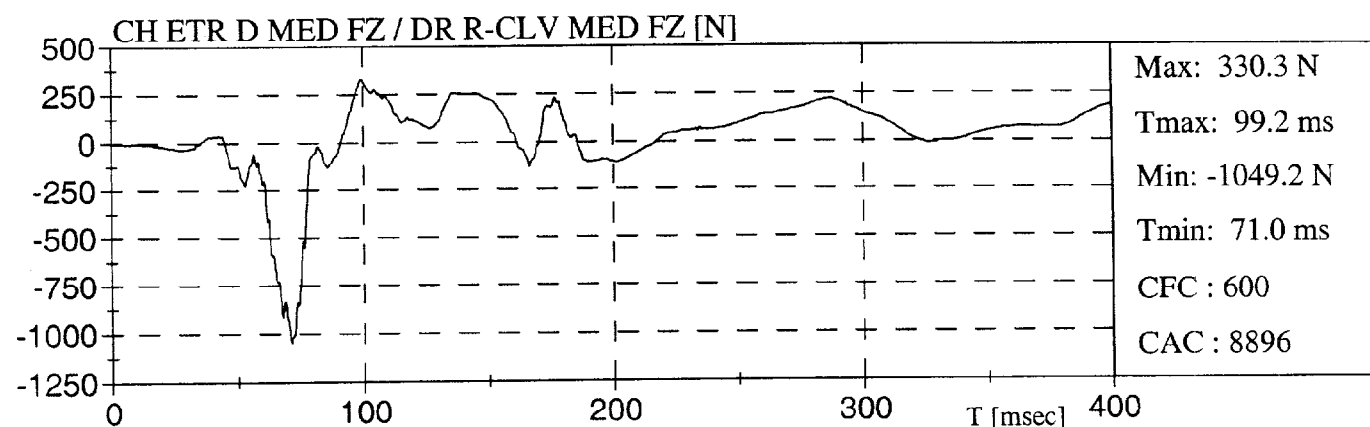
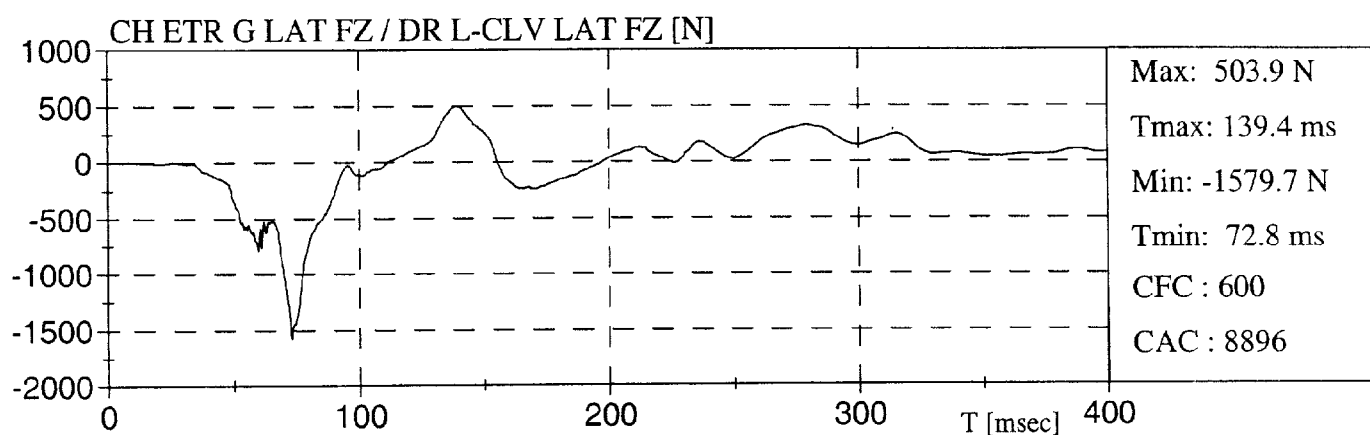
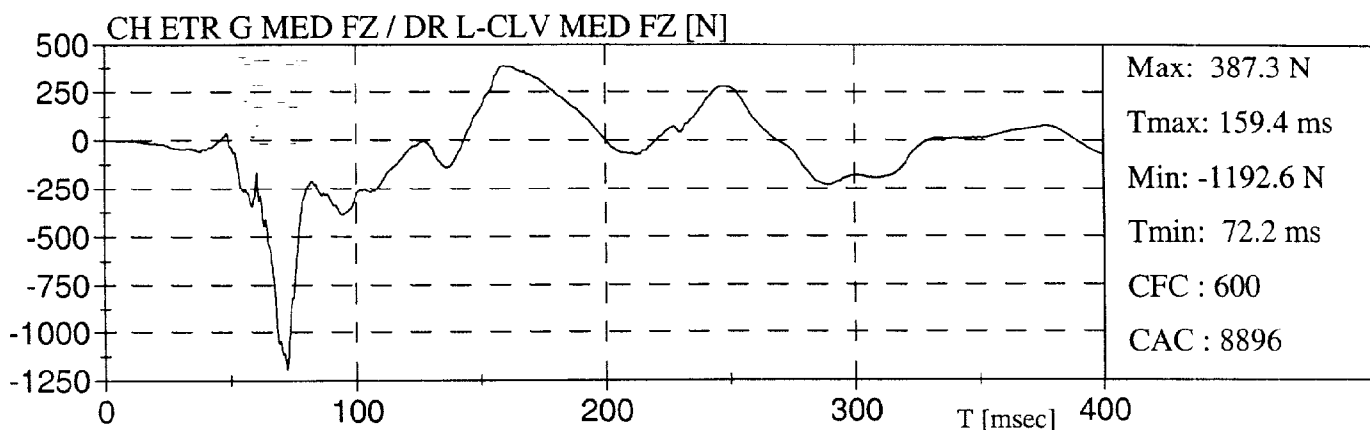


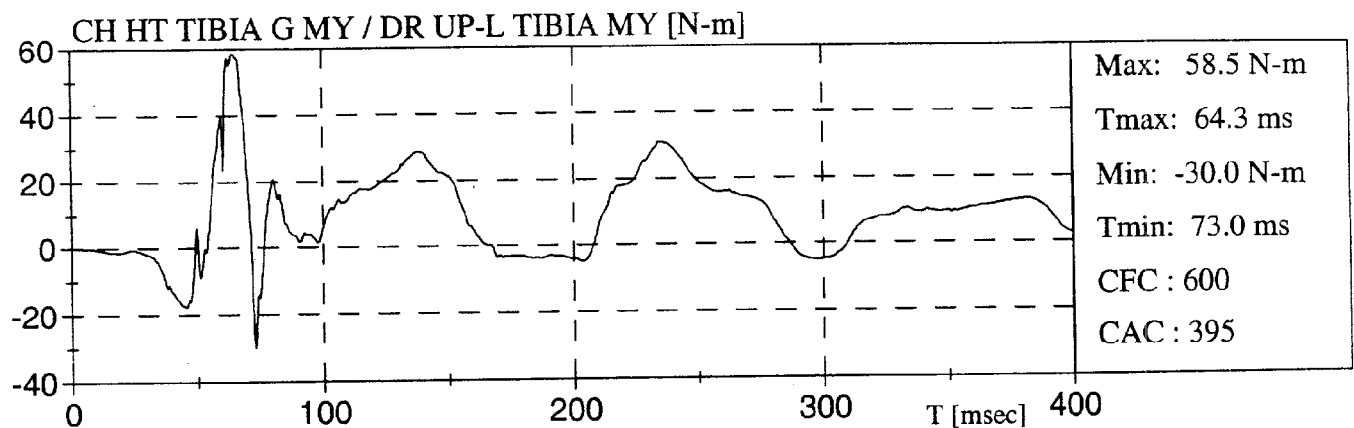
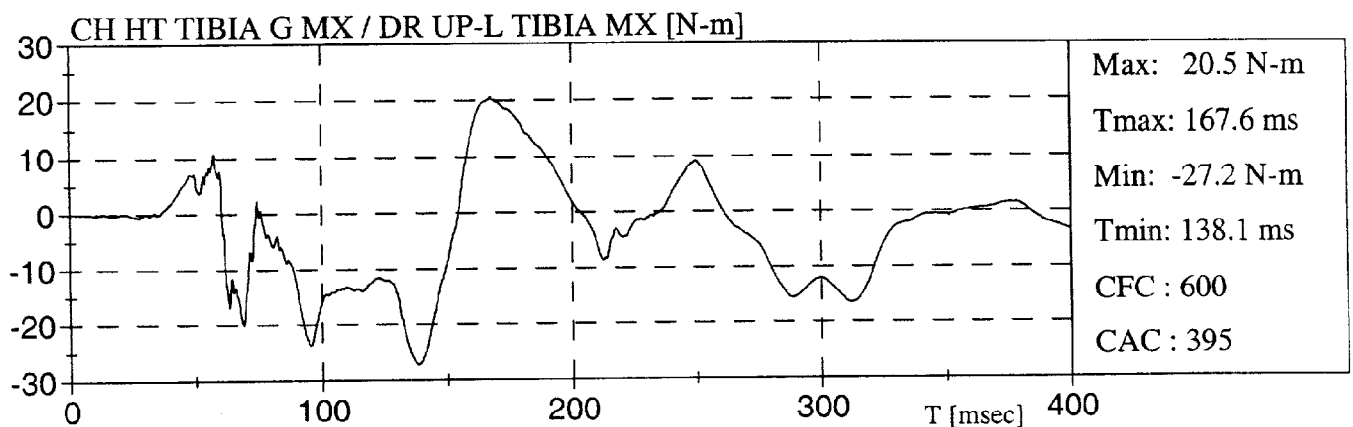
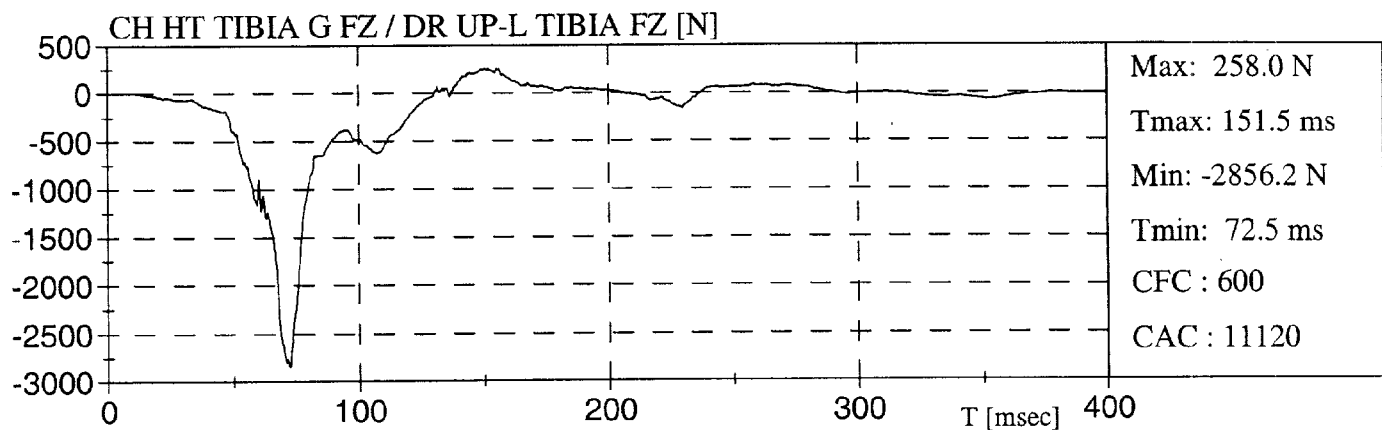
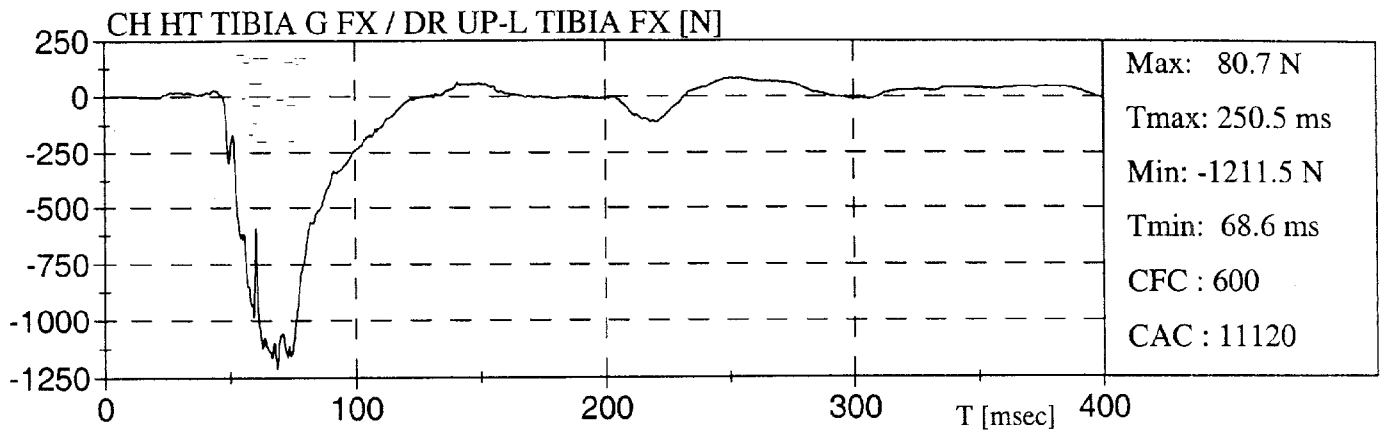


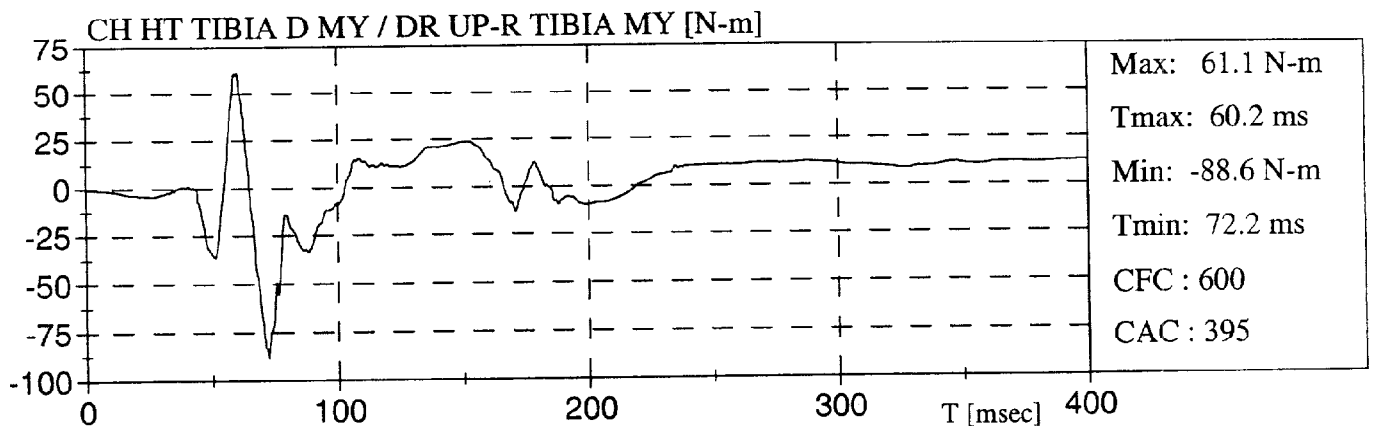
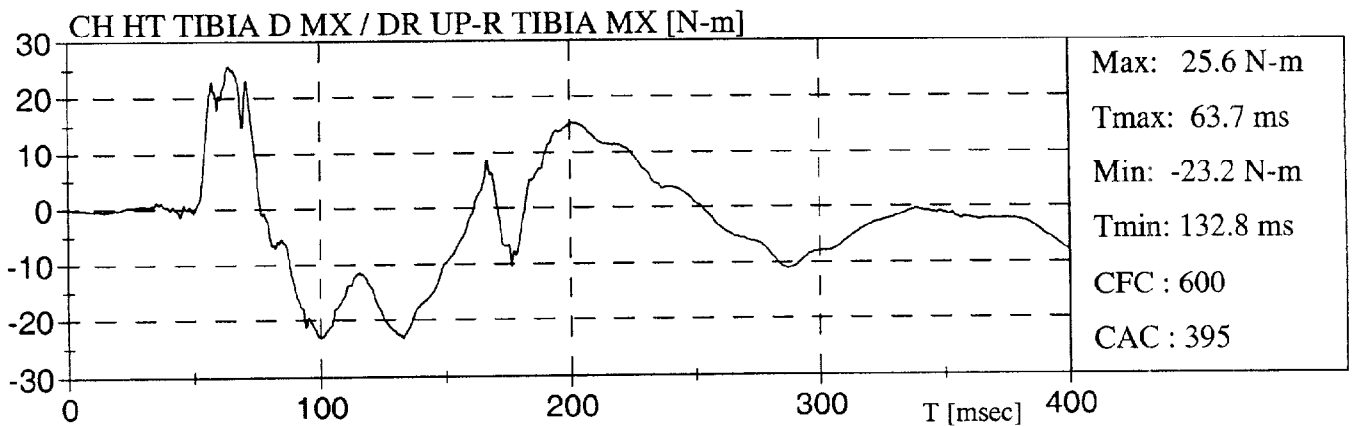
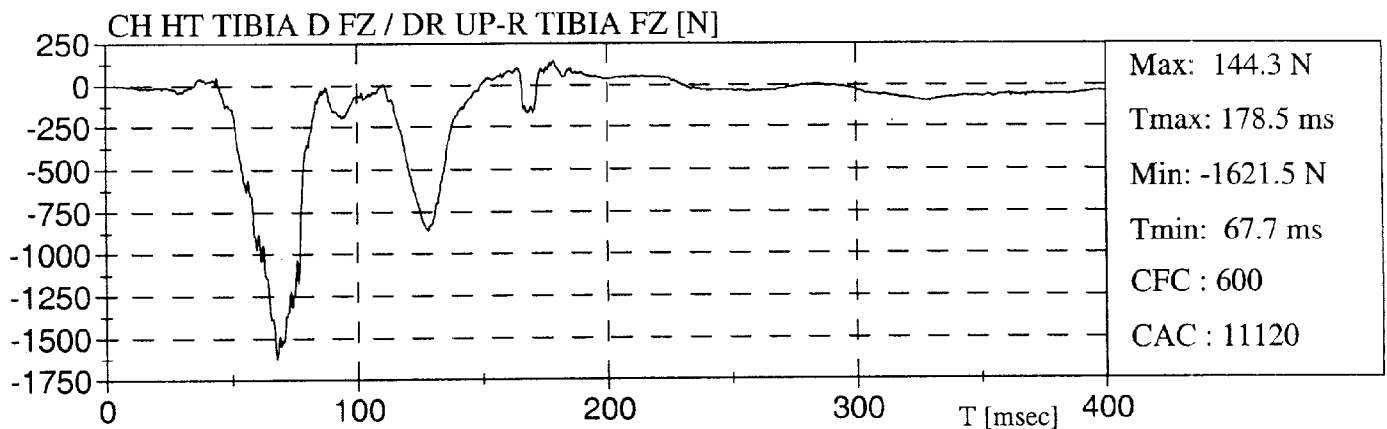
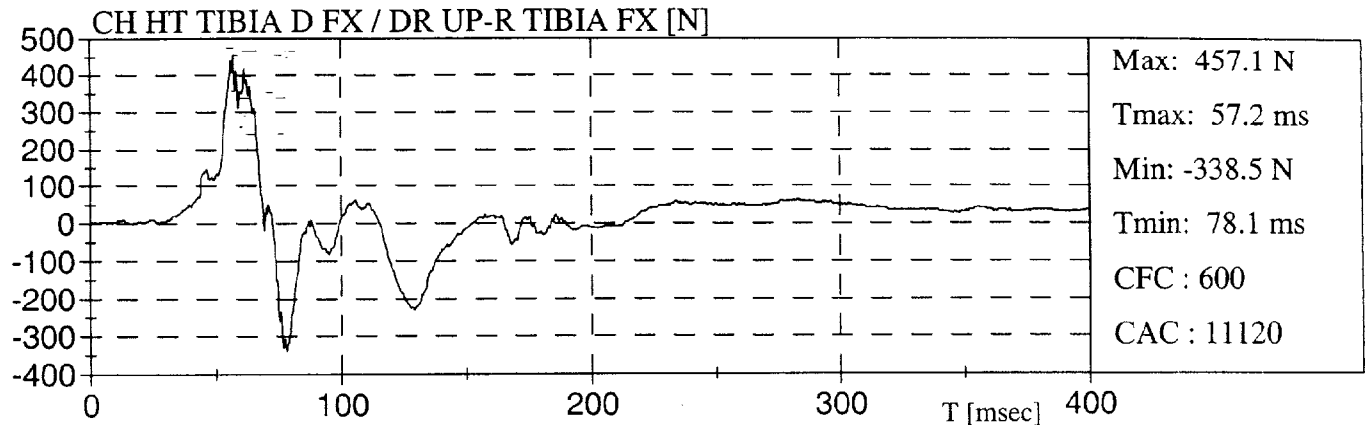


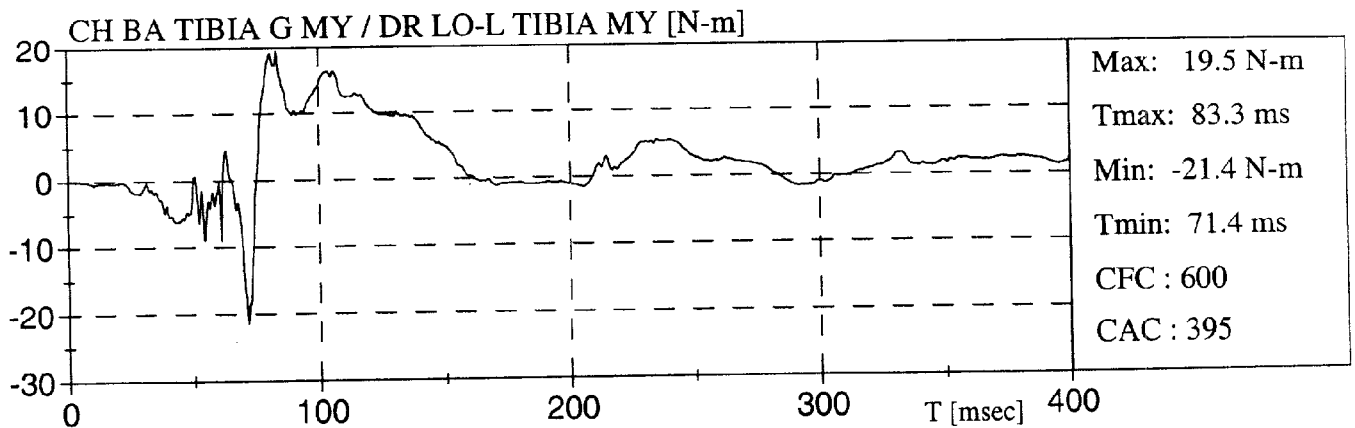
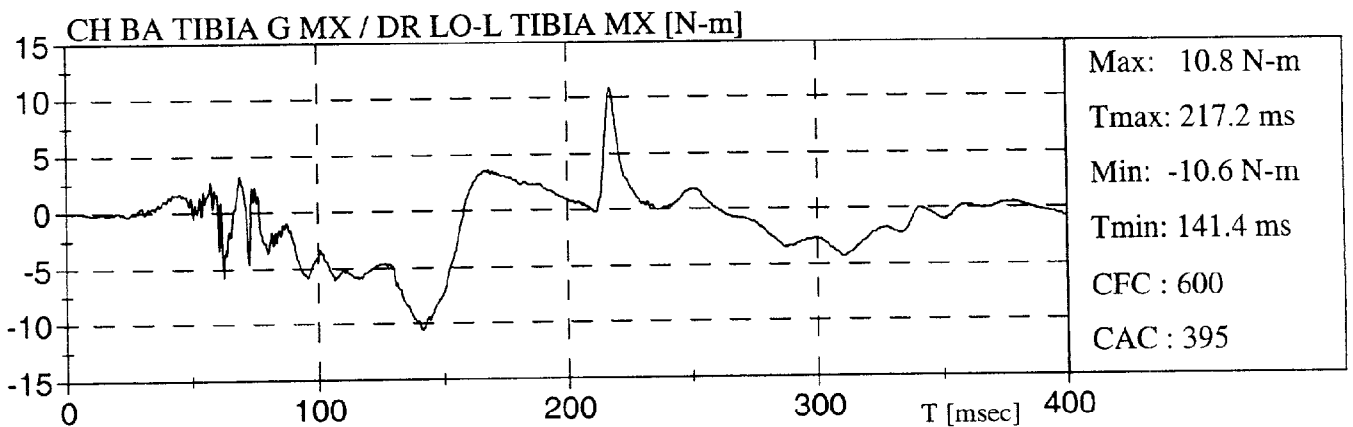
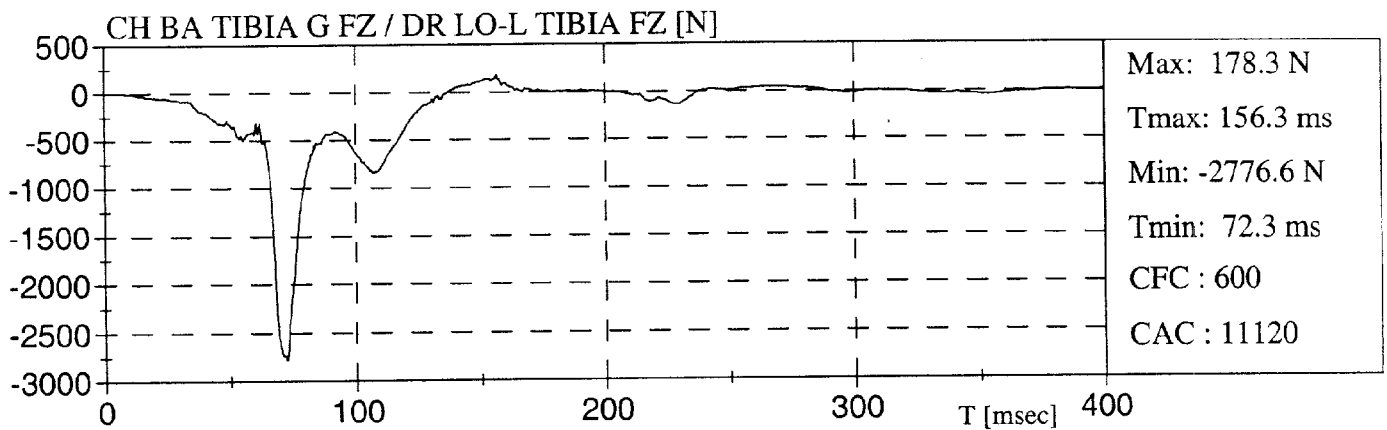
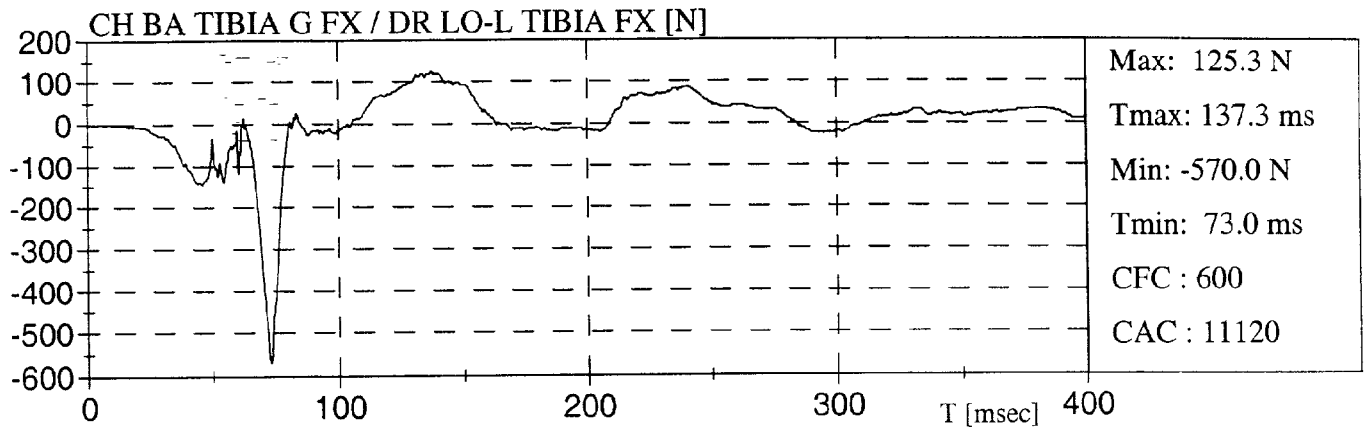


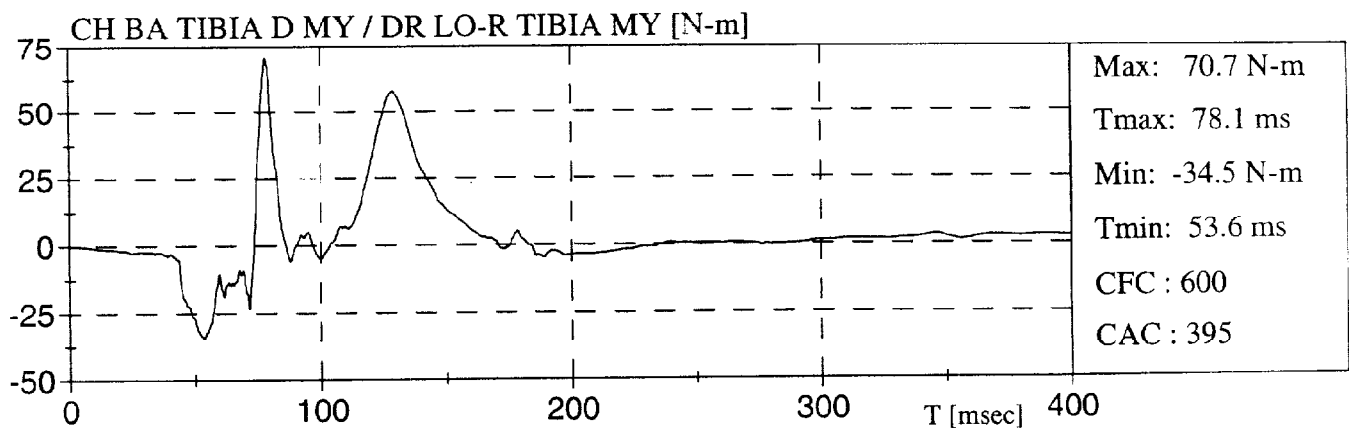
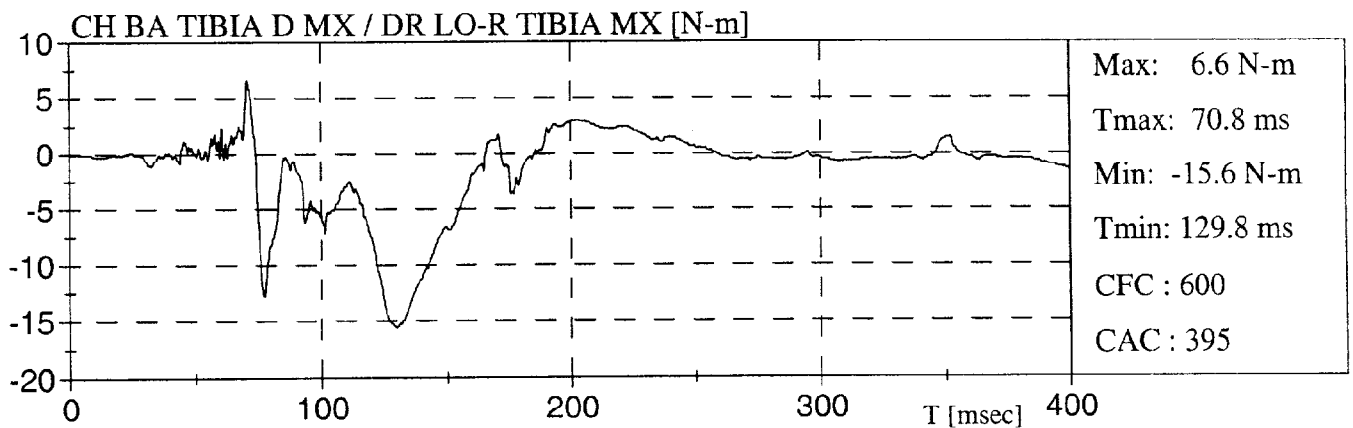
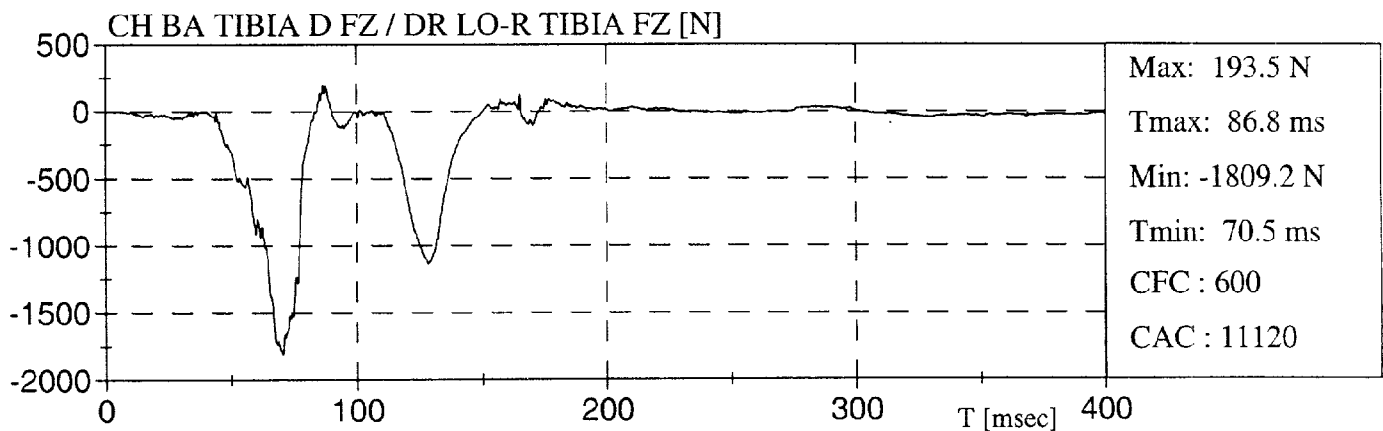
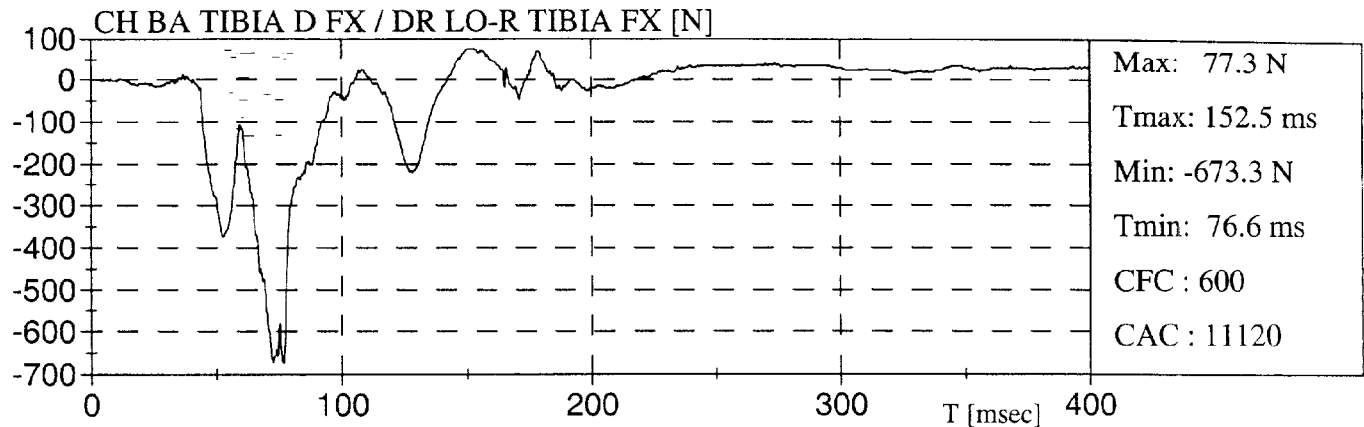


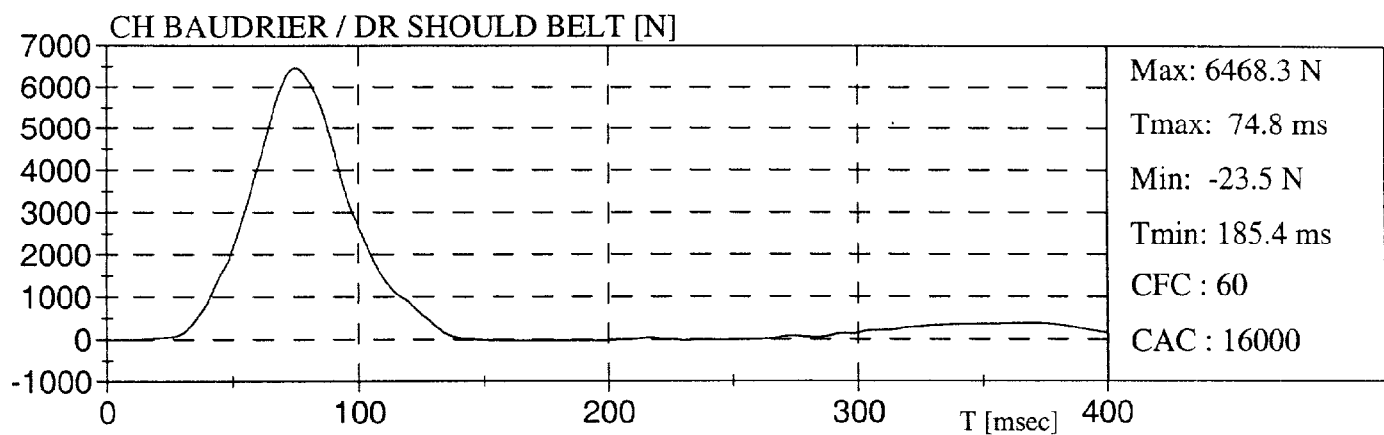
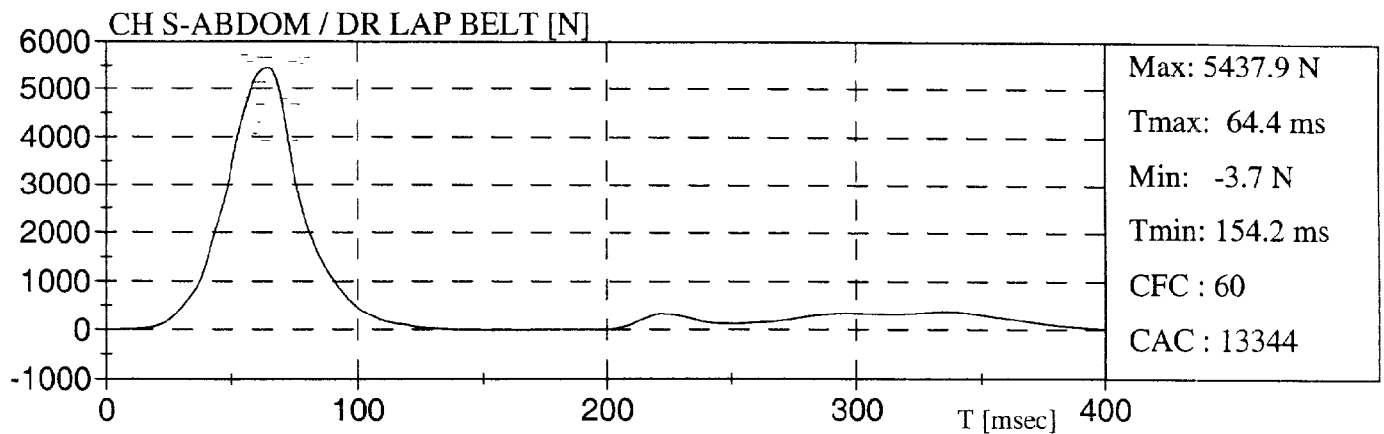


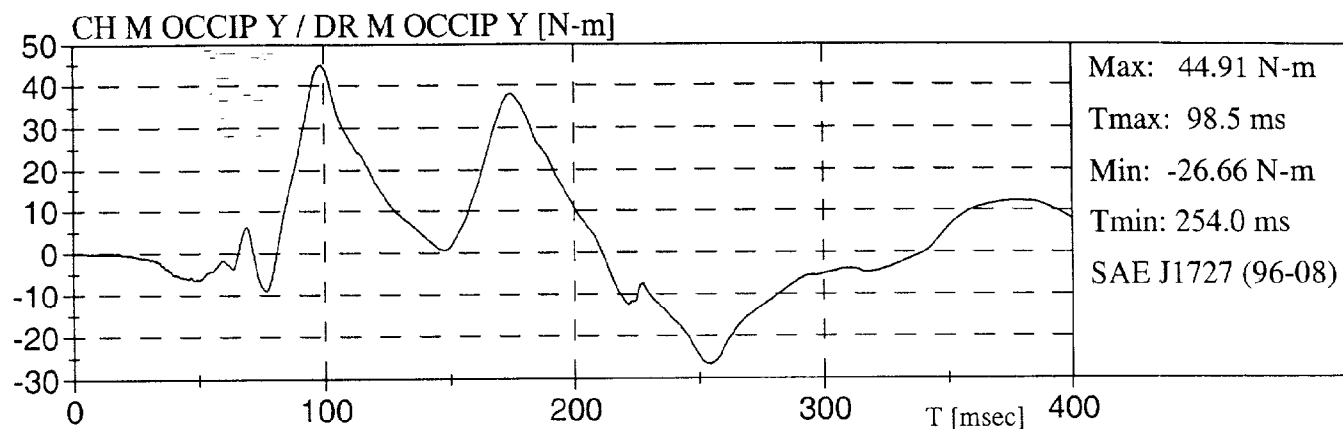


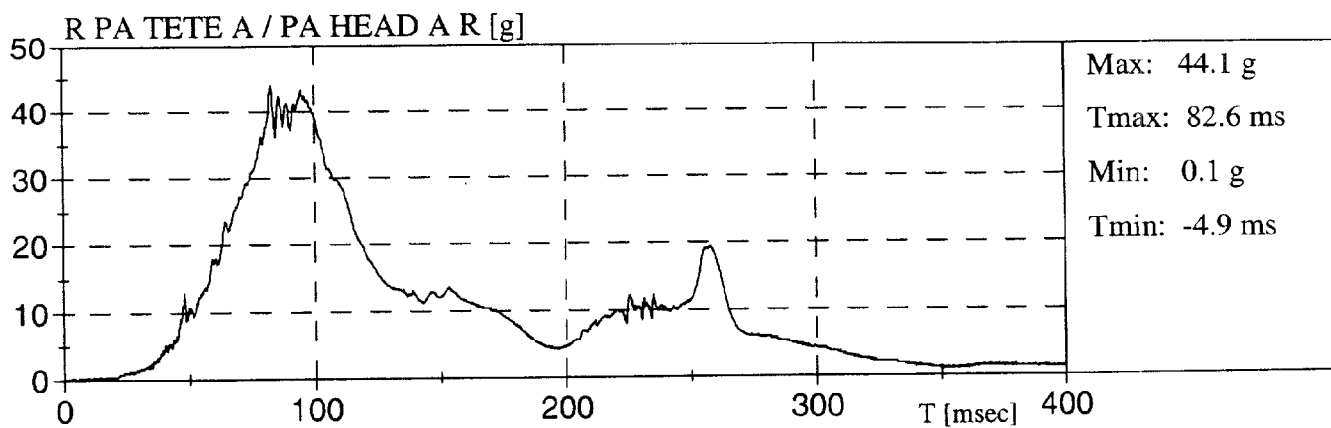
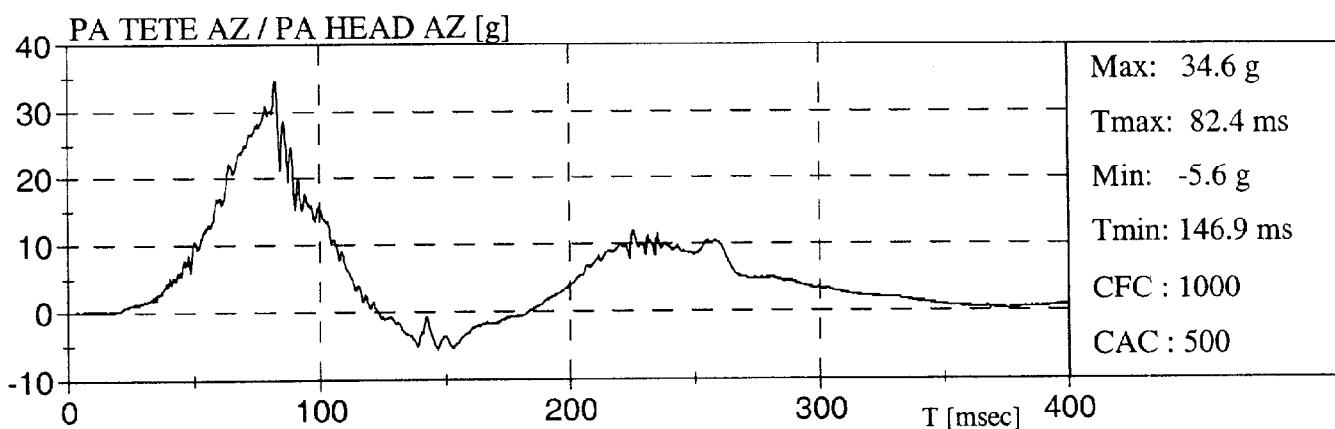
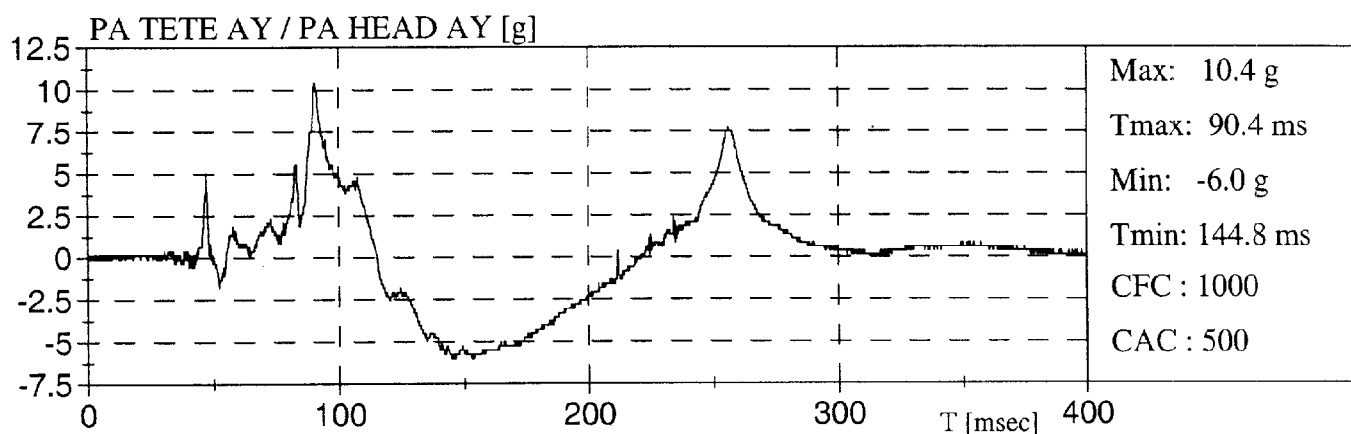
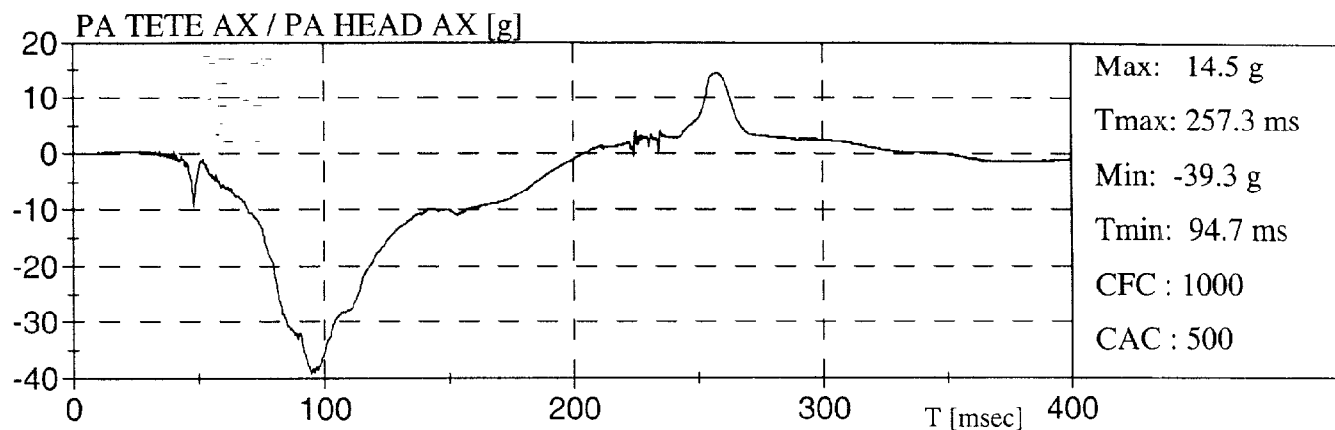


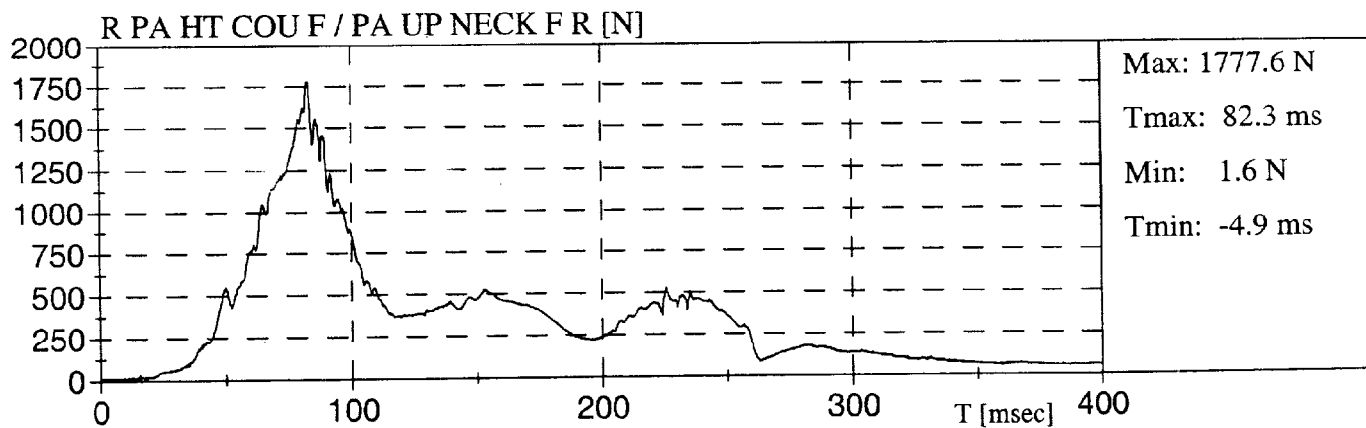
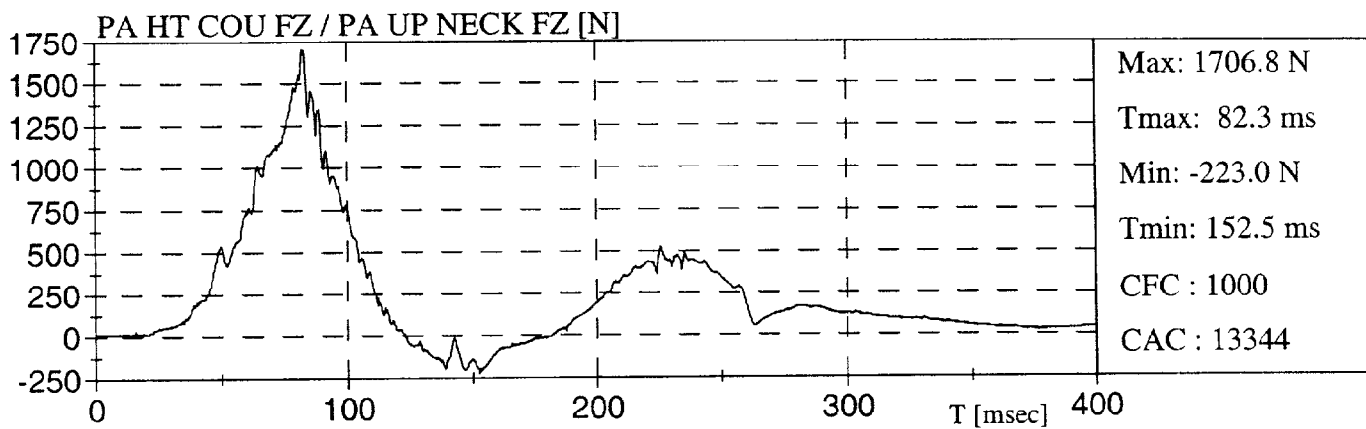
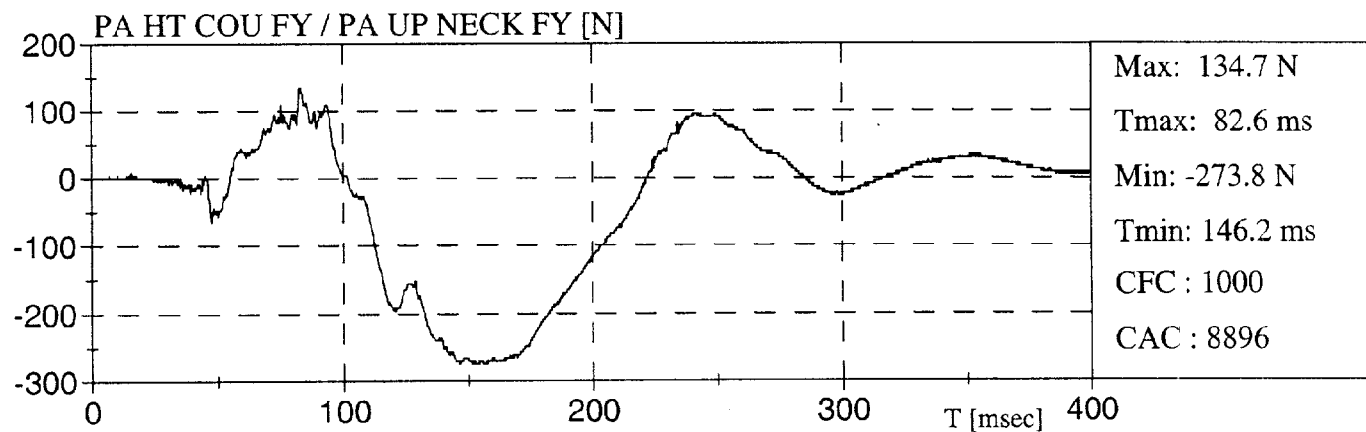
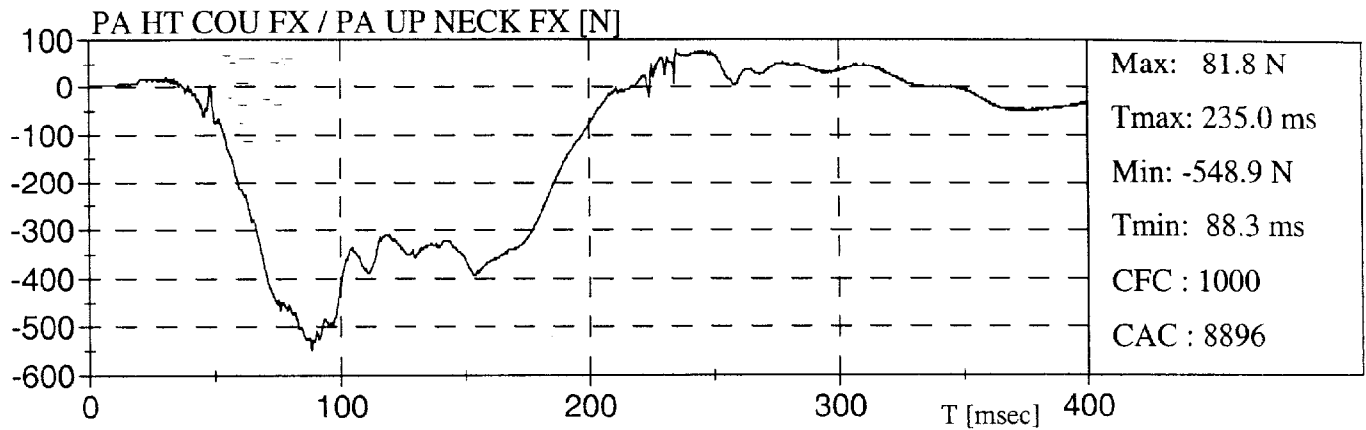


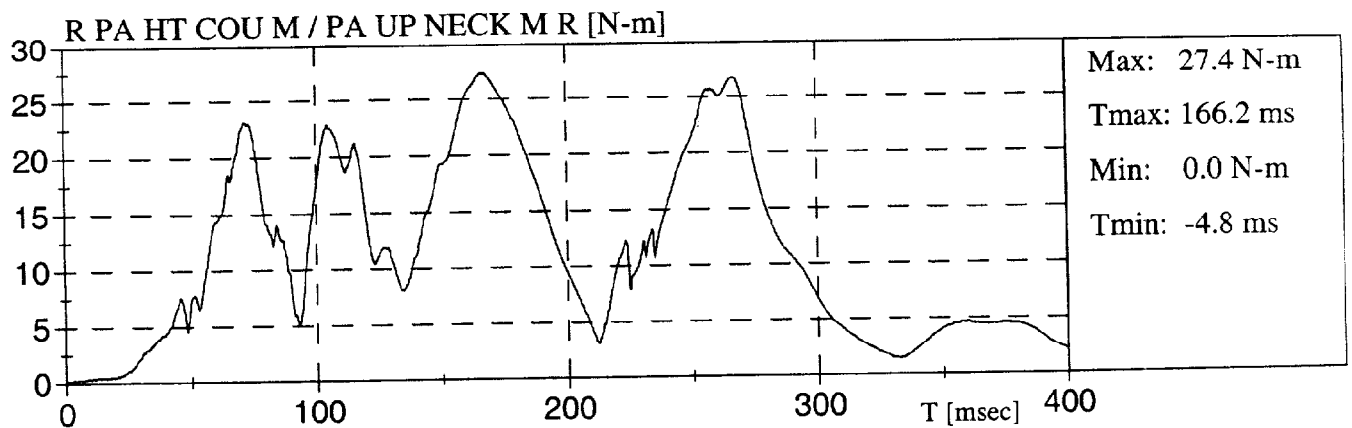
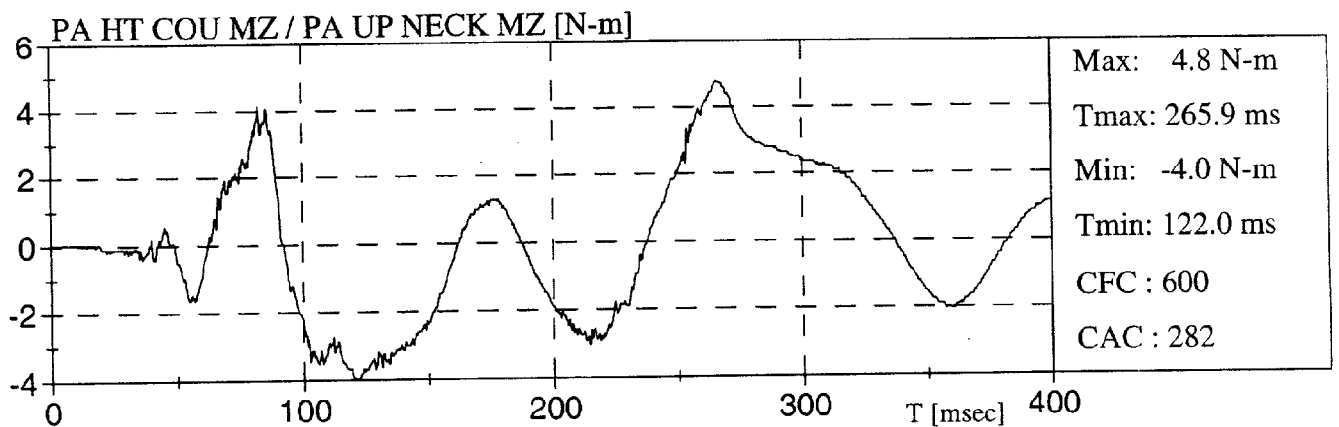
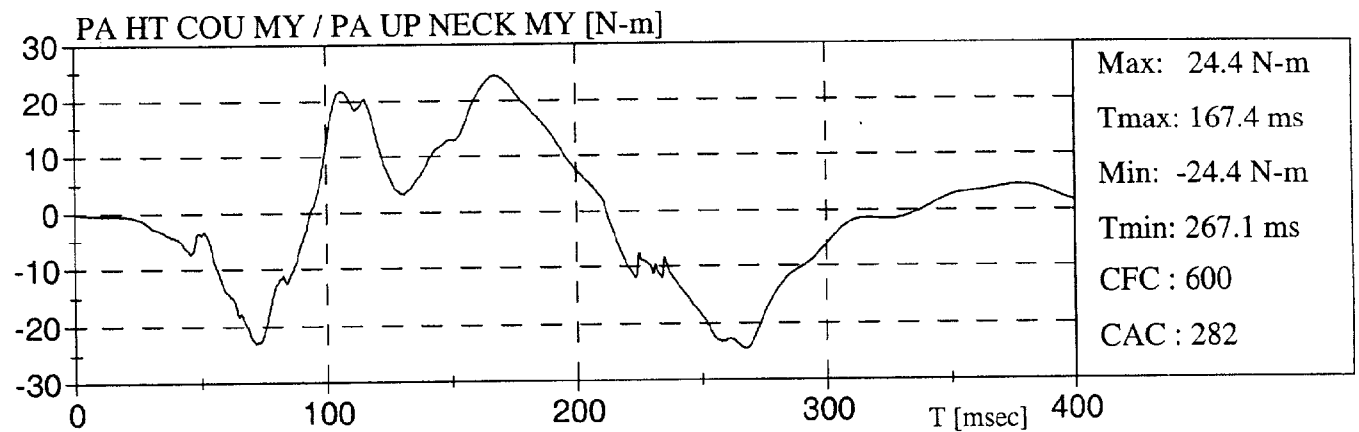
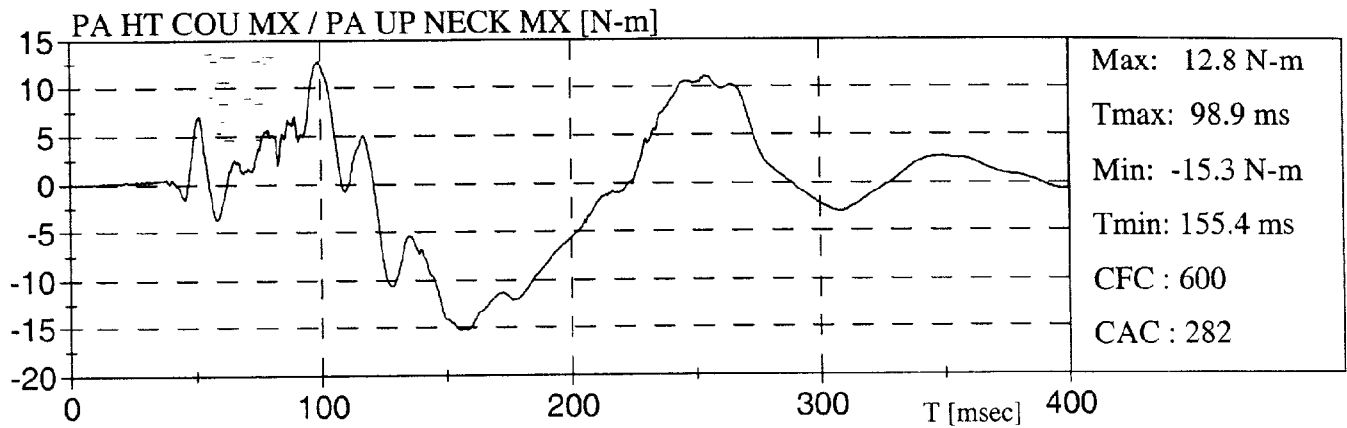


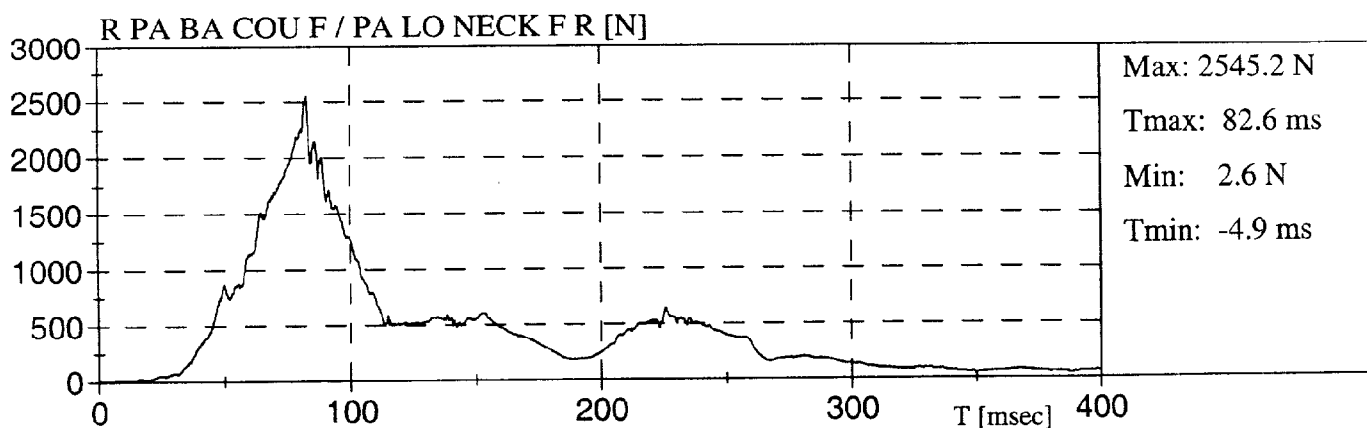
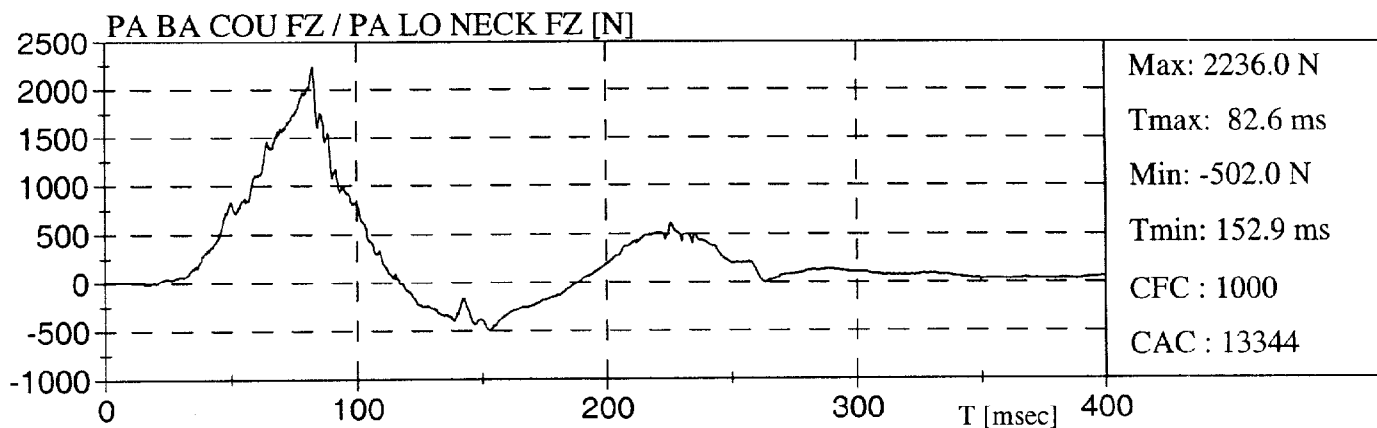
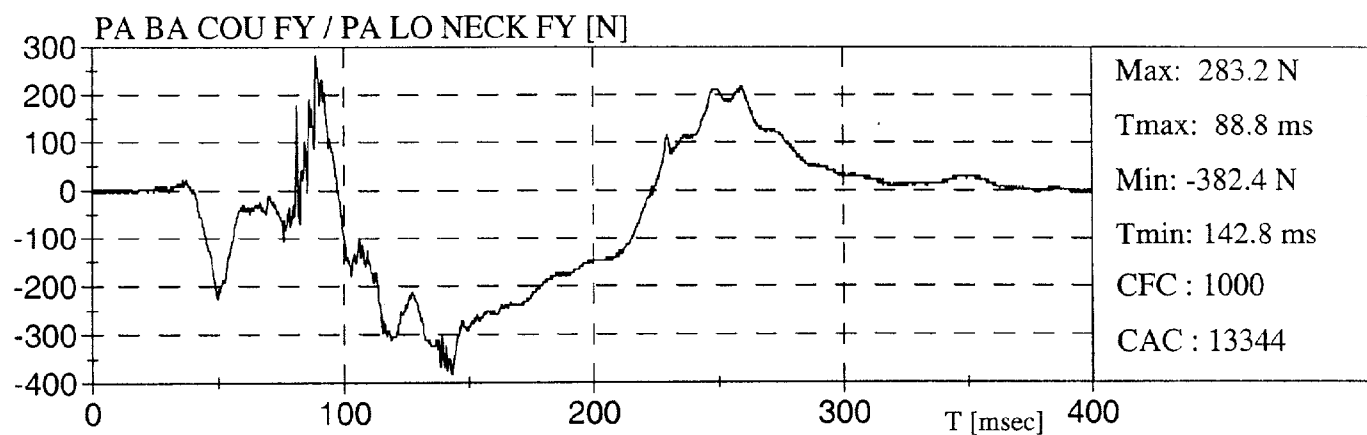
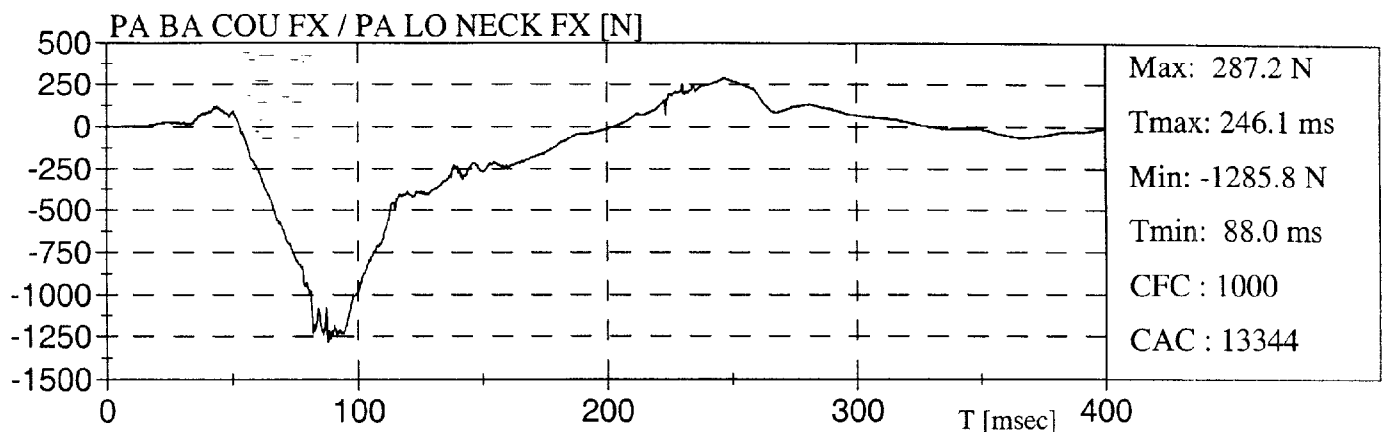


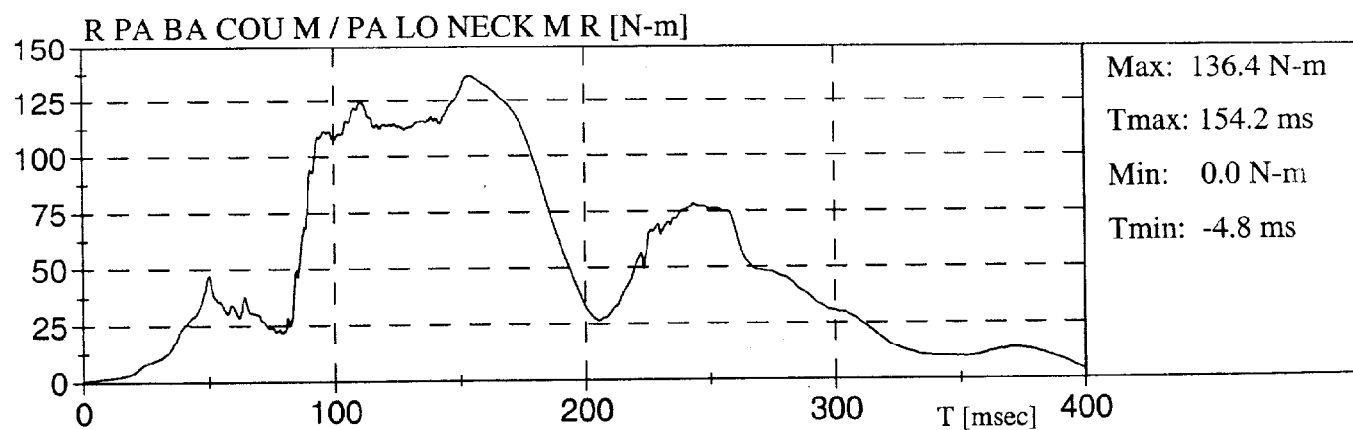
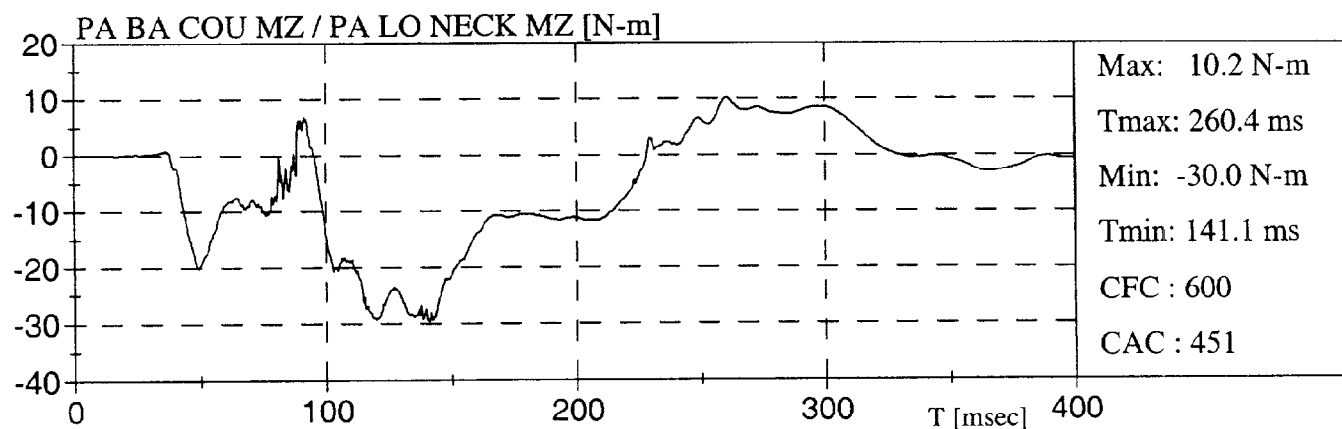
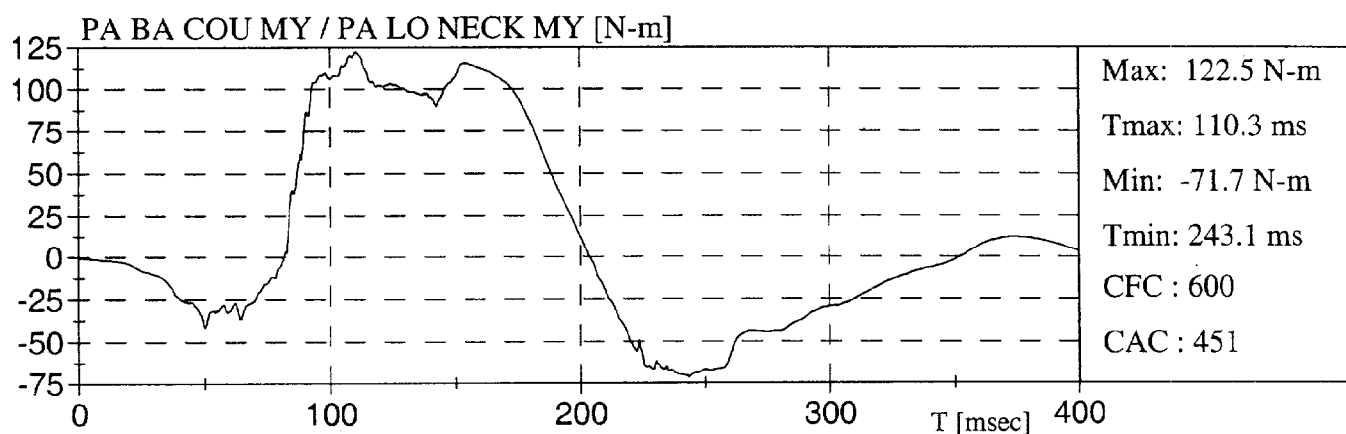
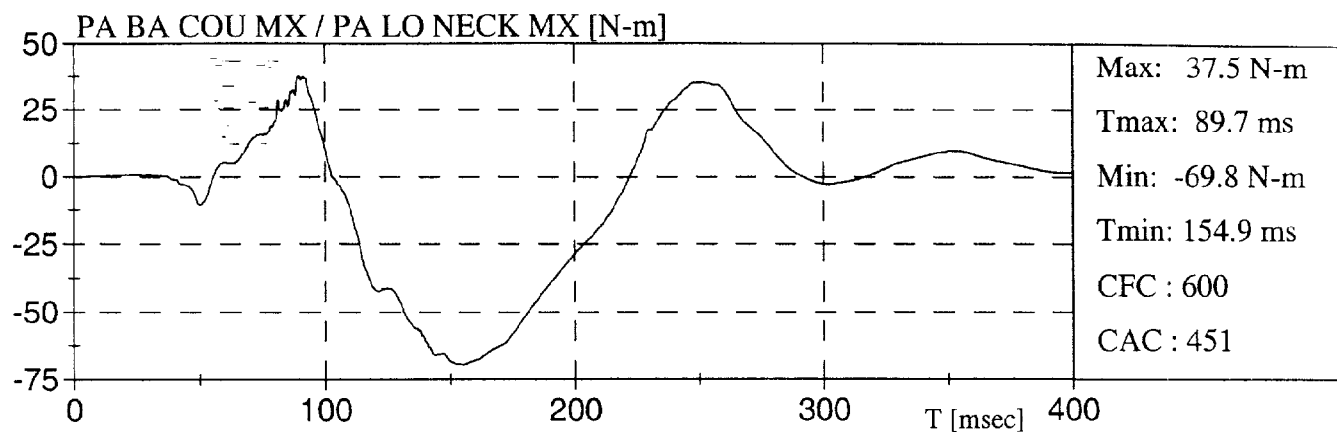


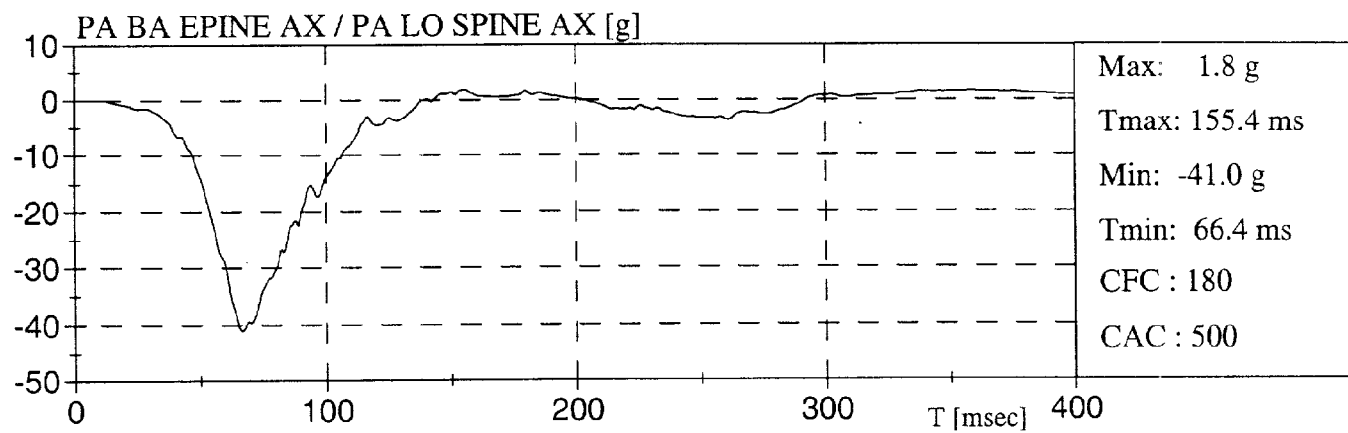
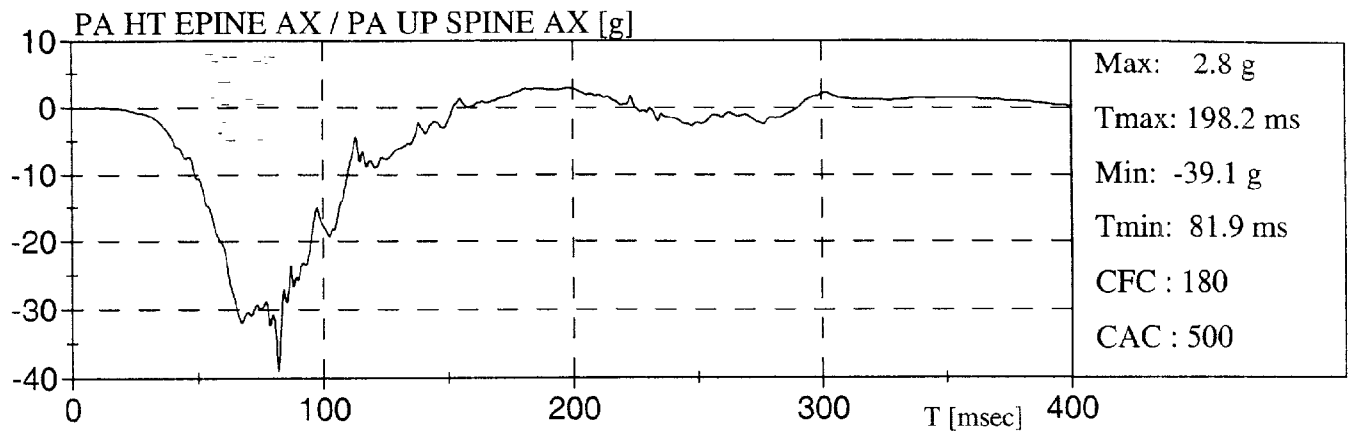


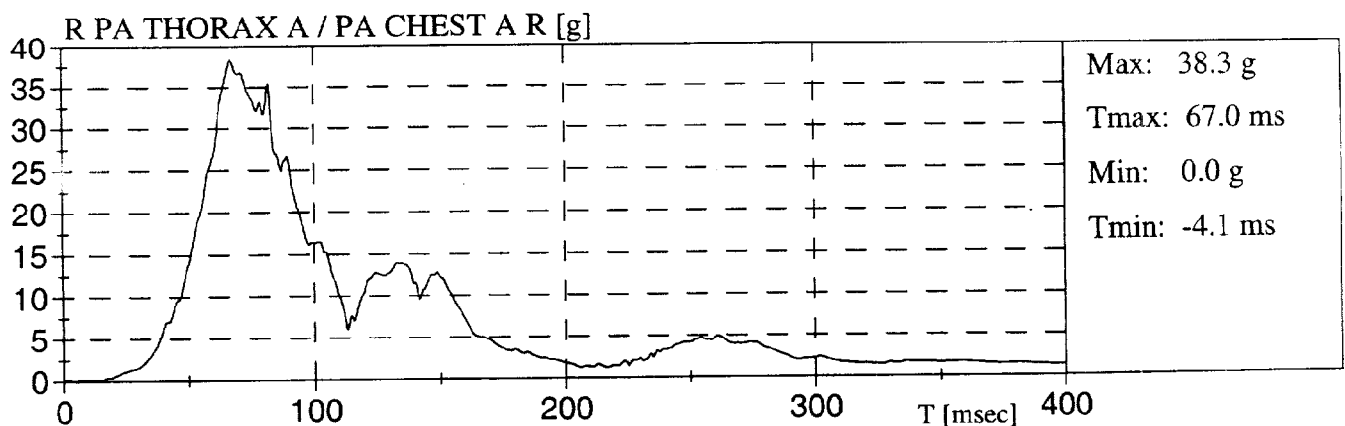
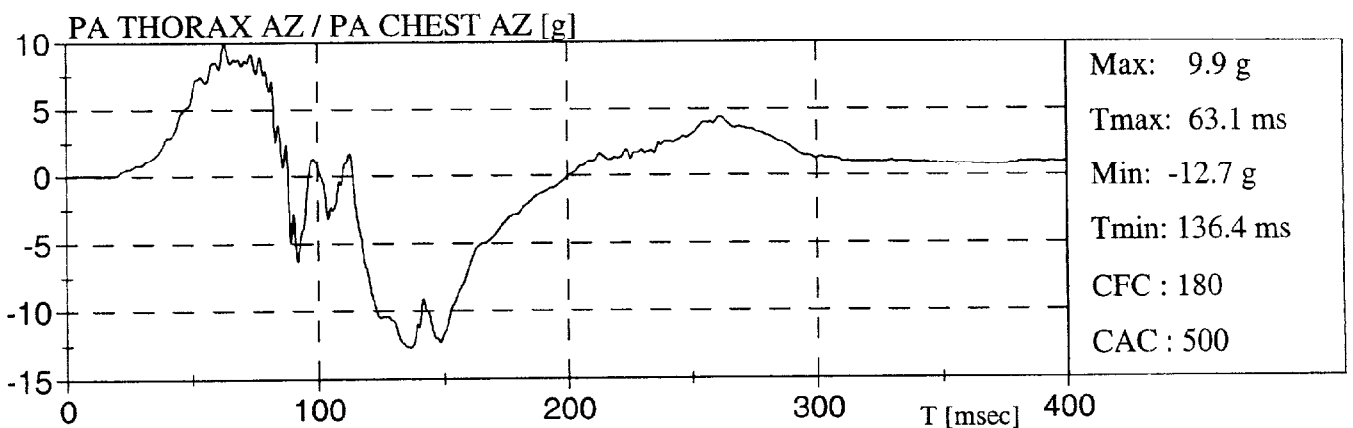
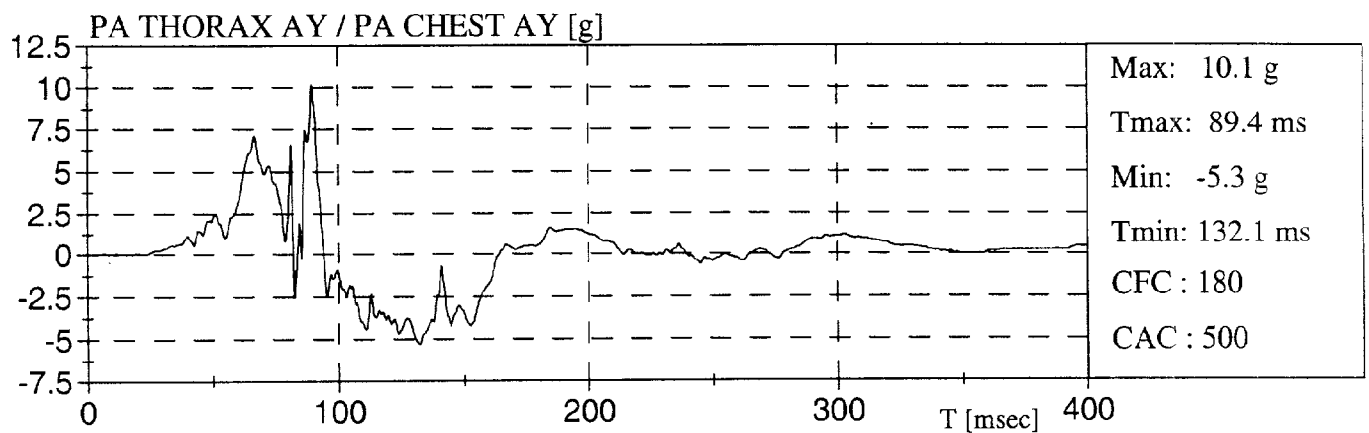
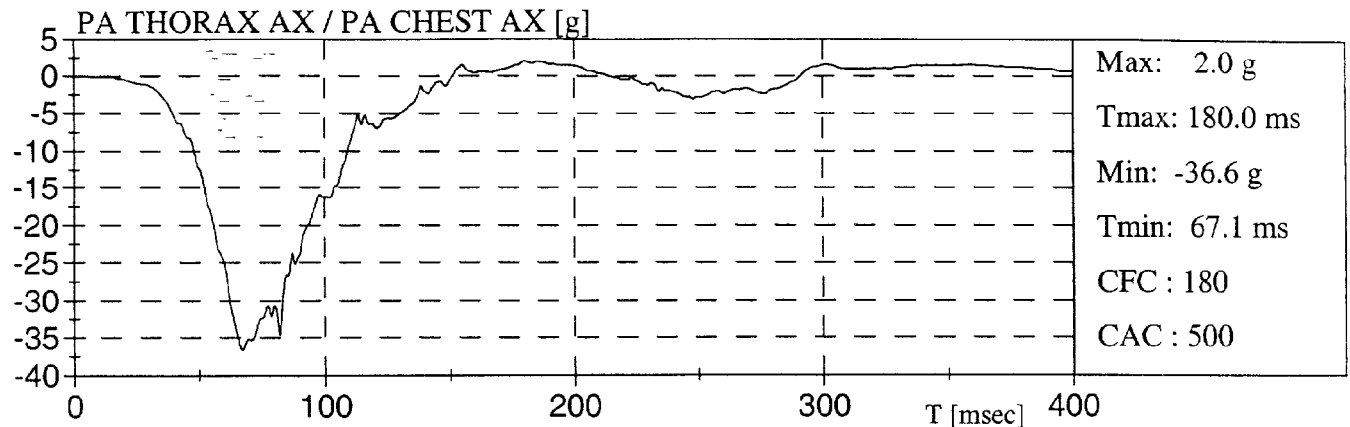


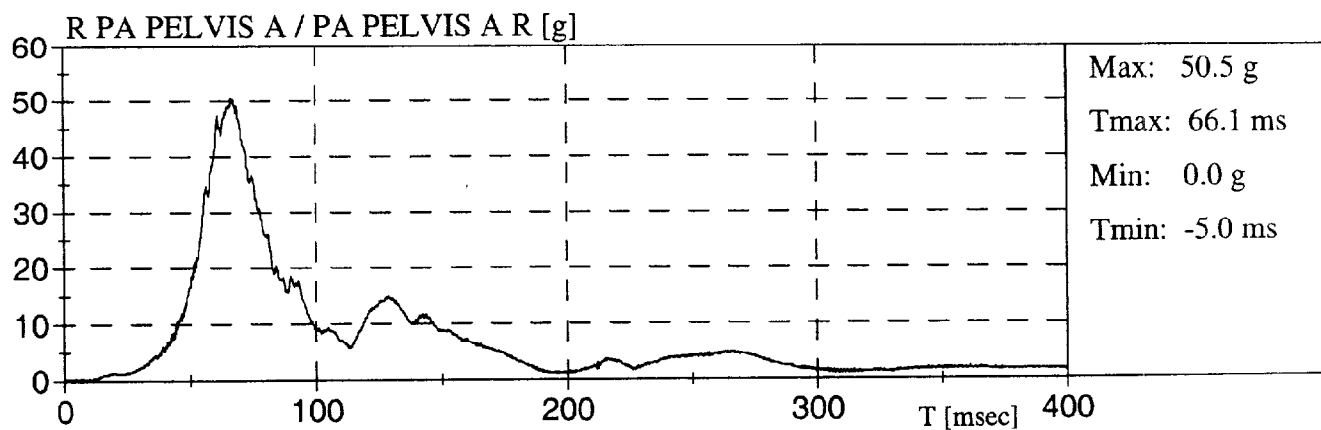
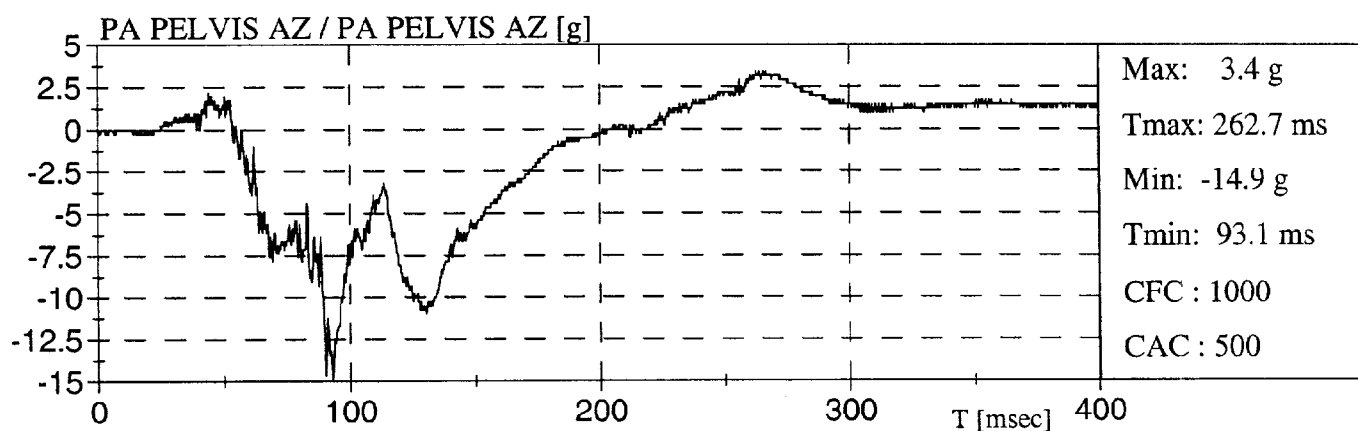
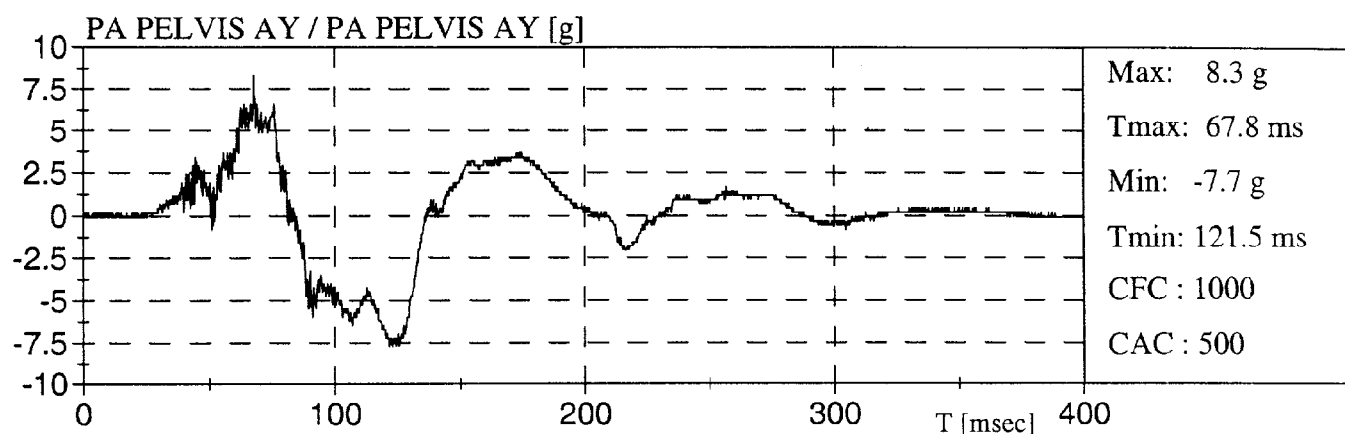
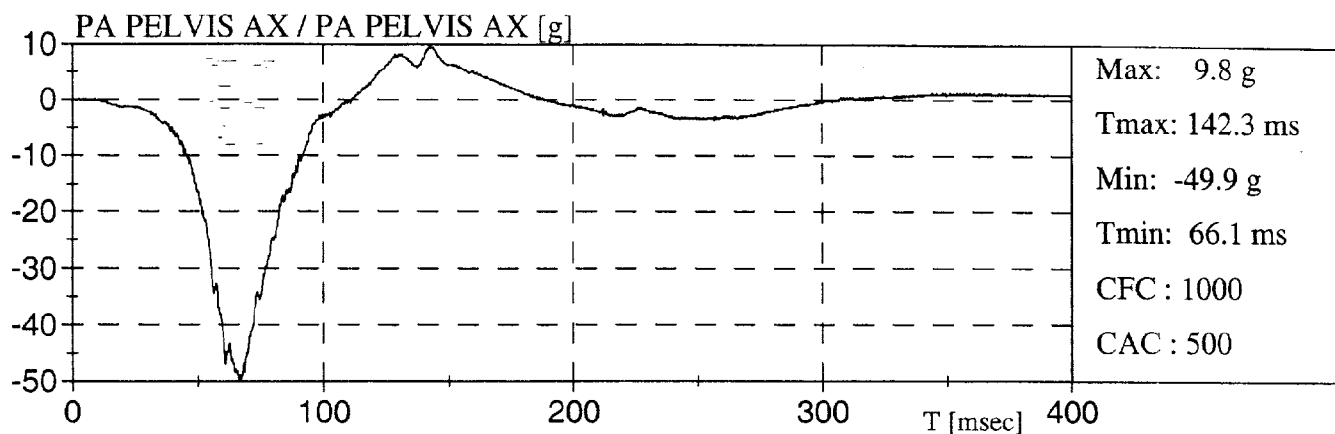


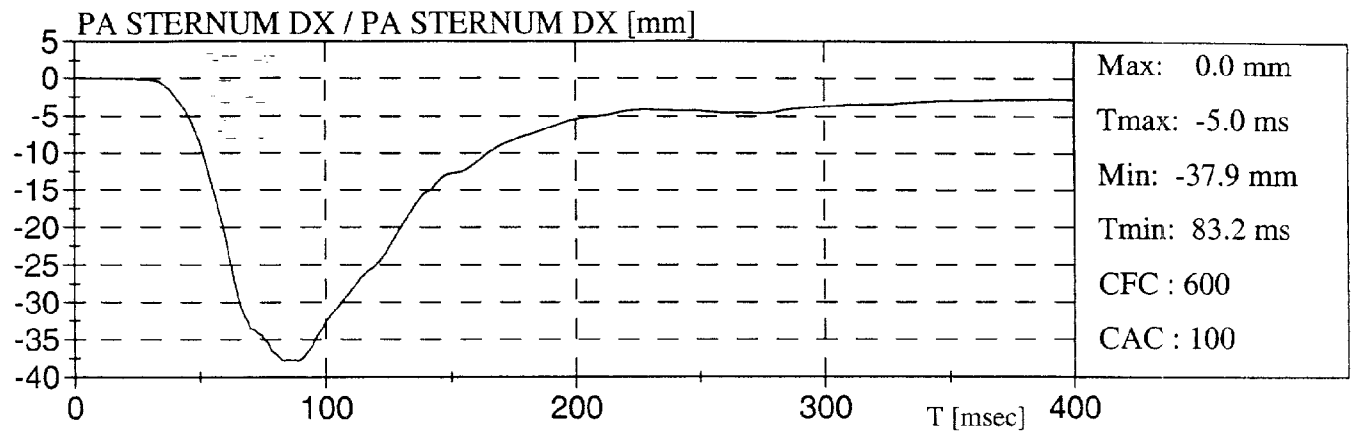


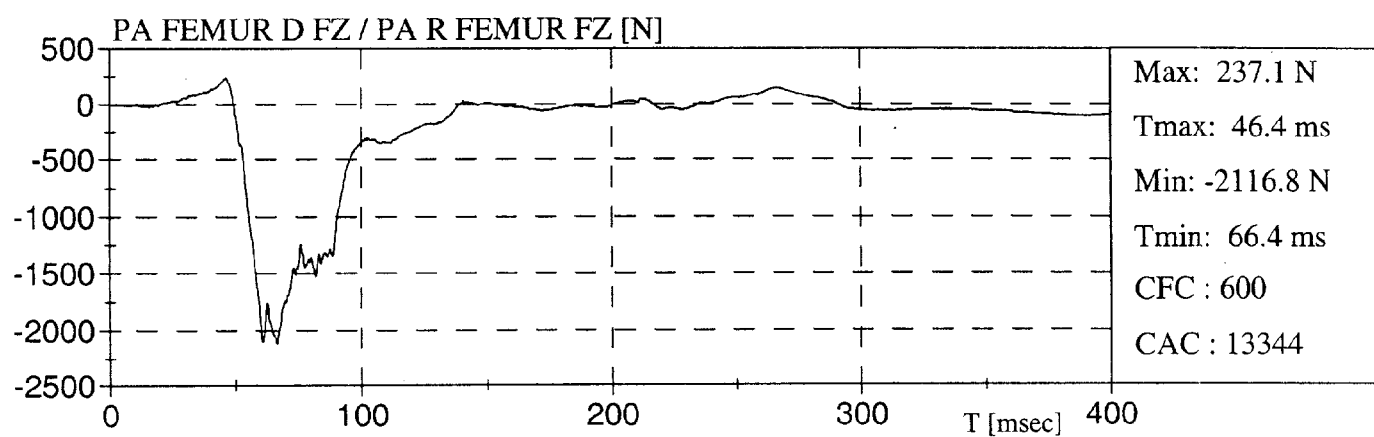
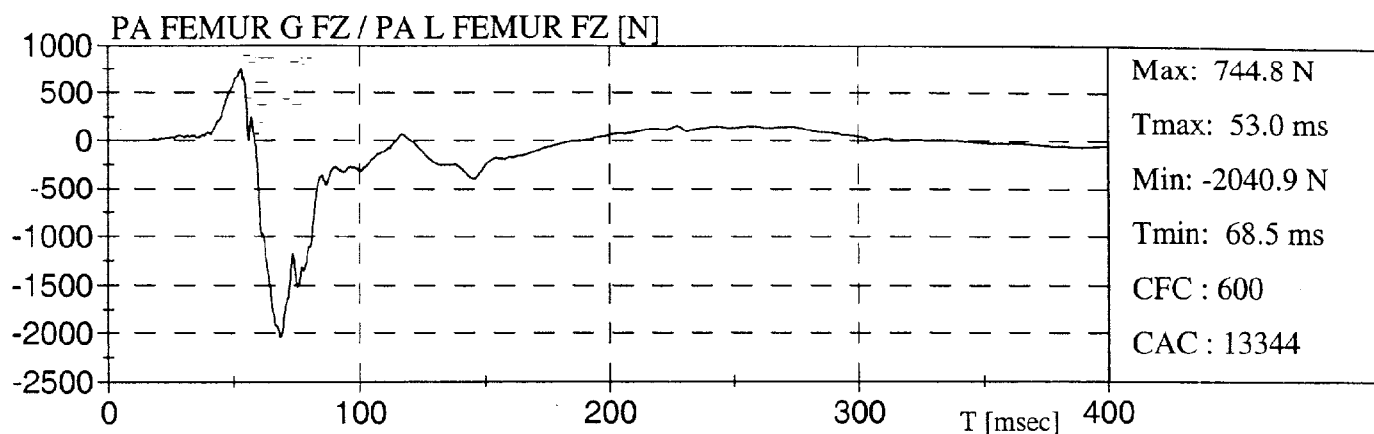


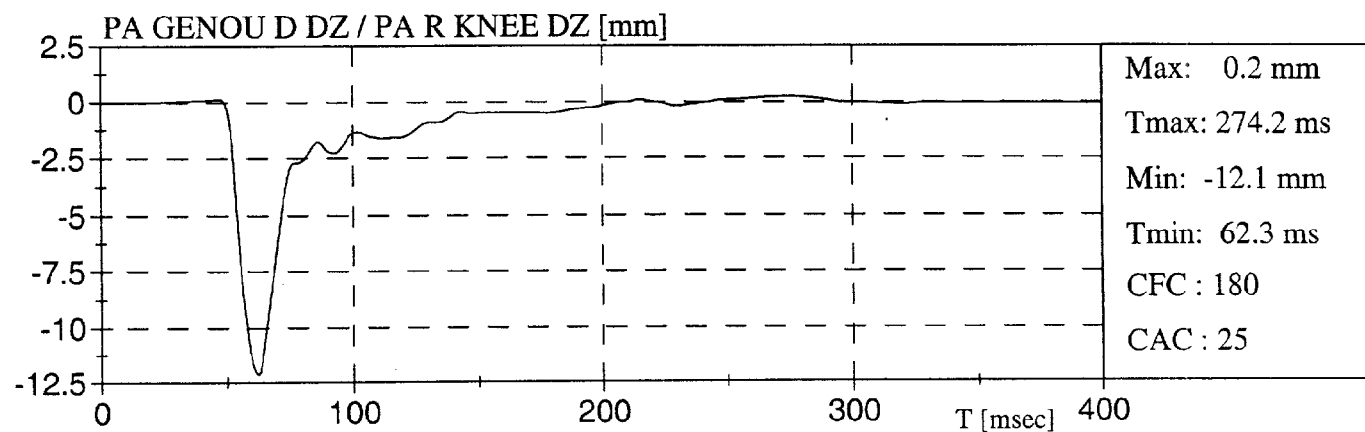
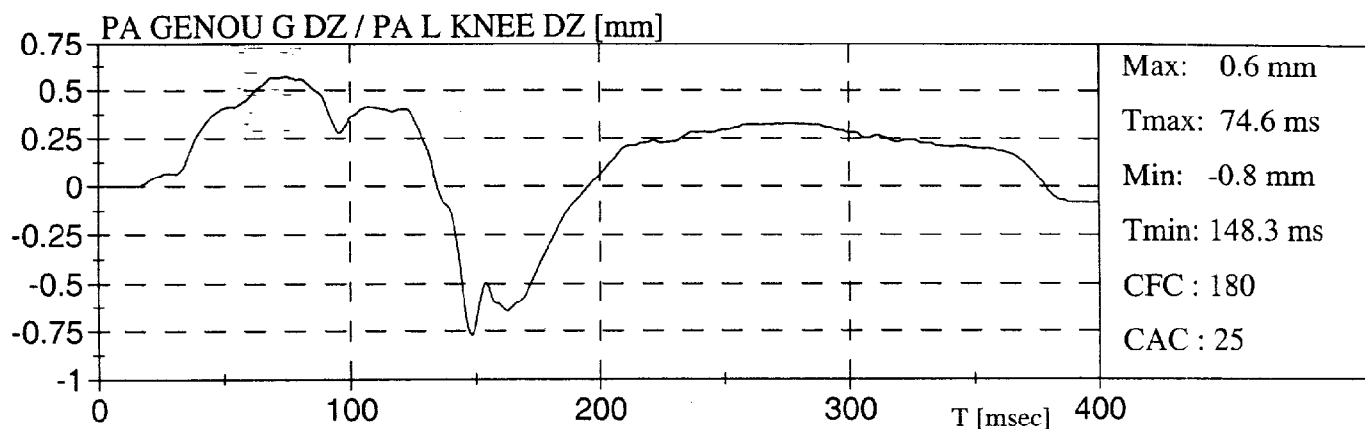


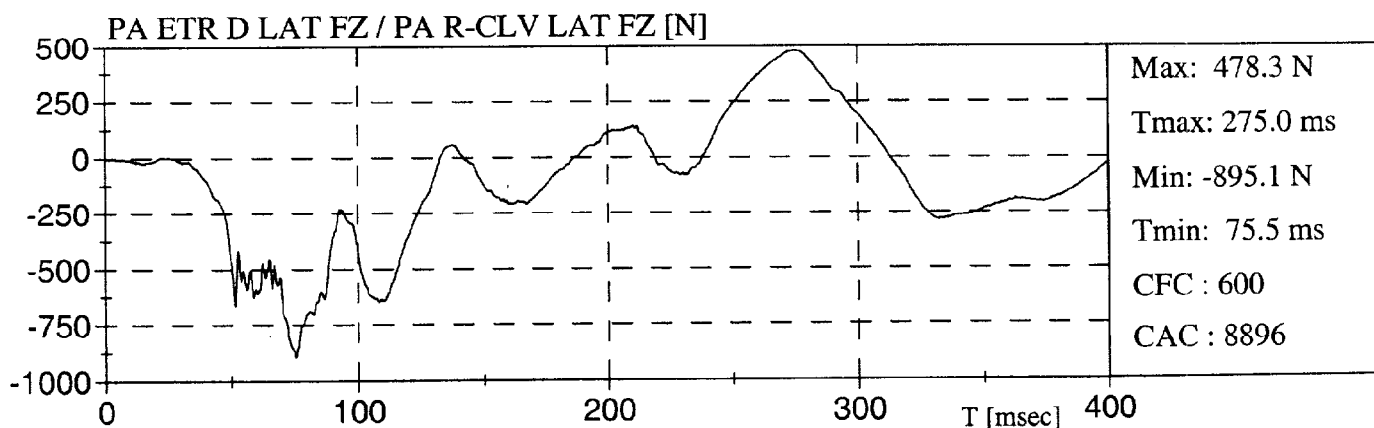
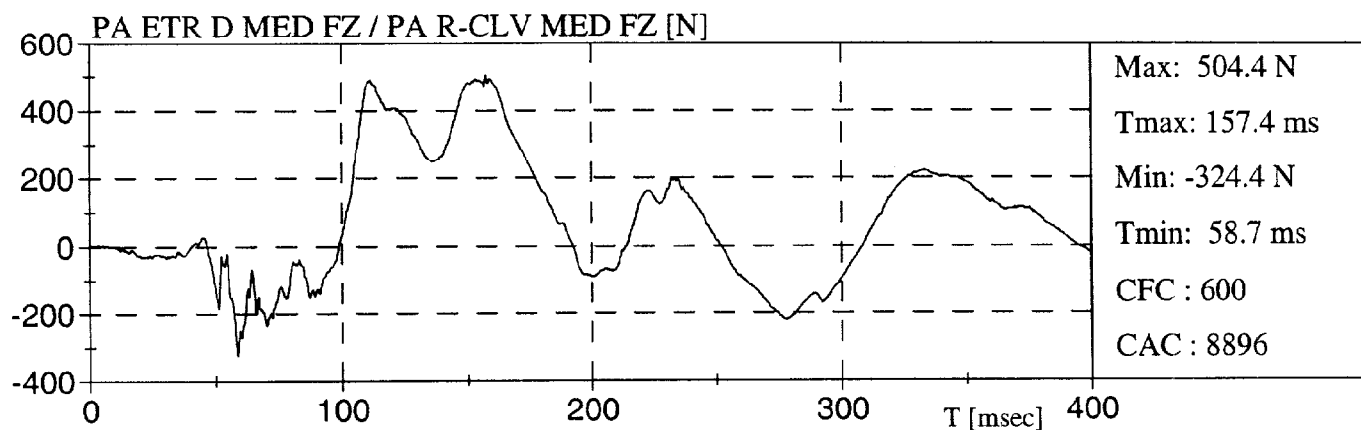
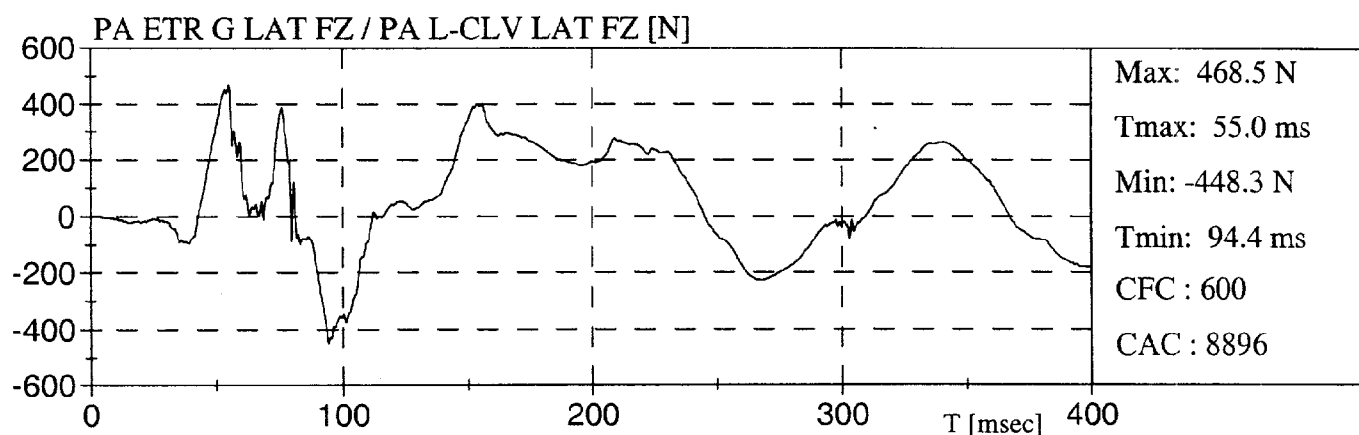
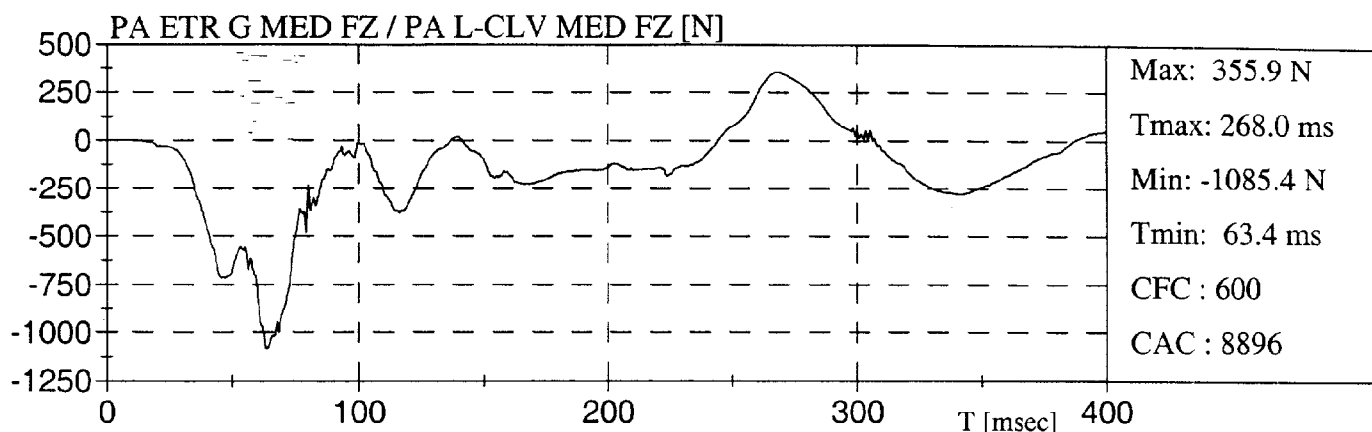


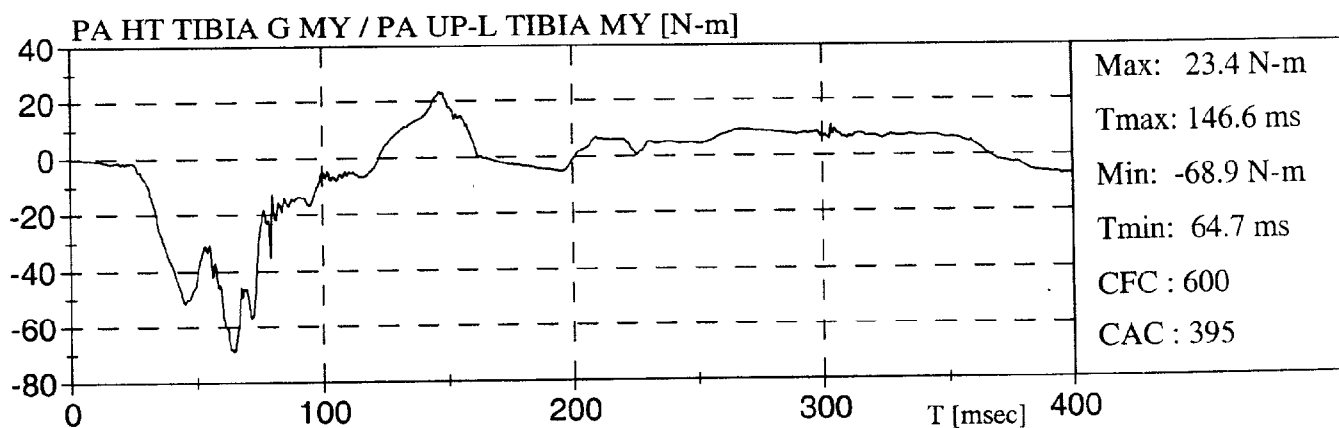
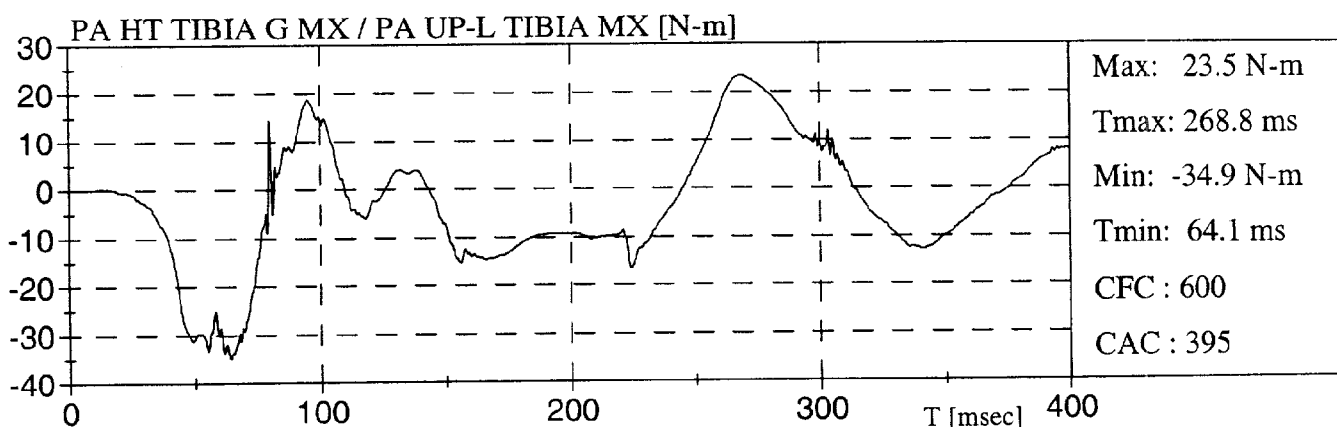
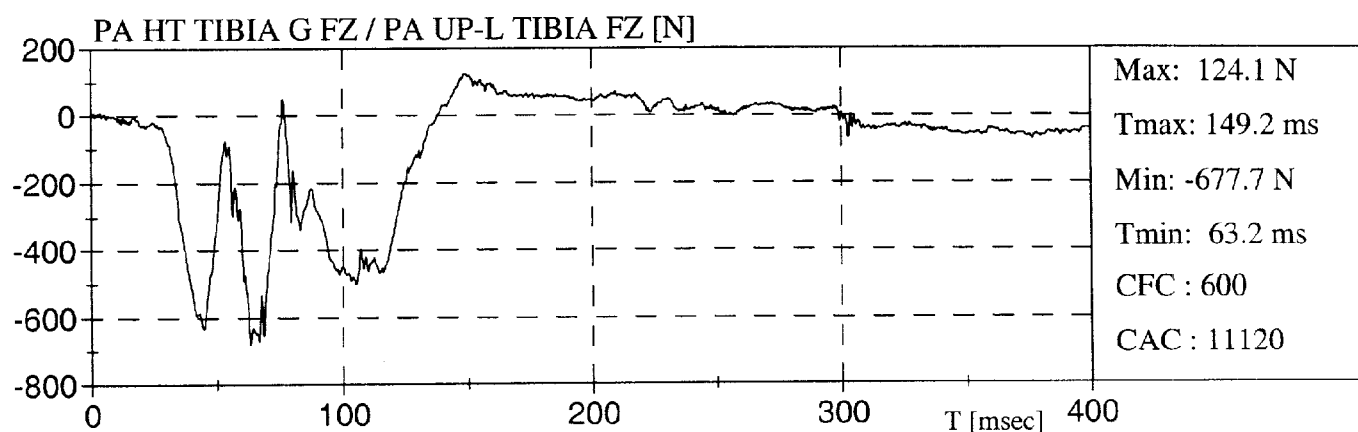
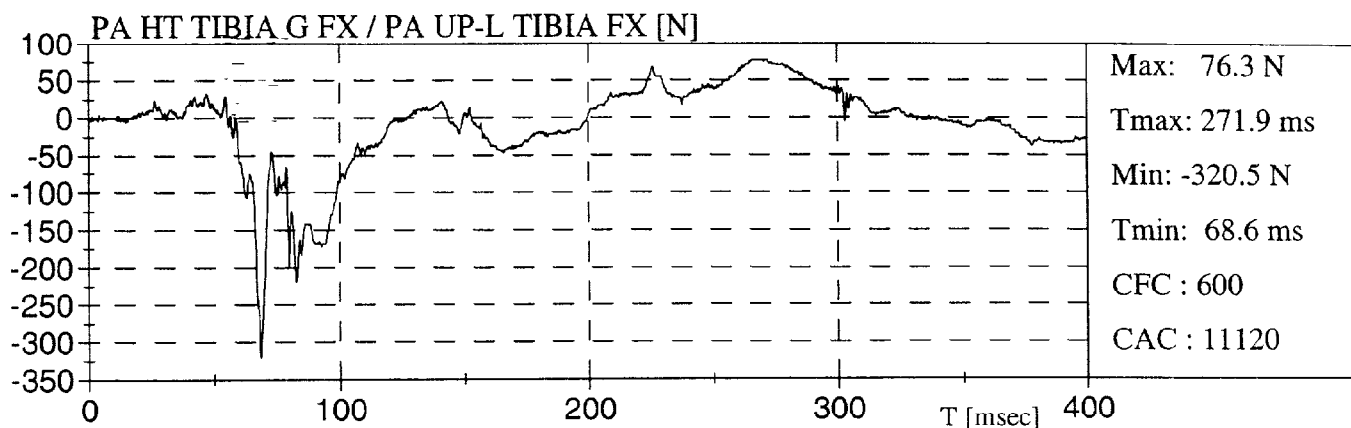


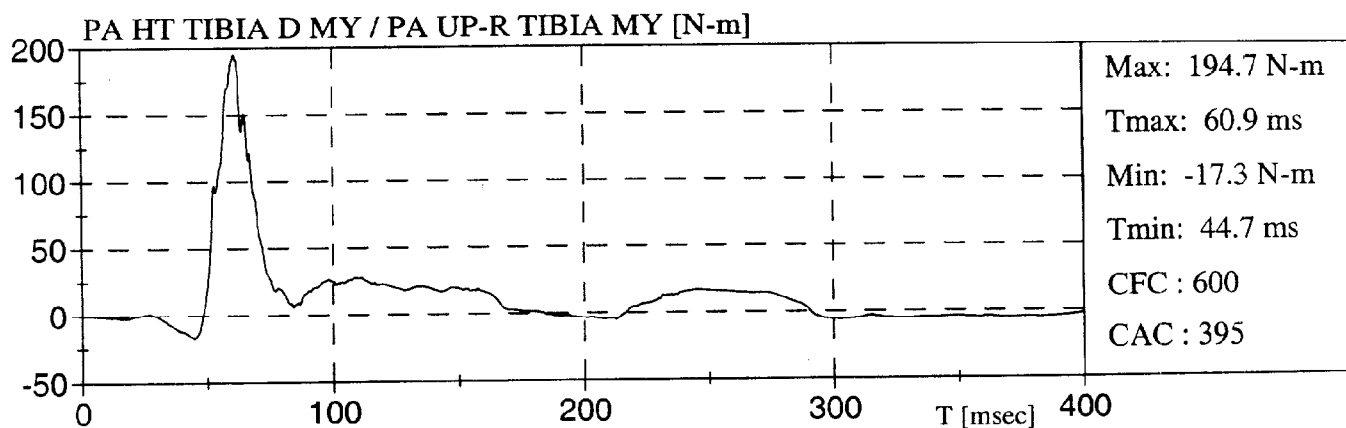
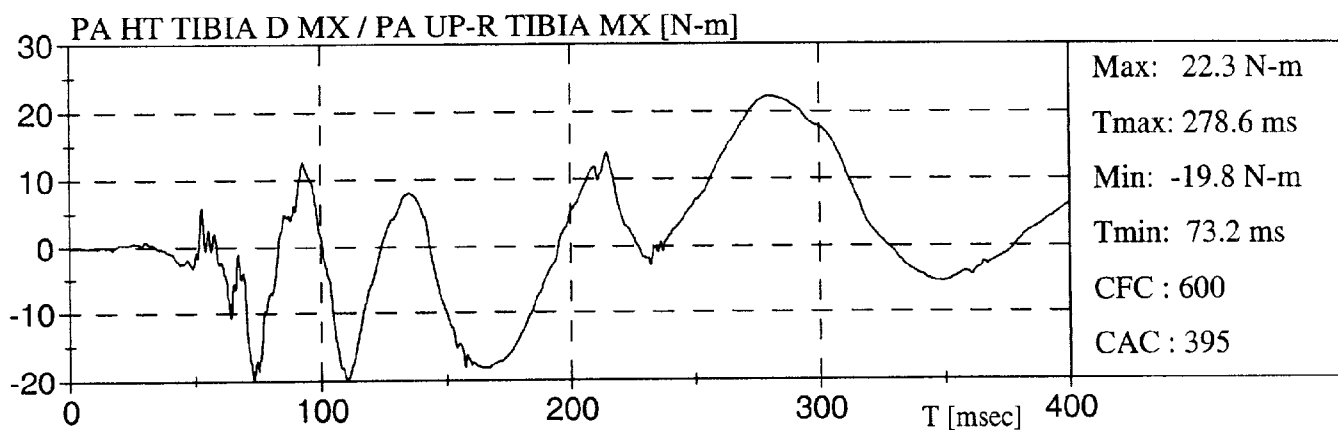
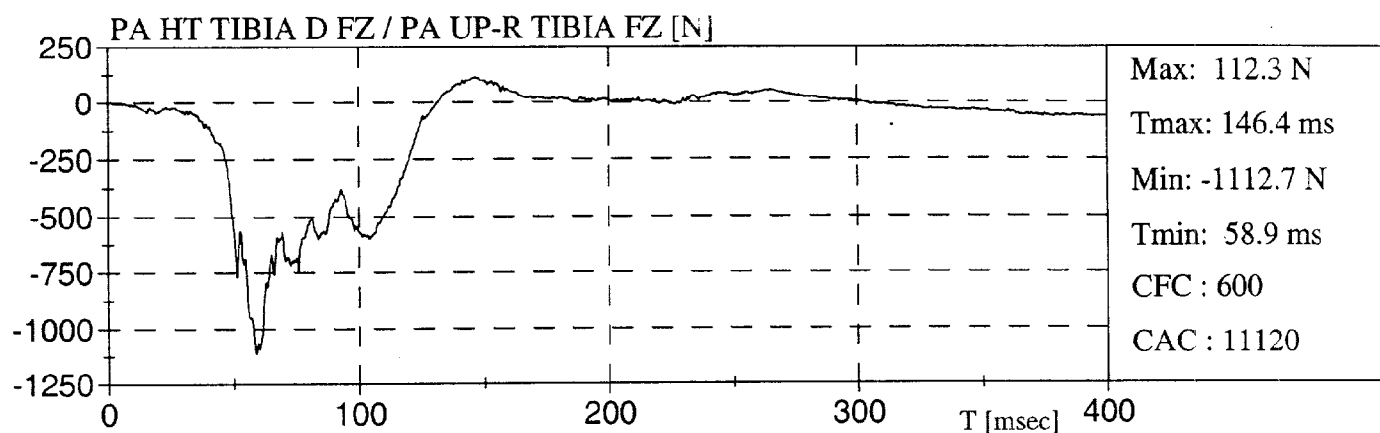
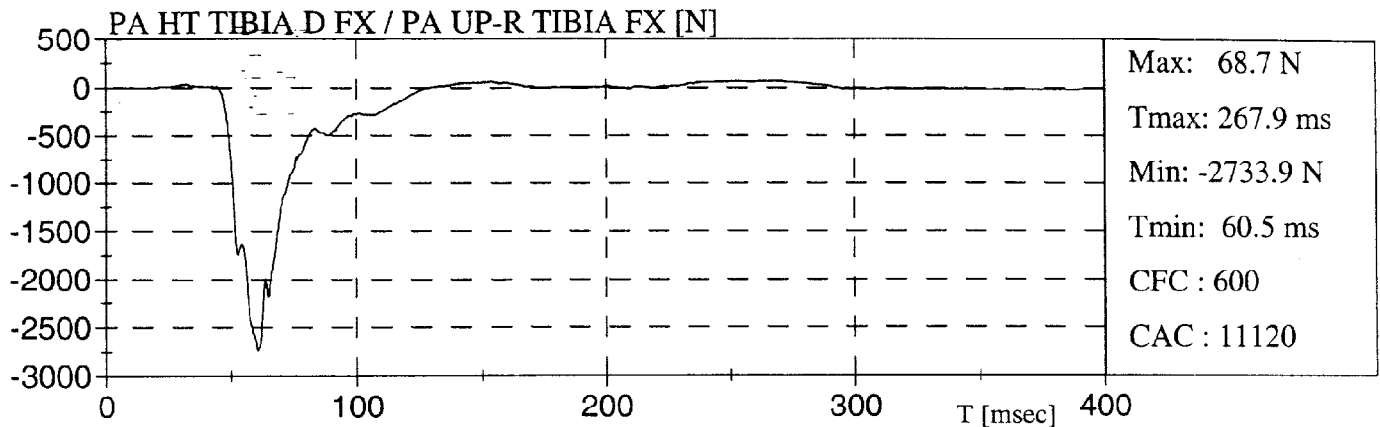


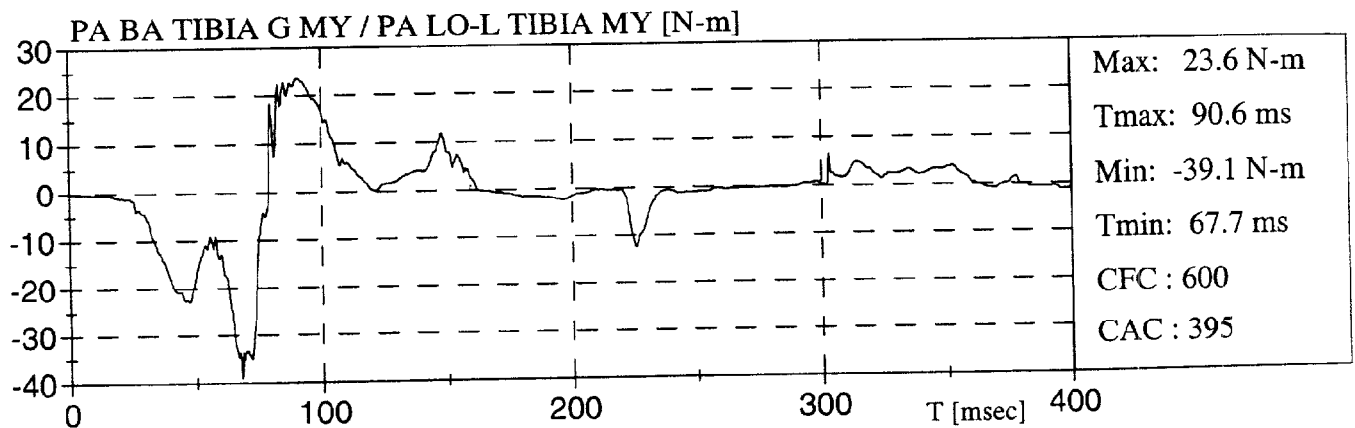
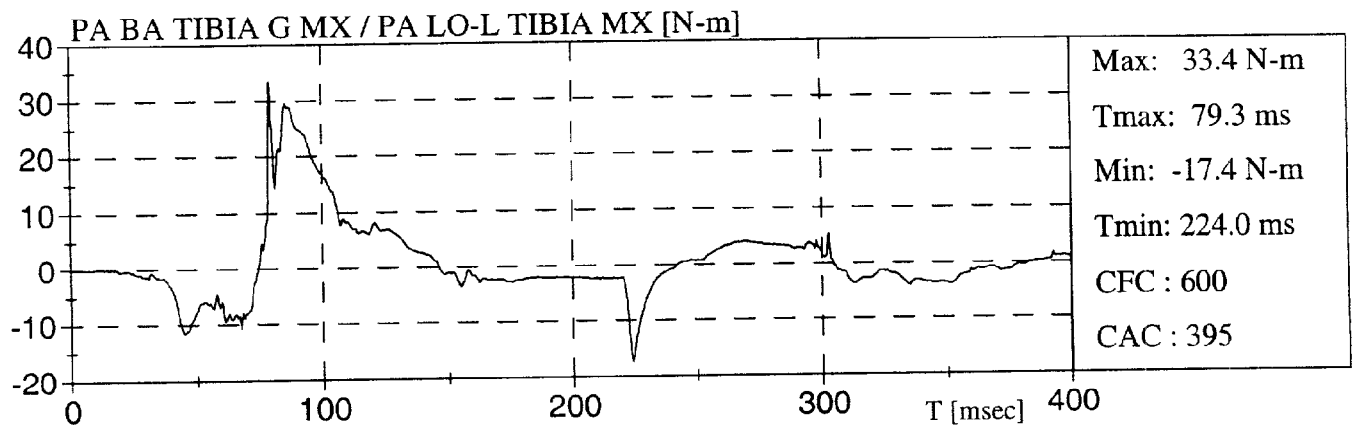
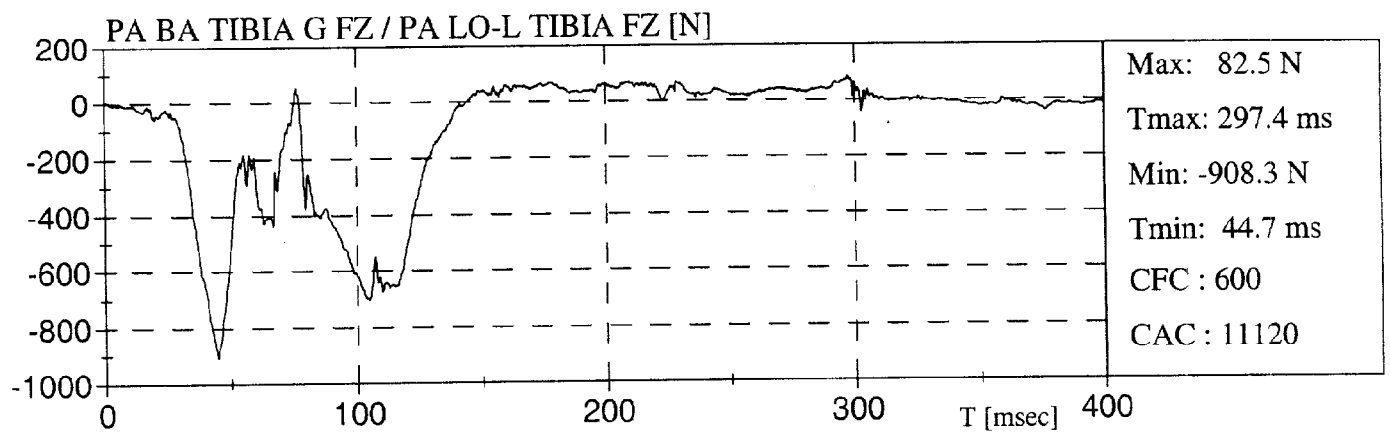
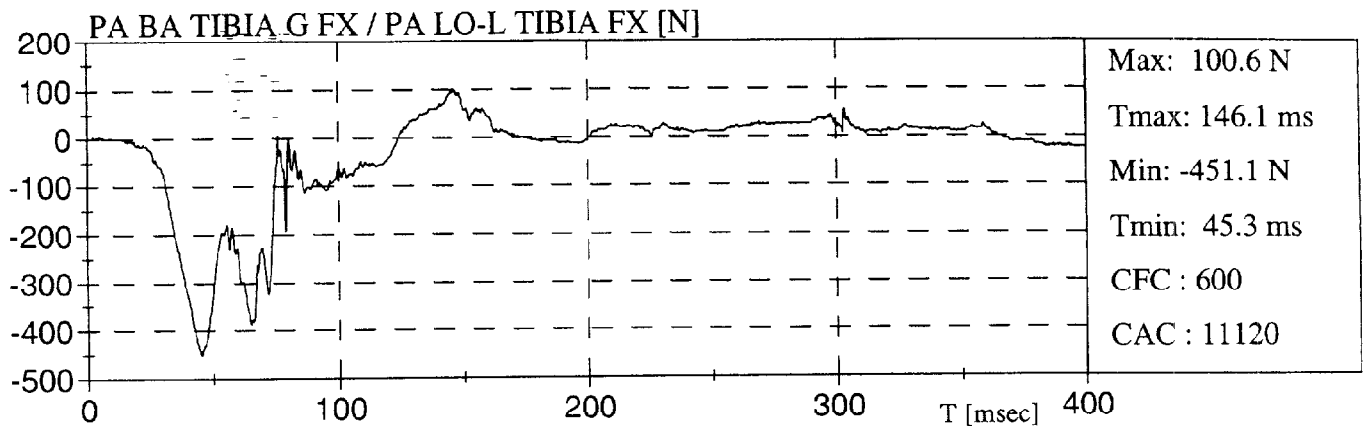


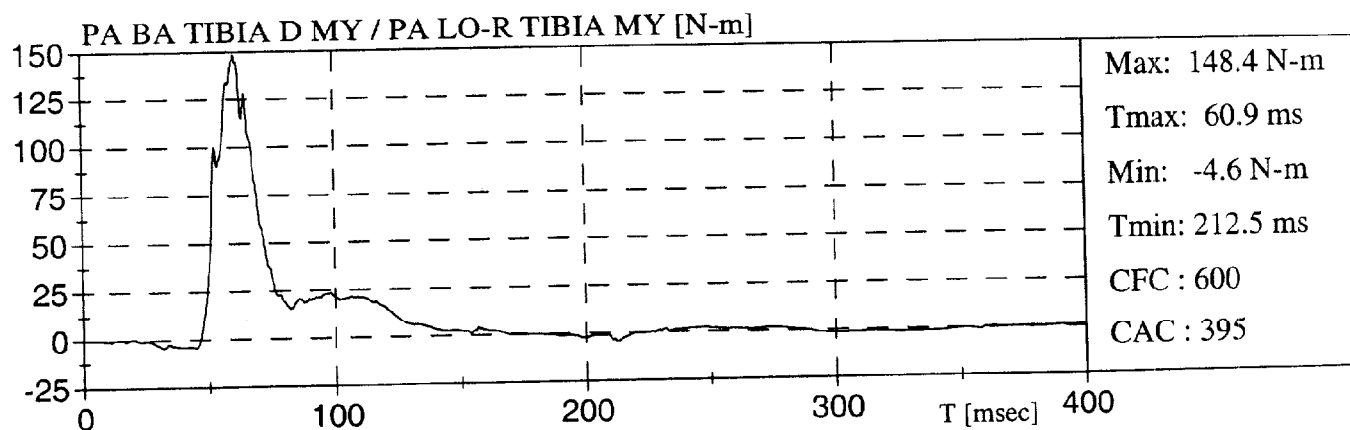
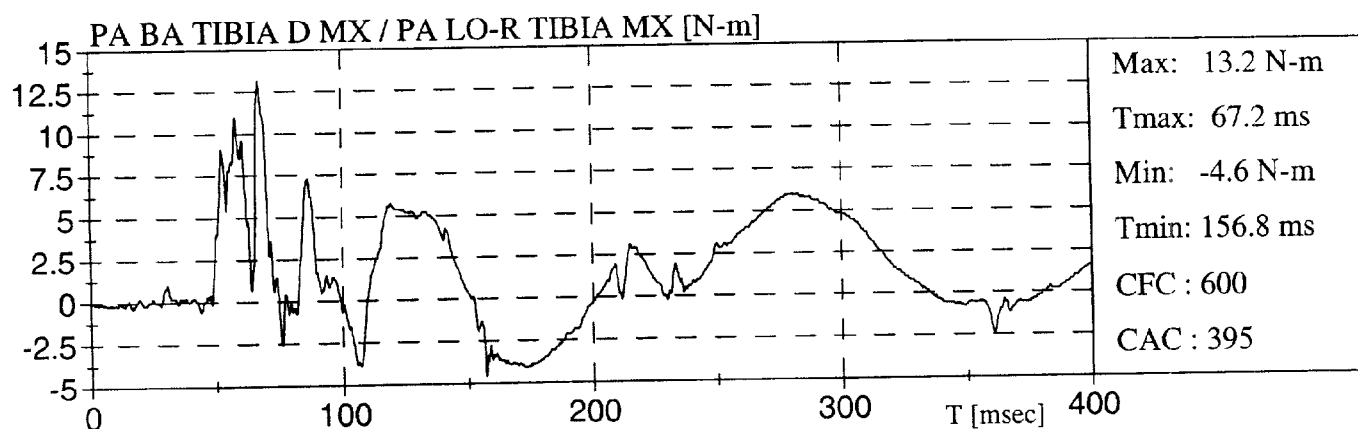
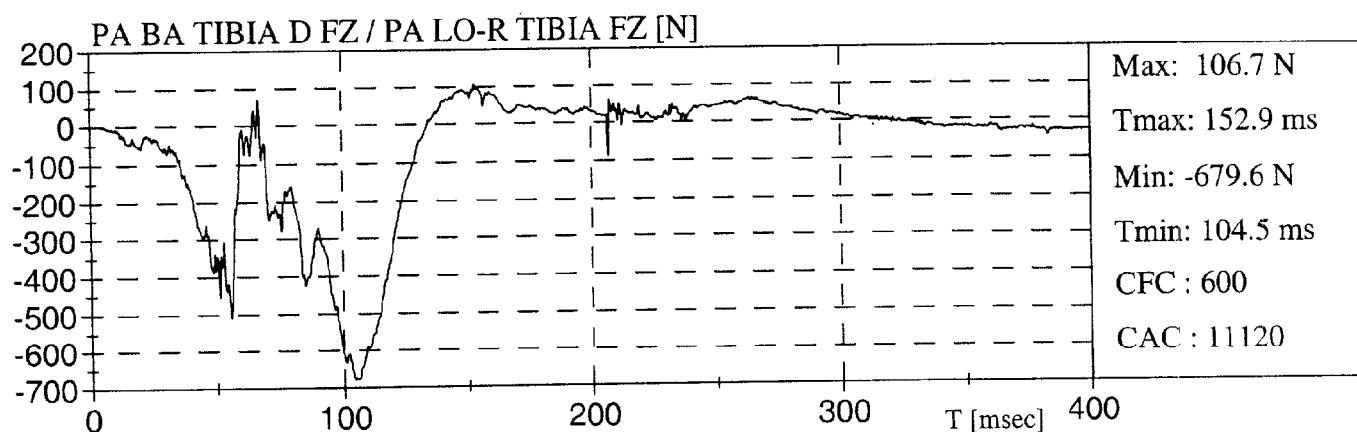
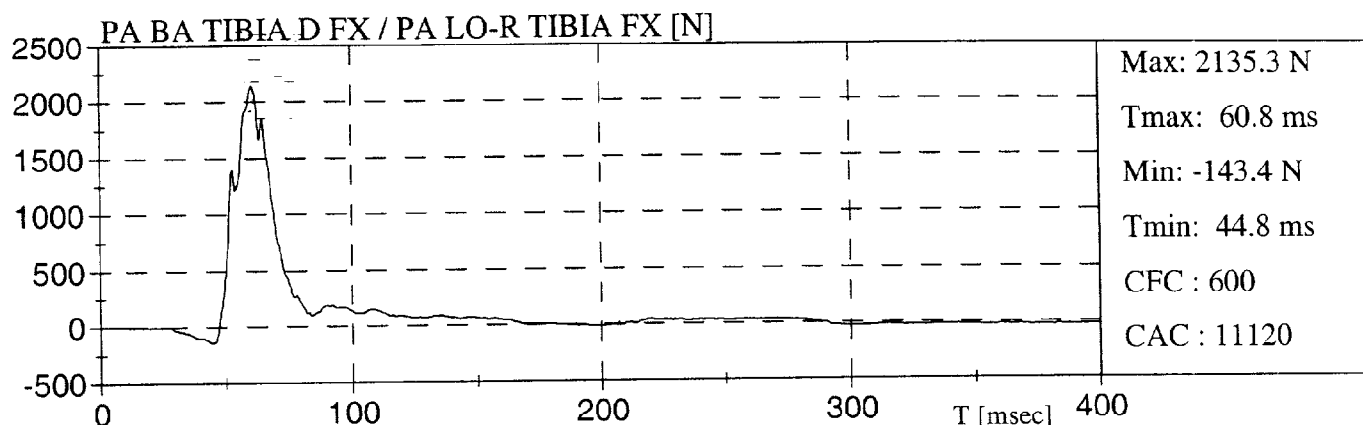


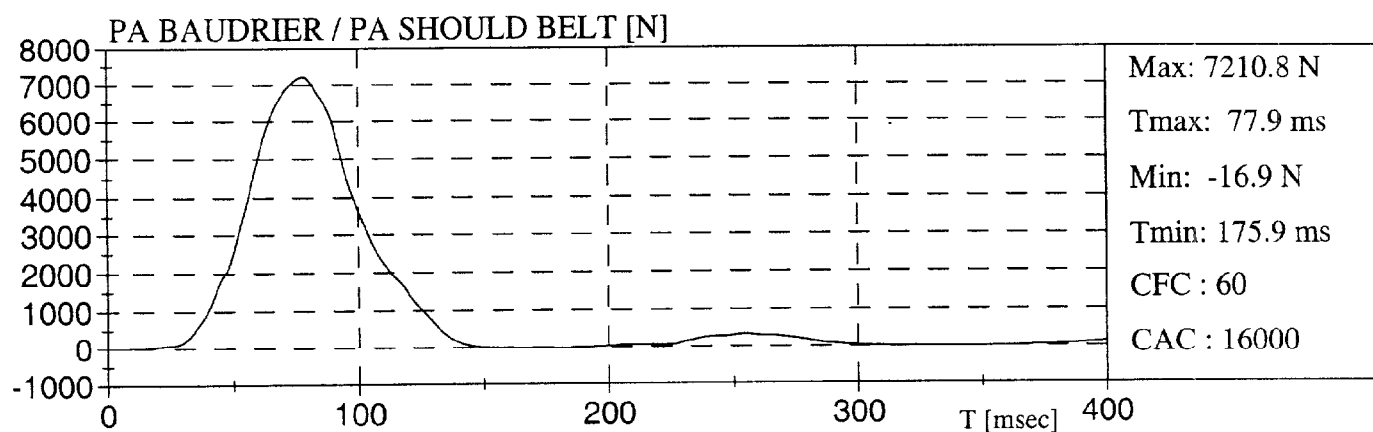
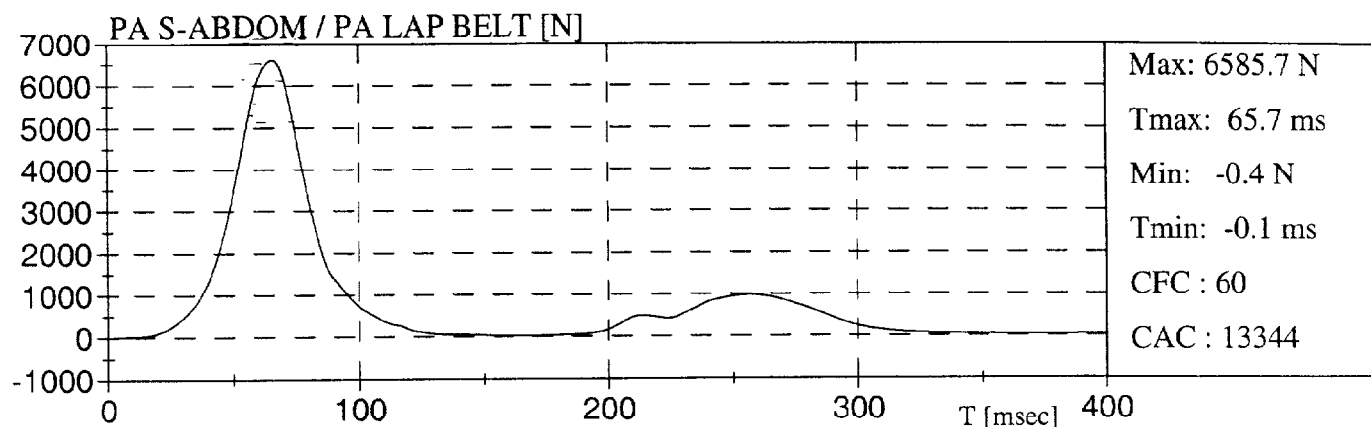


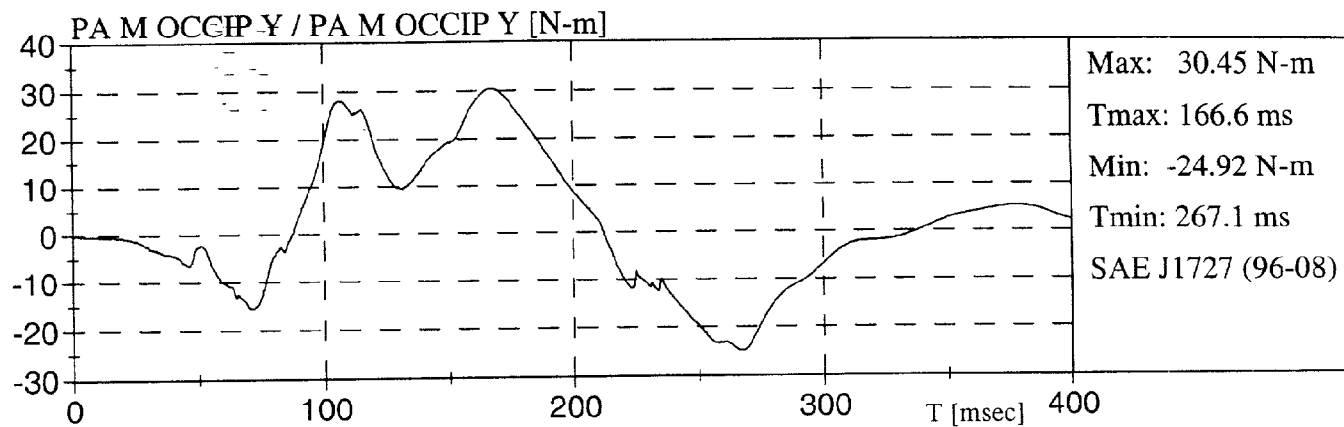


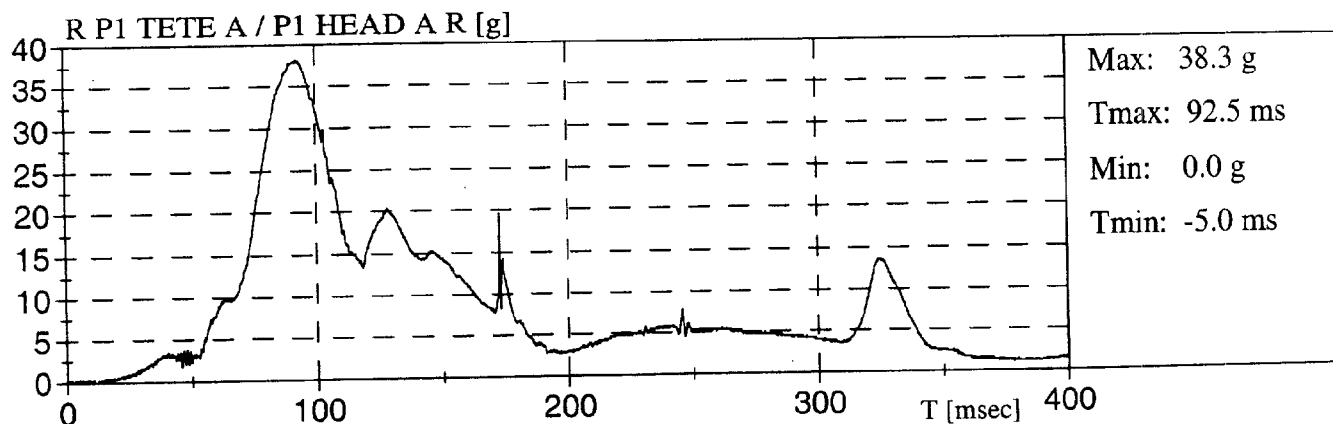
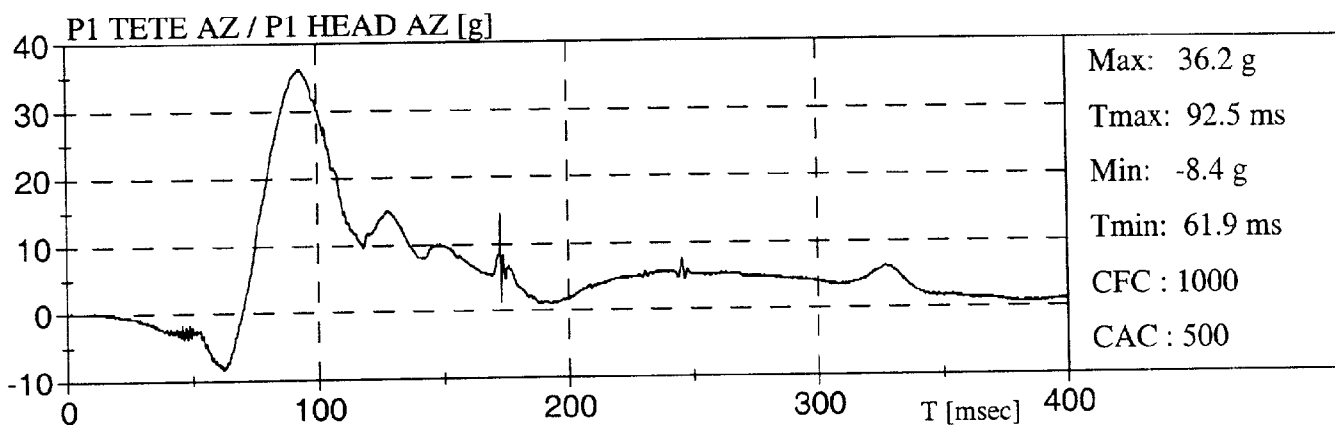
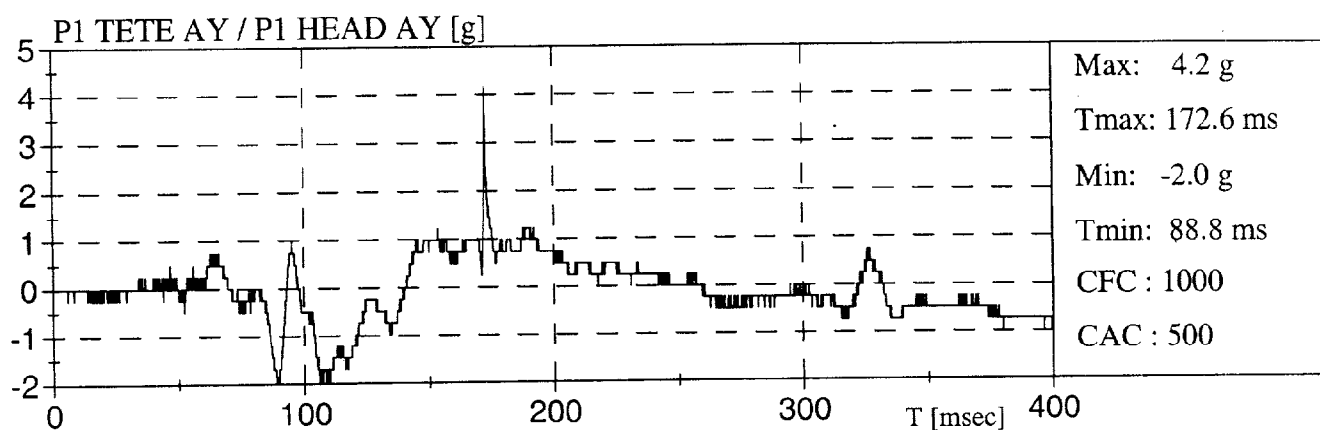
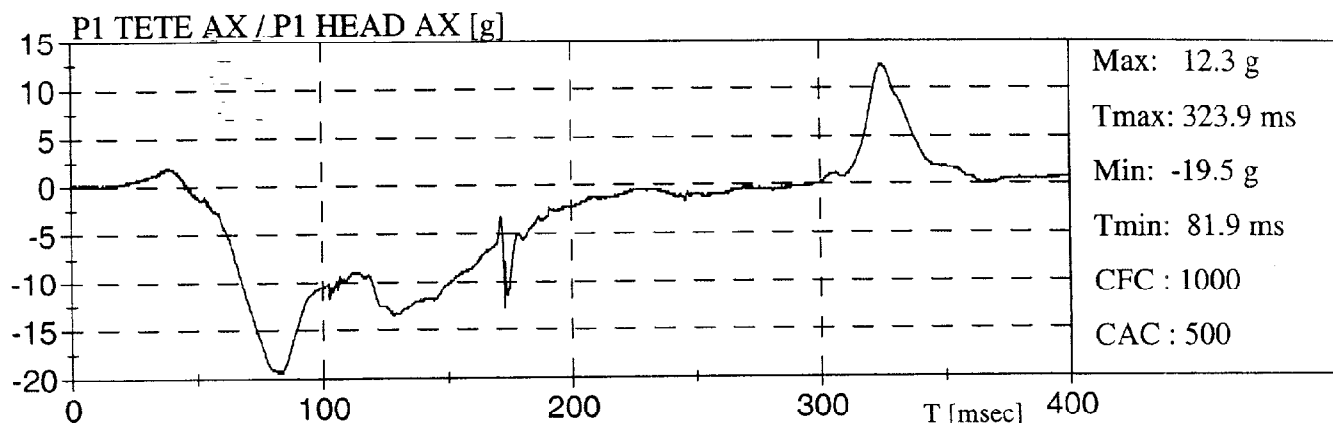














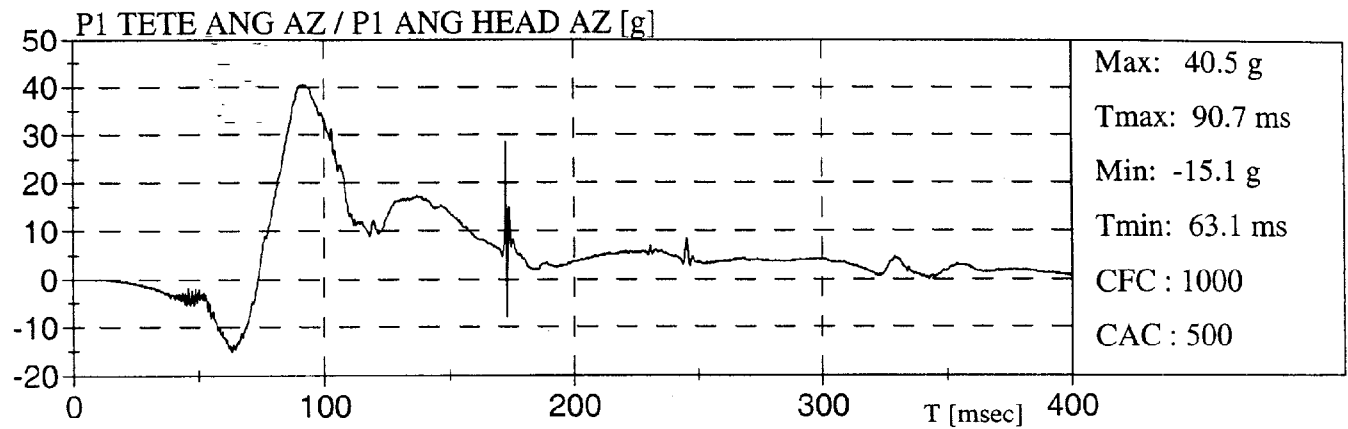
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PROTECTION DE L'OCCUPANT EN COLLISION
OCCUPANT CRASH PROTECTION

FORD EXPEDITION 99

Date: 1999-03-12

N° TC / TC No.: TC99-108





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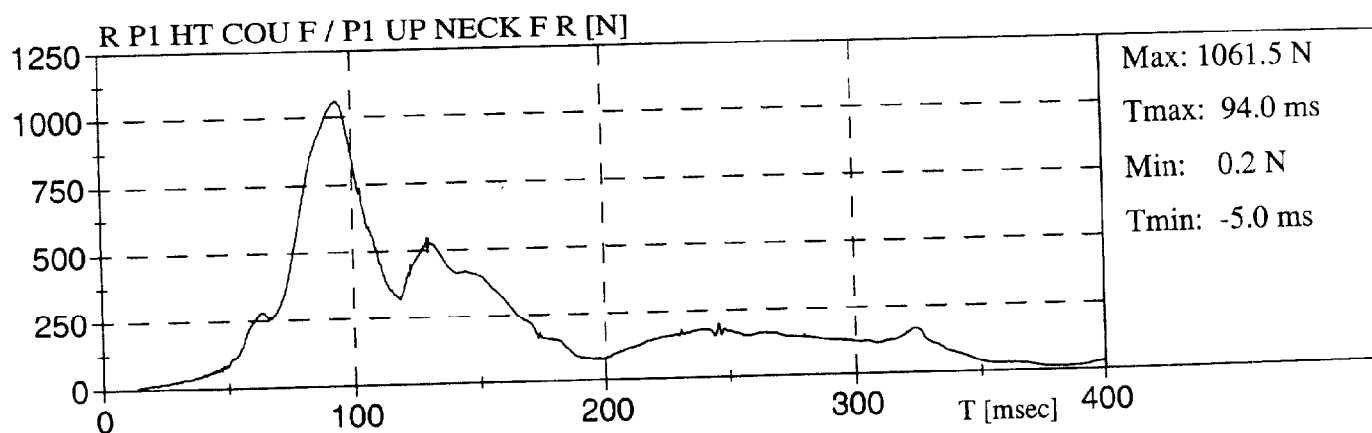
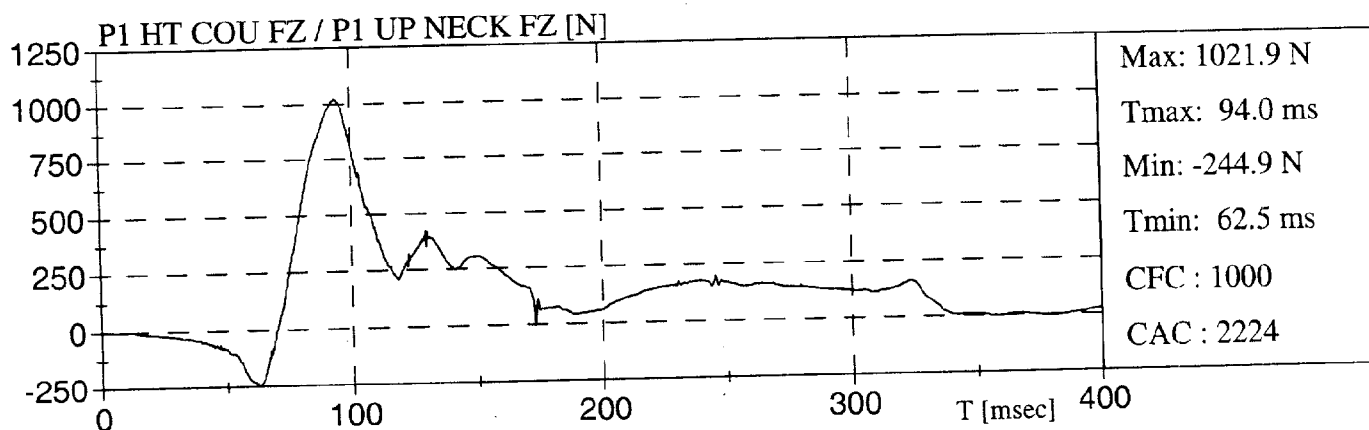
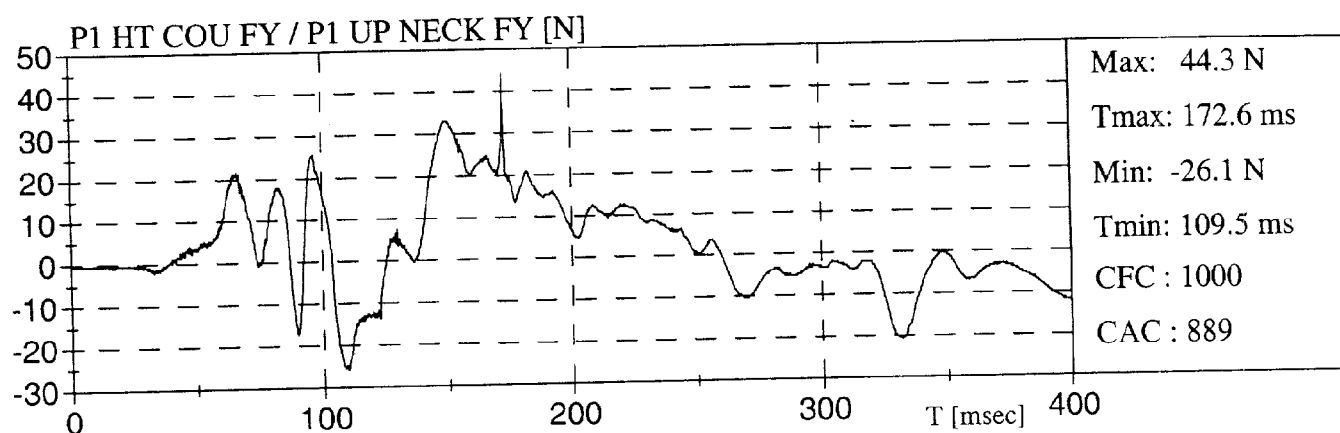
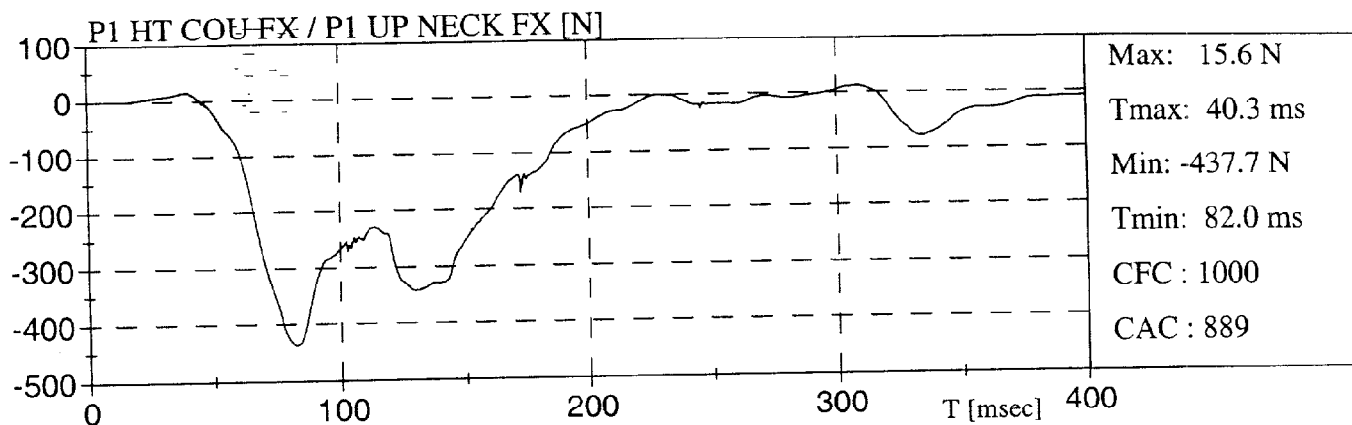
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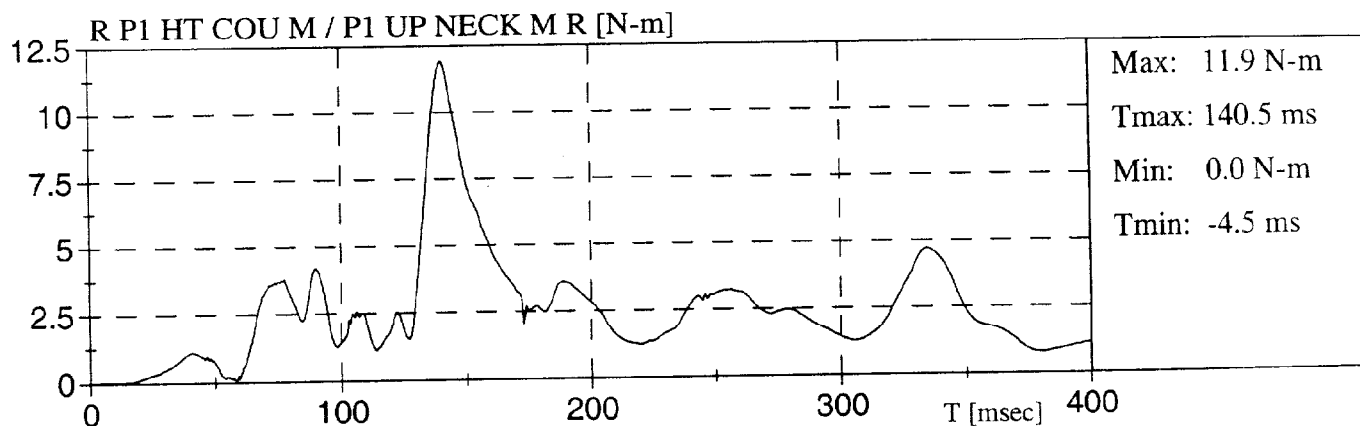
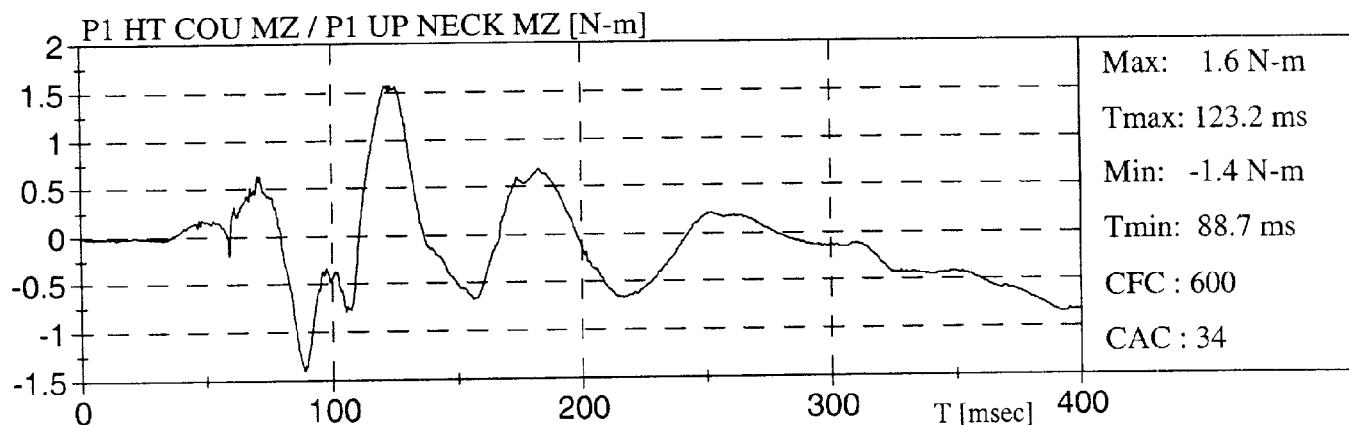
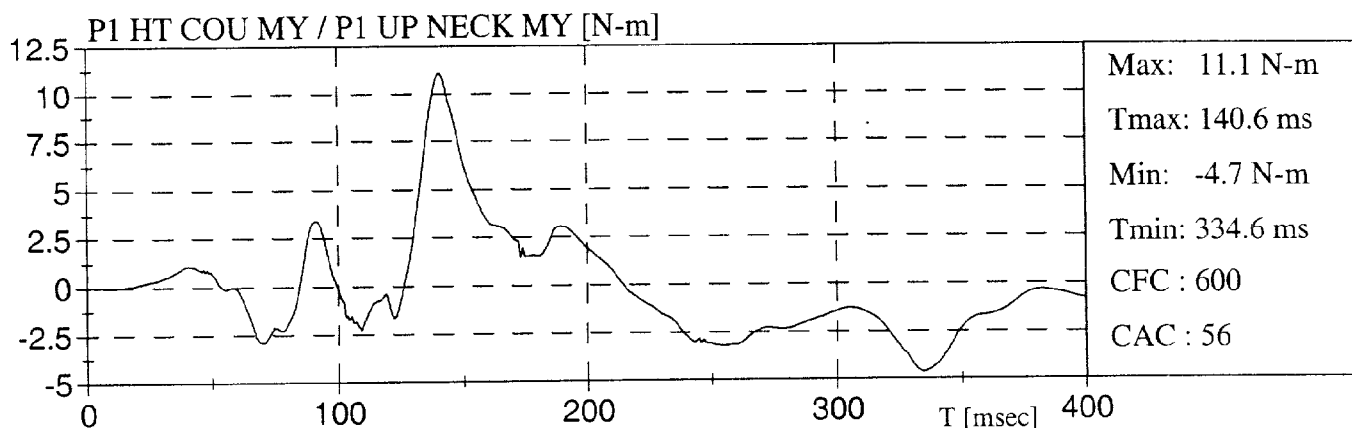
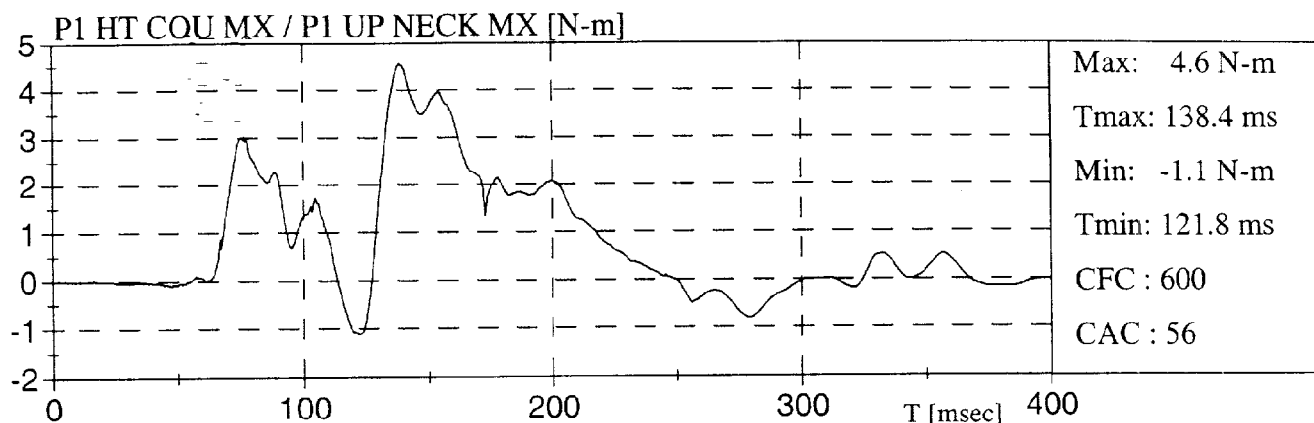
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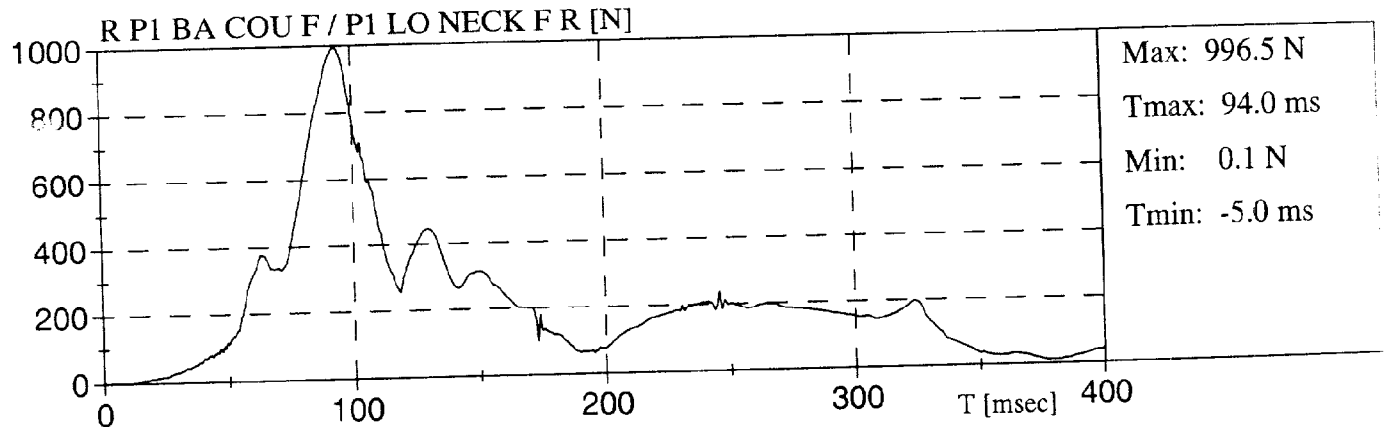
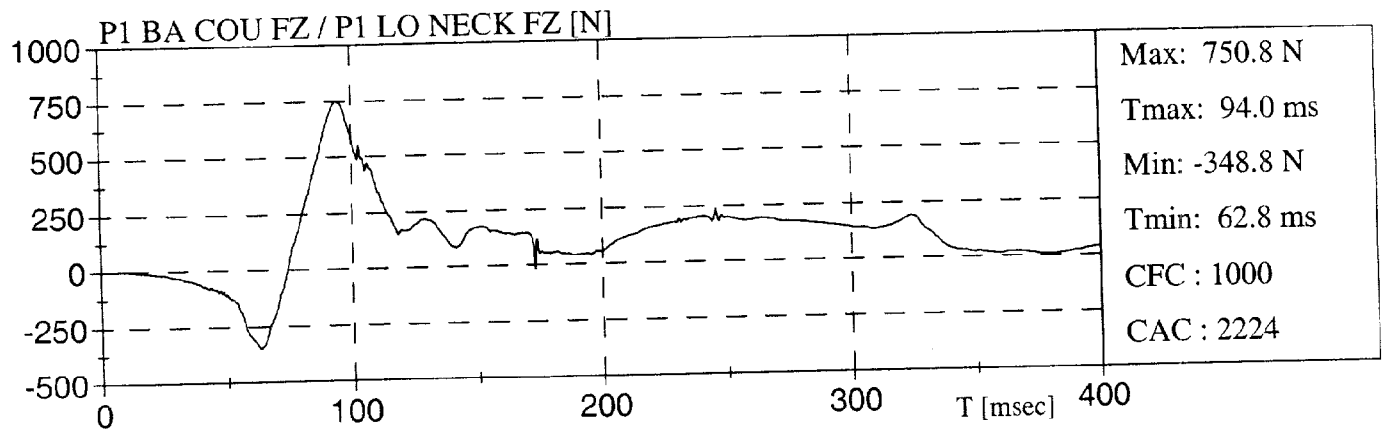
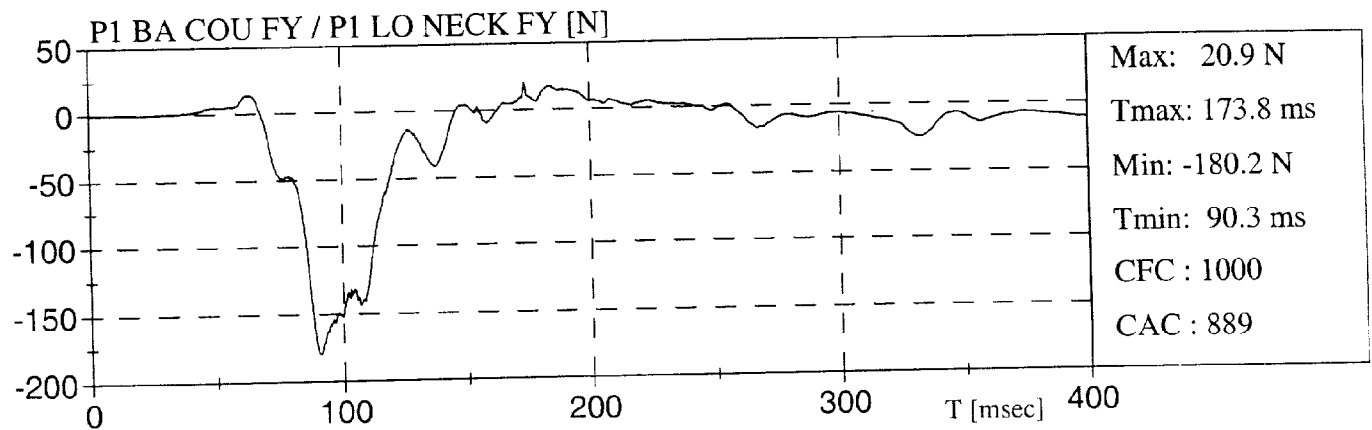
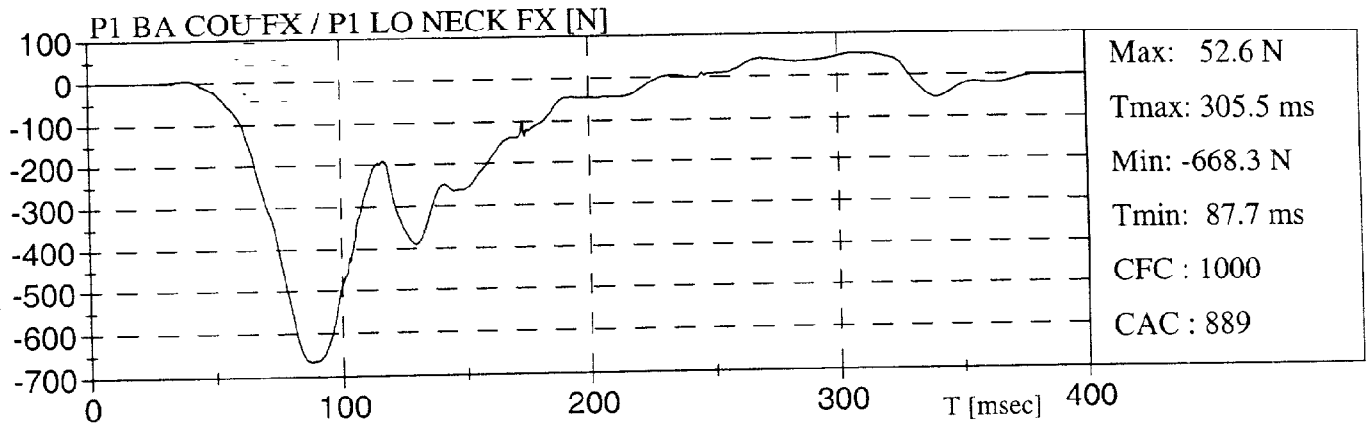
FORD EXPEDITION 99

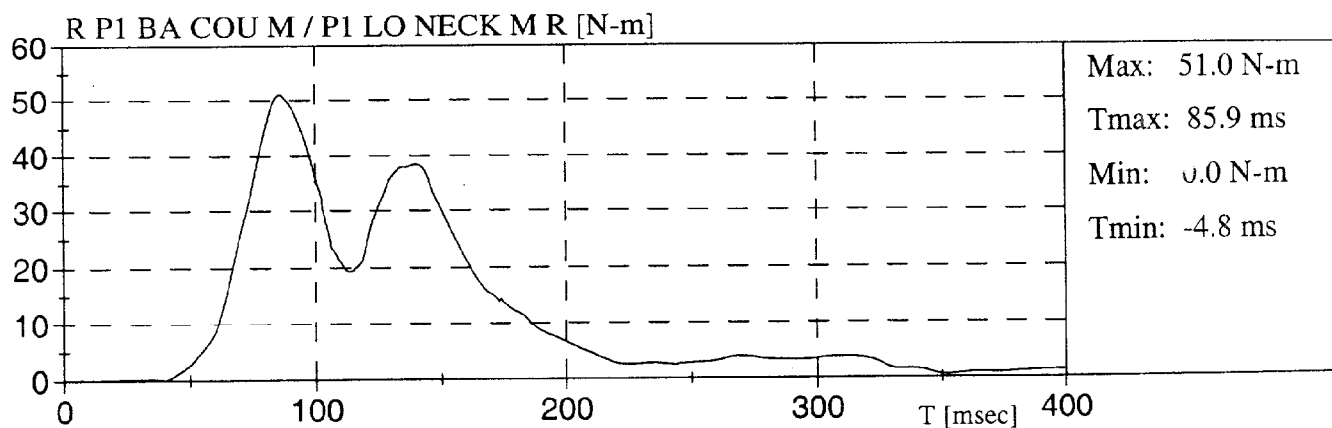
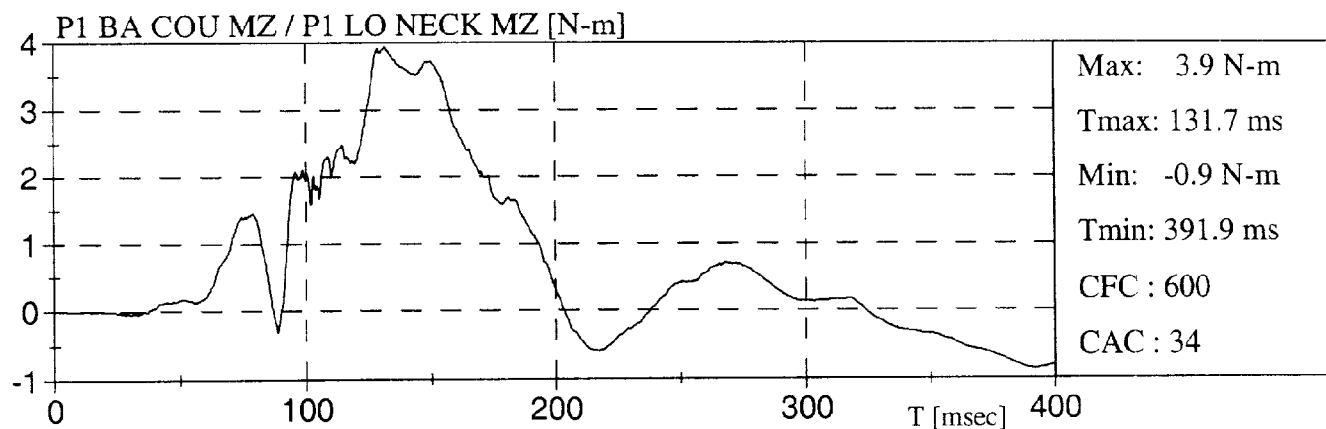
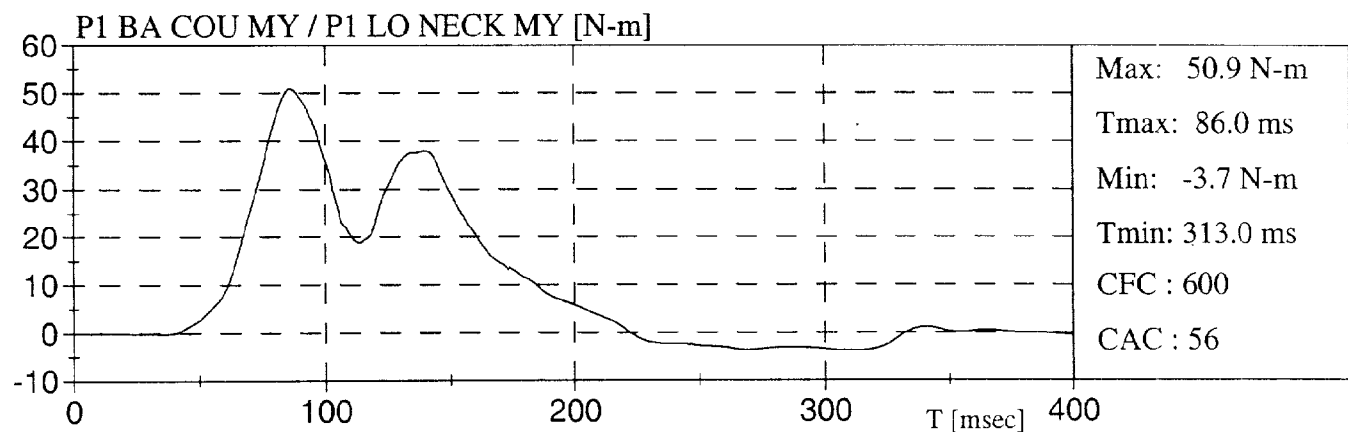
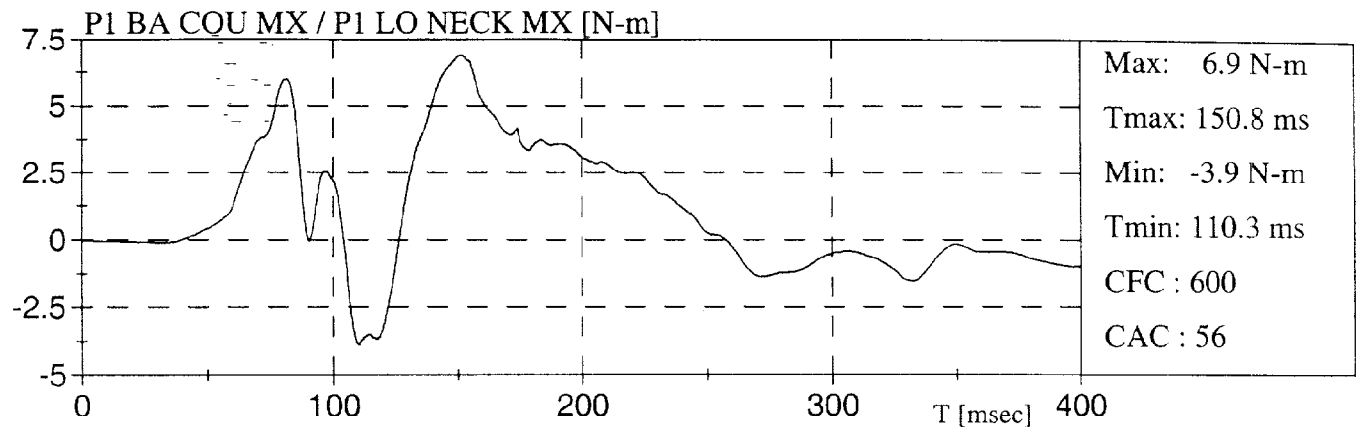
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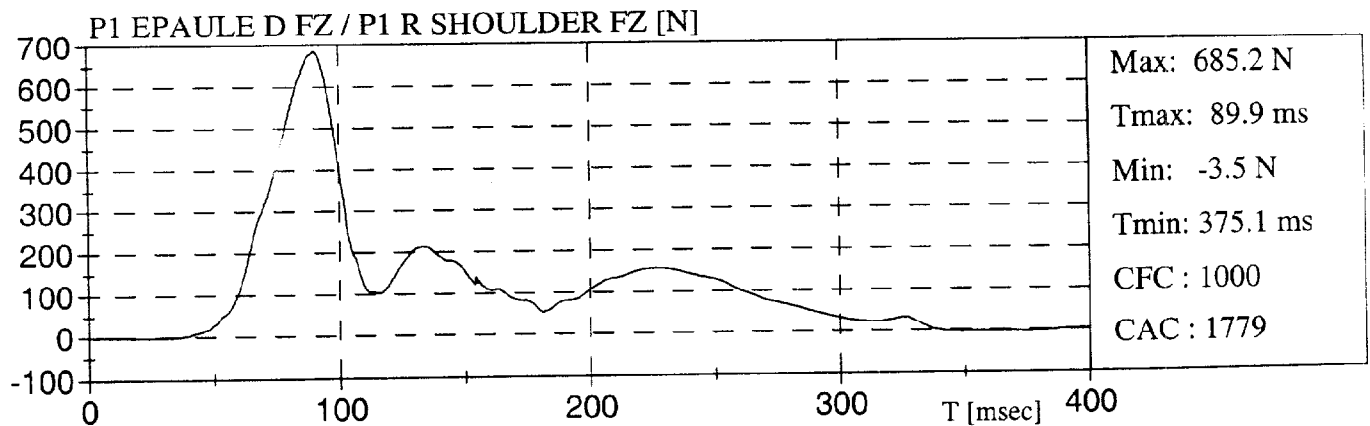
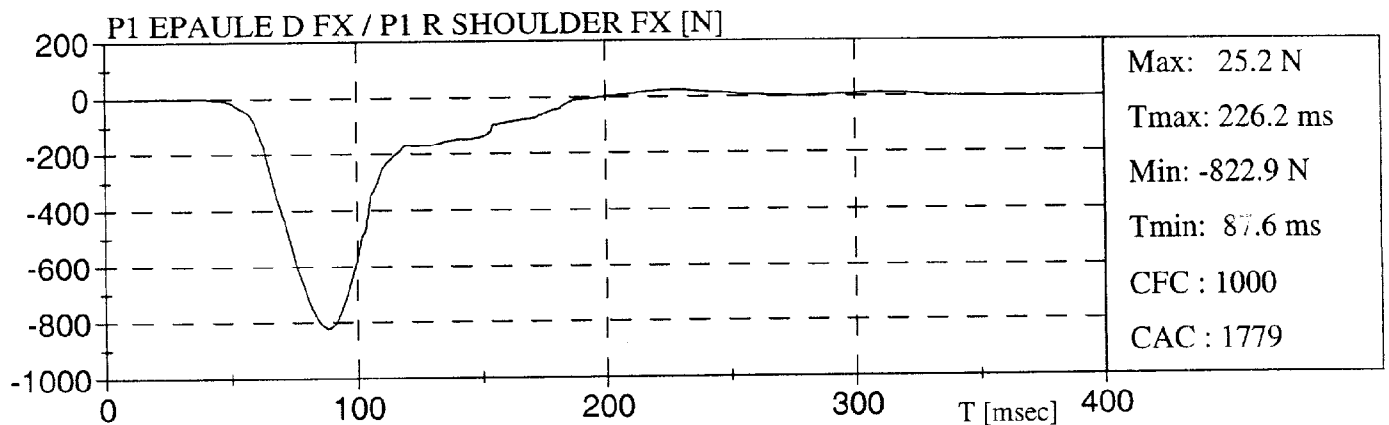
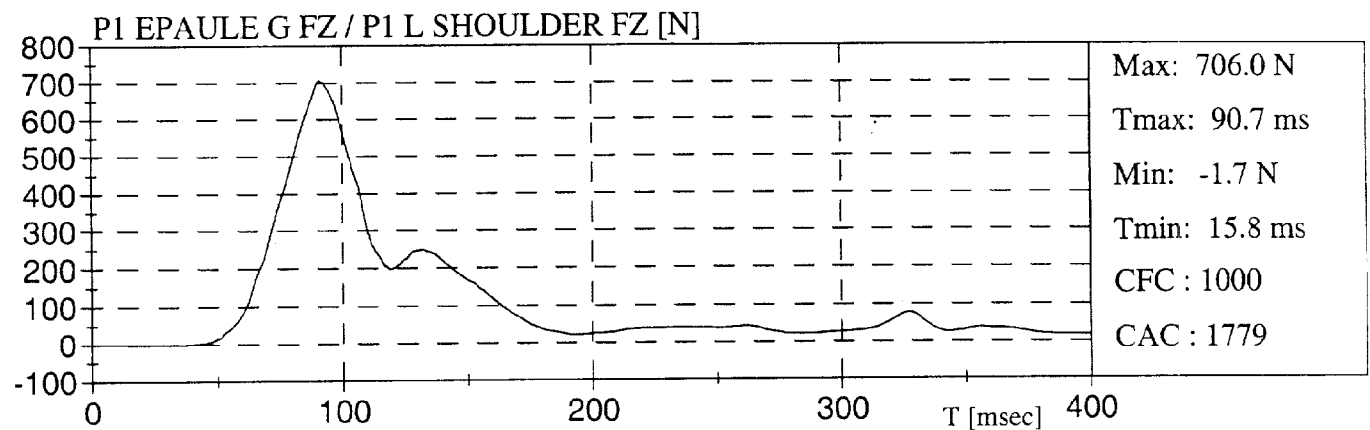
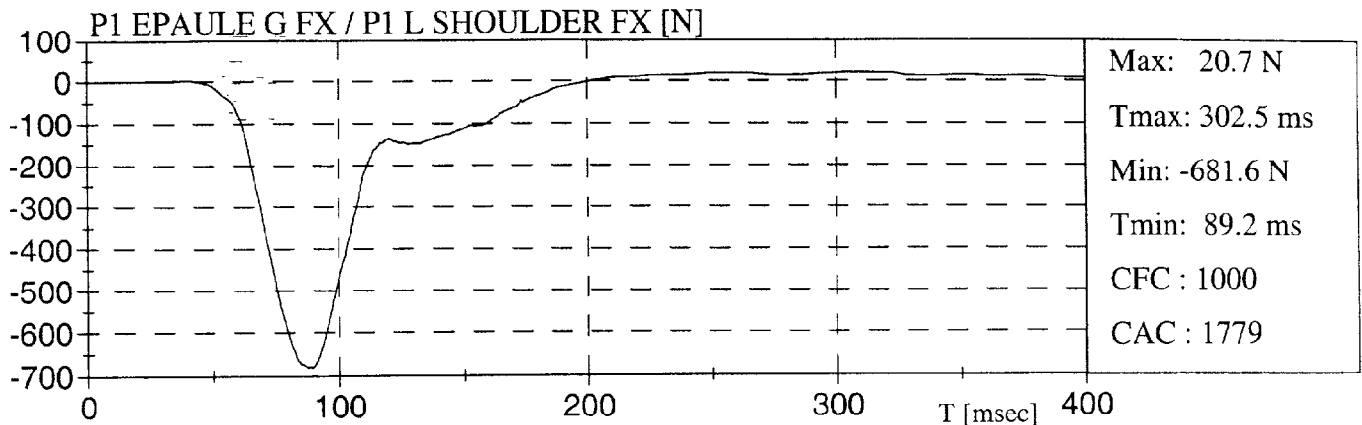
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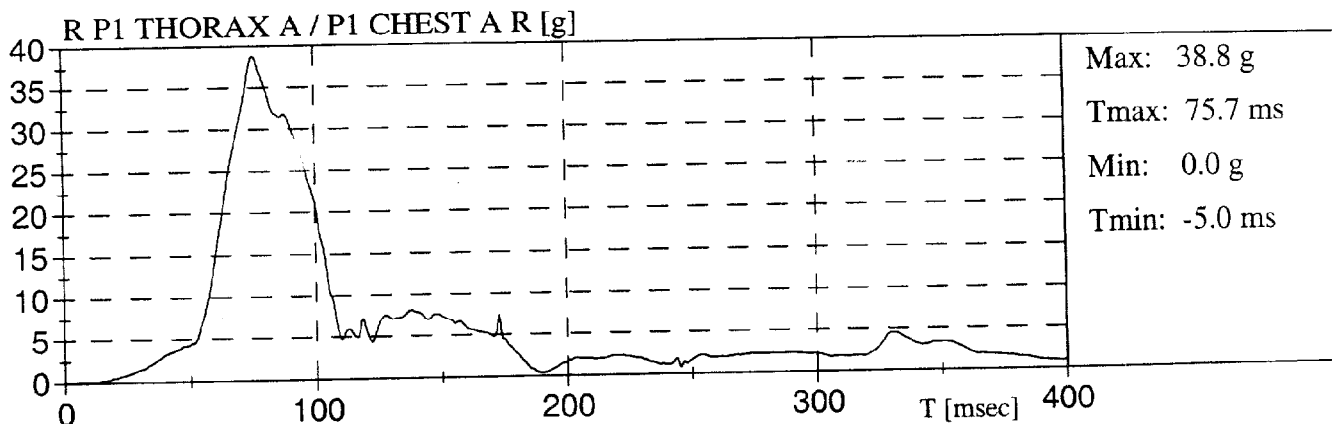
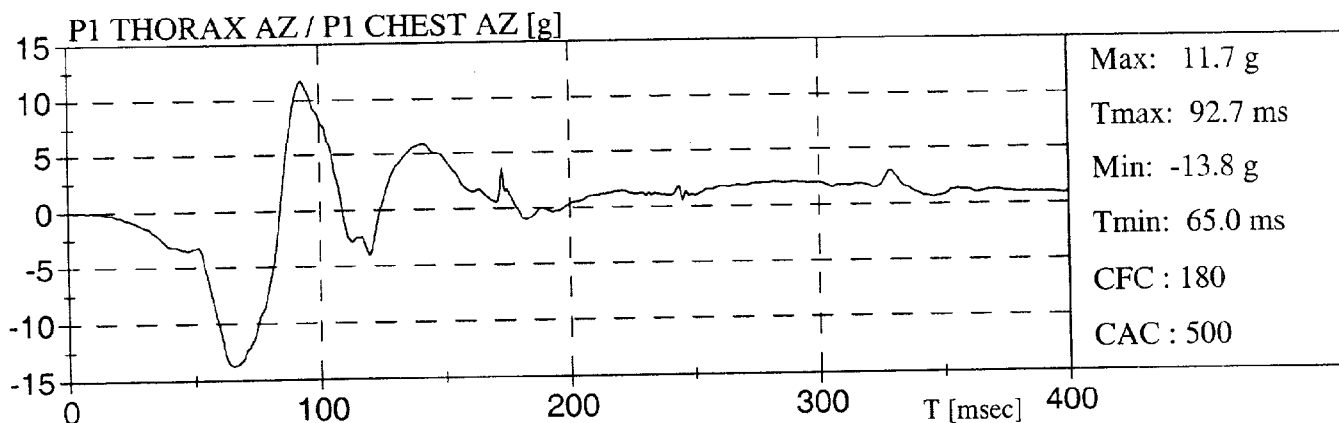
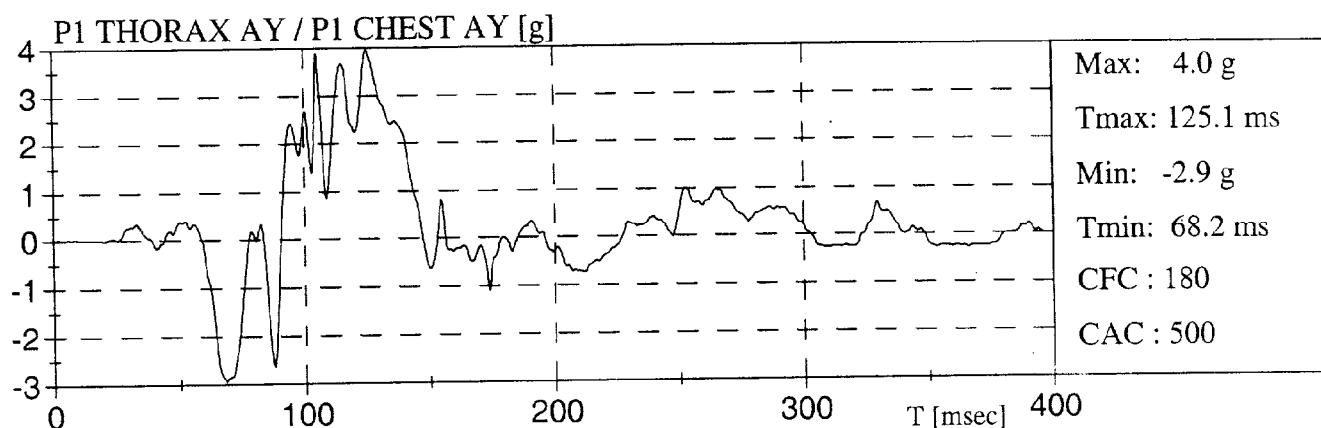
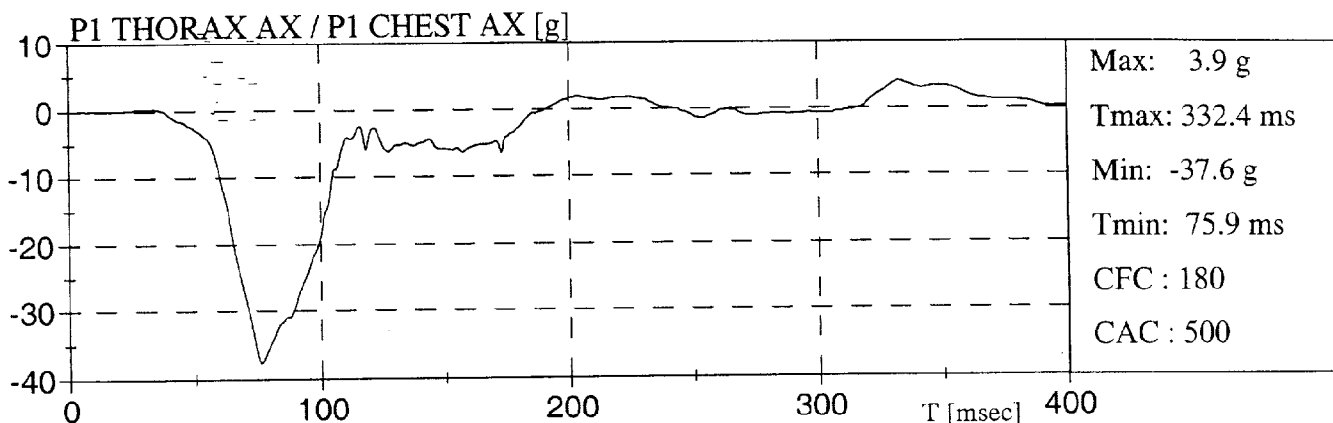


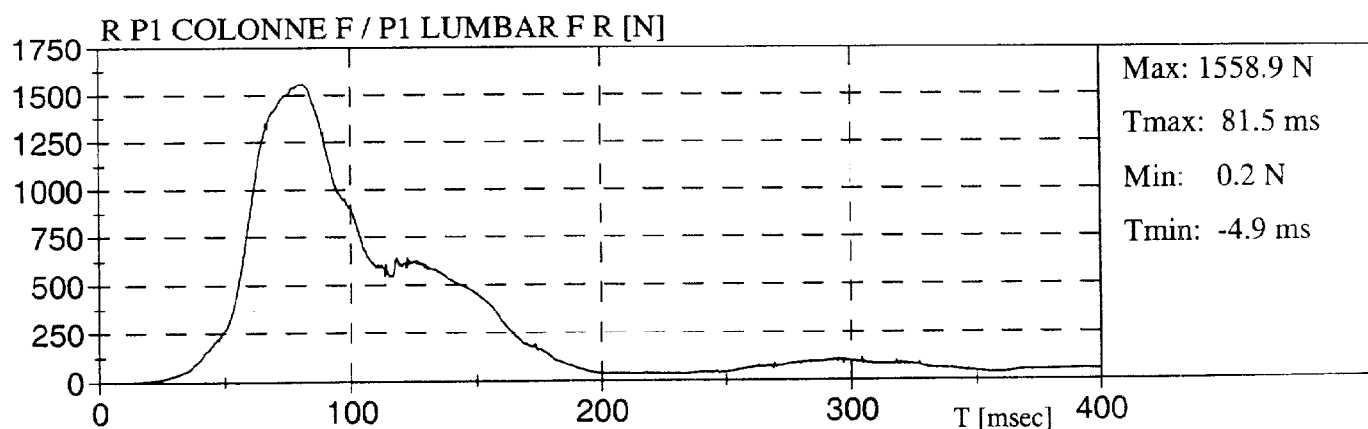
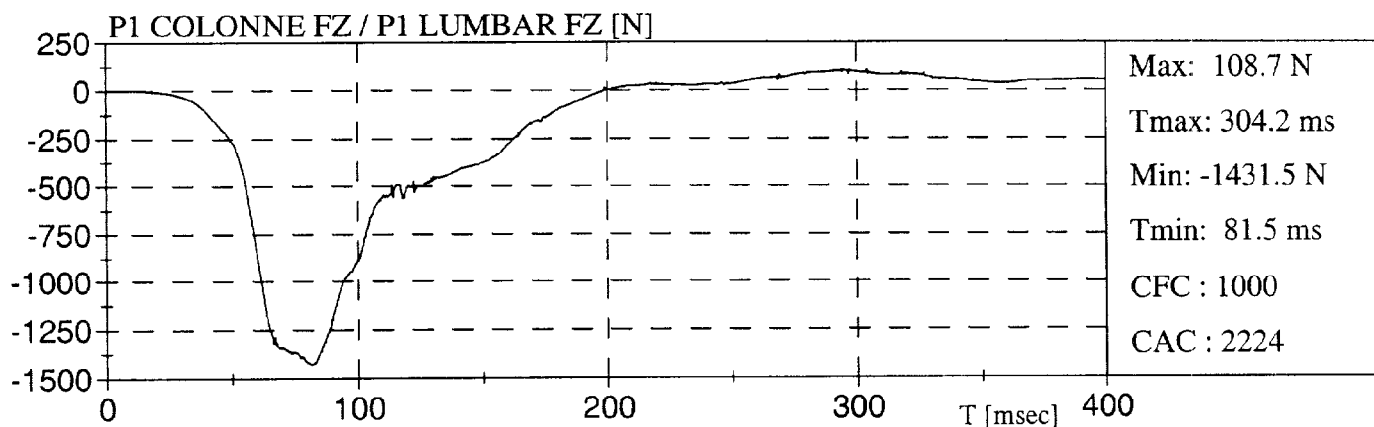
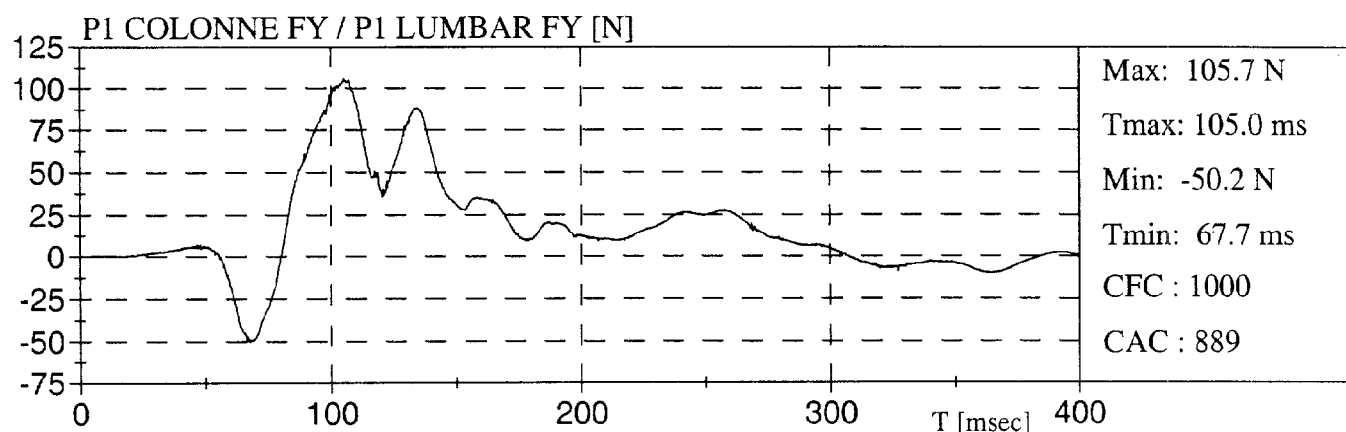
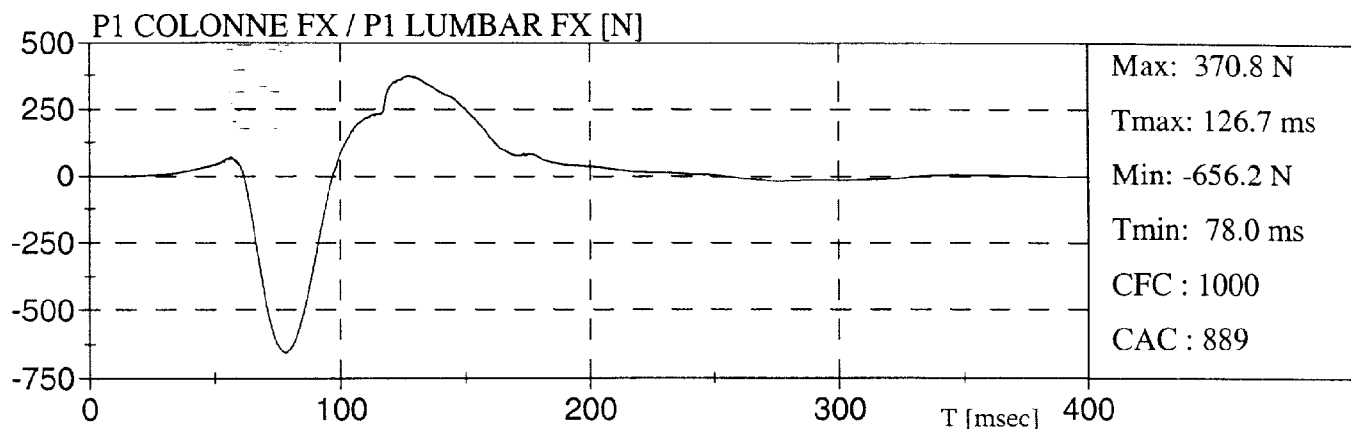


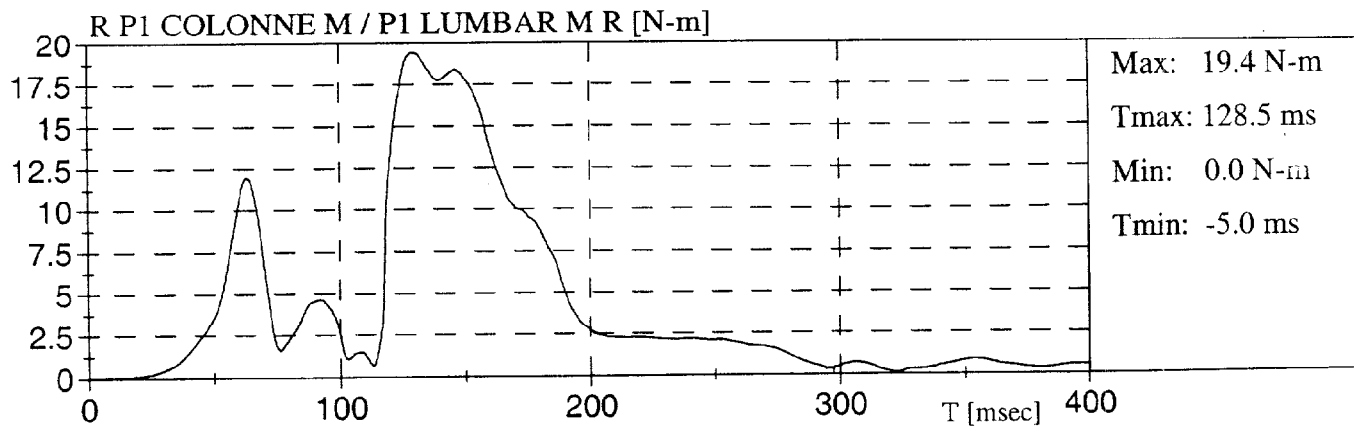
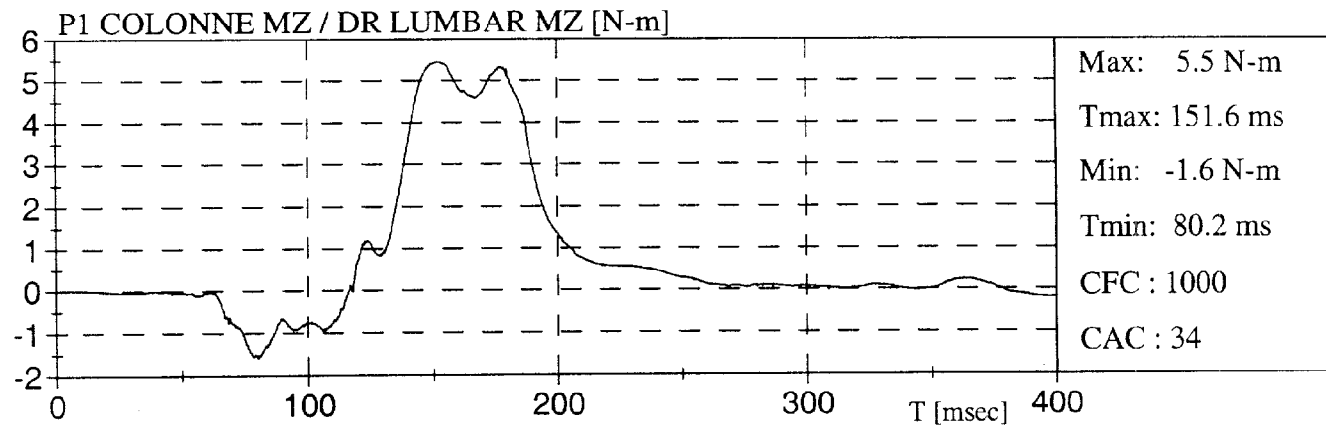
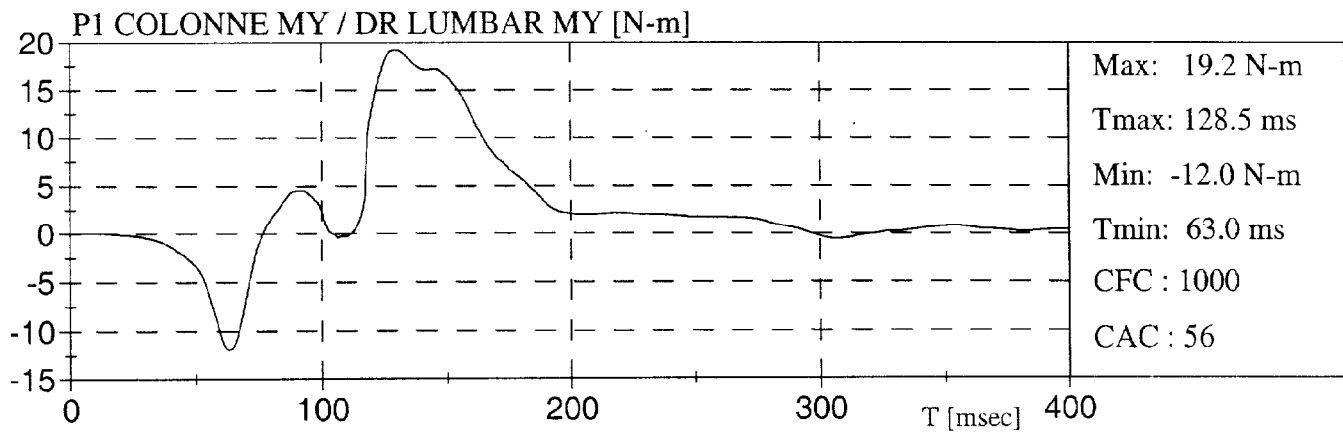
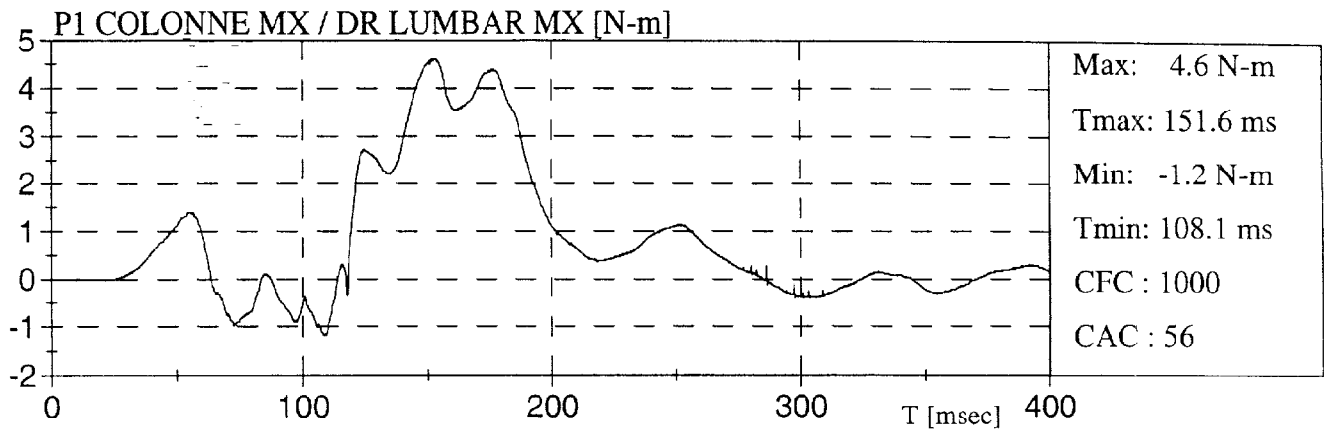


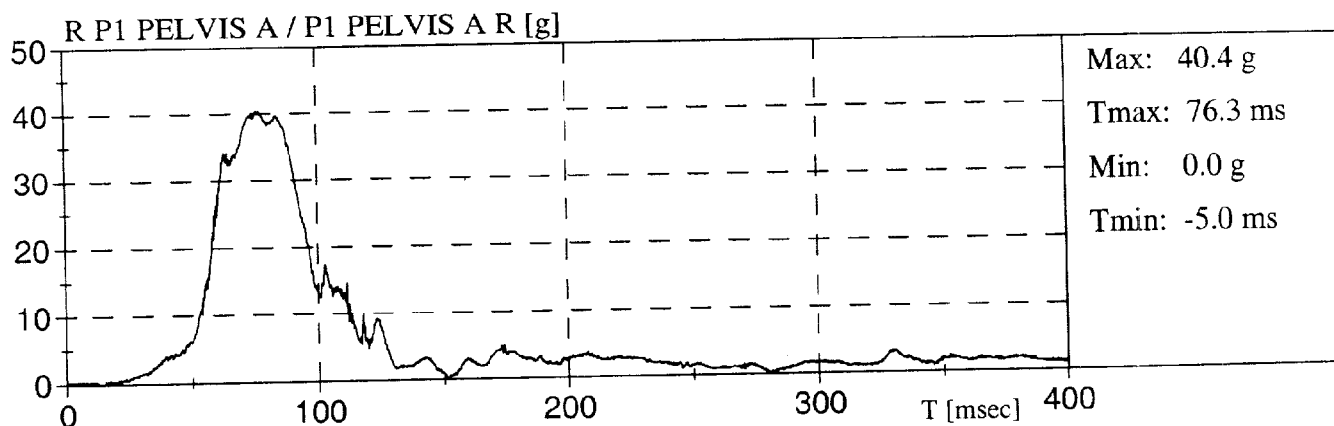
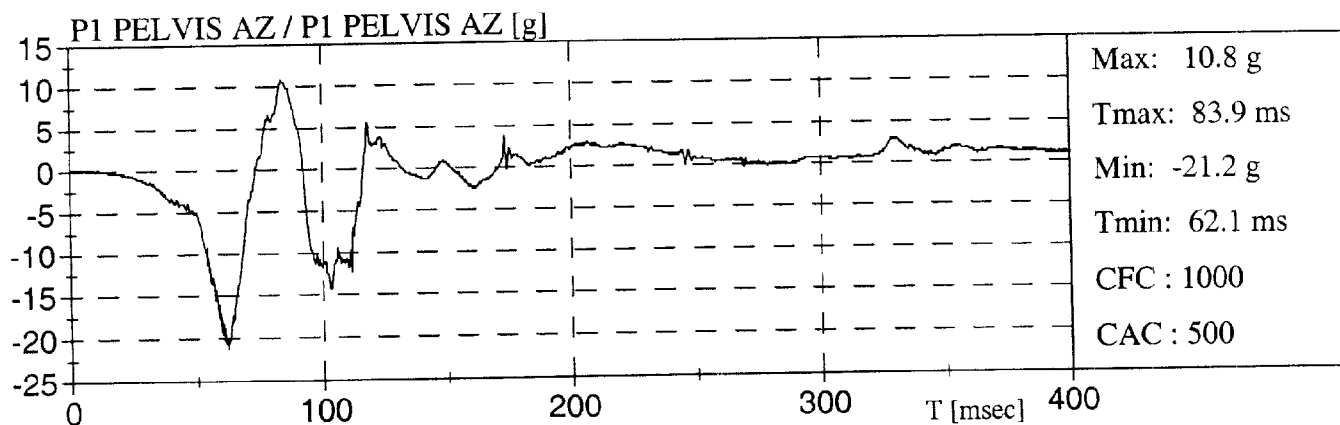
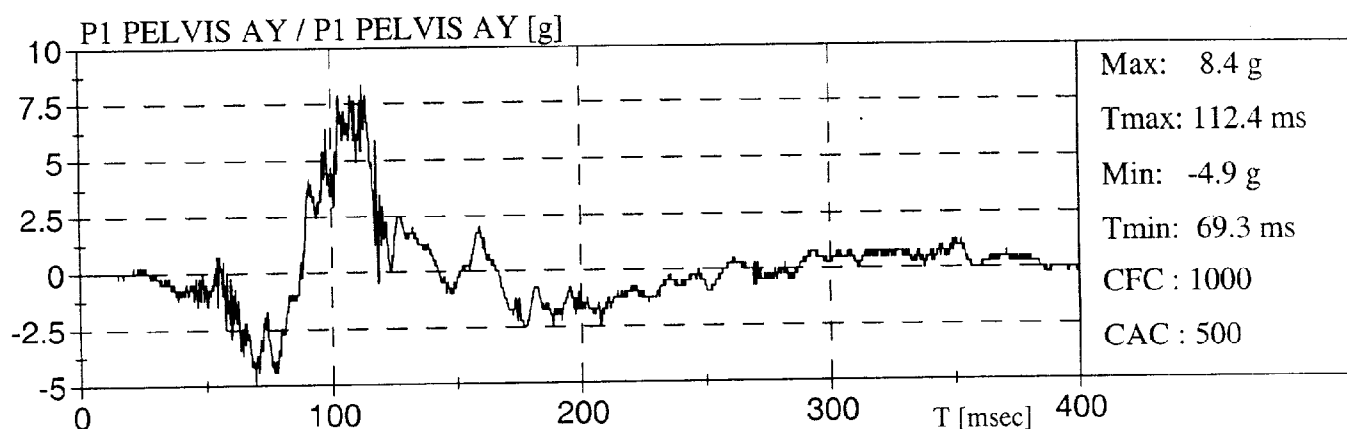
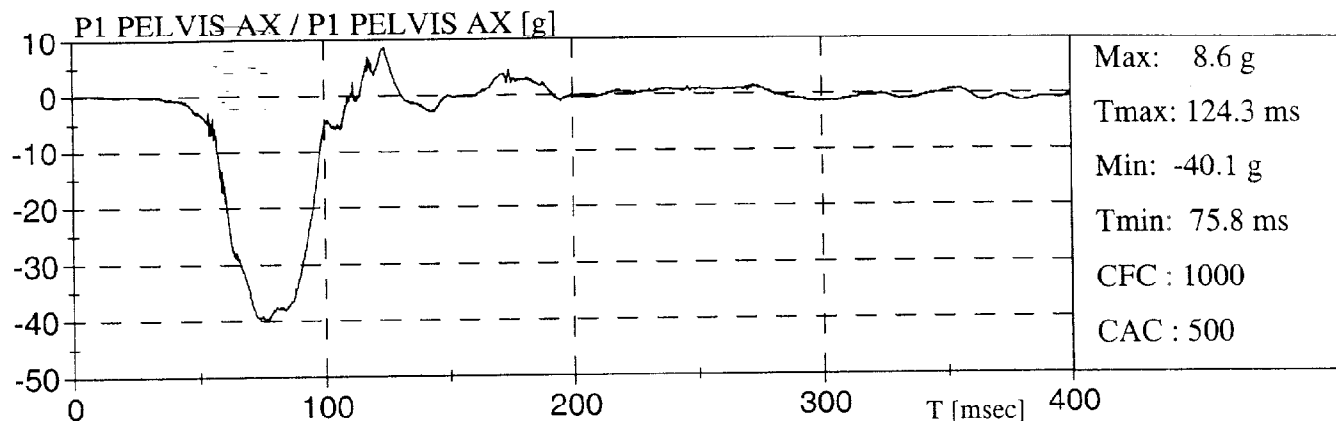


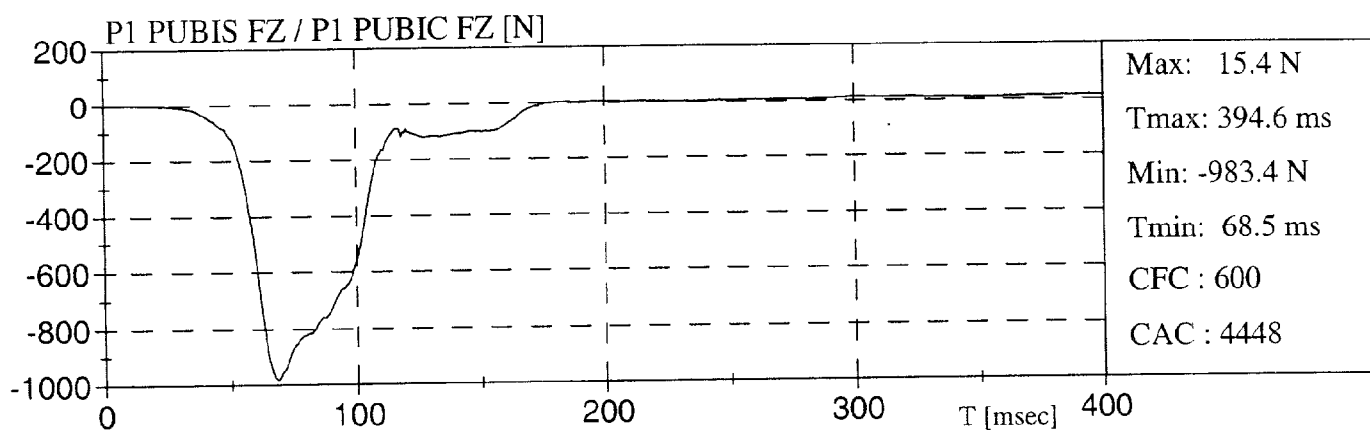
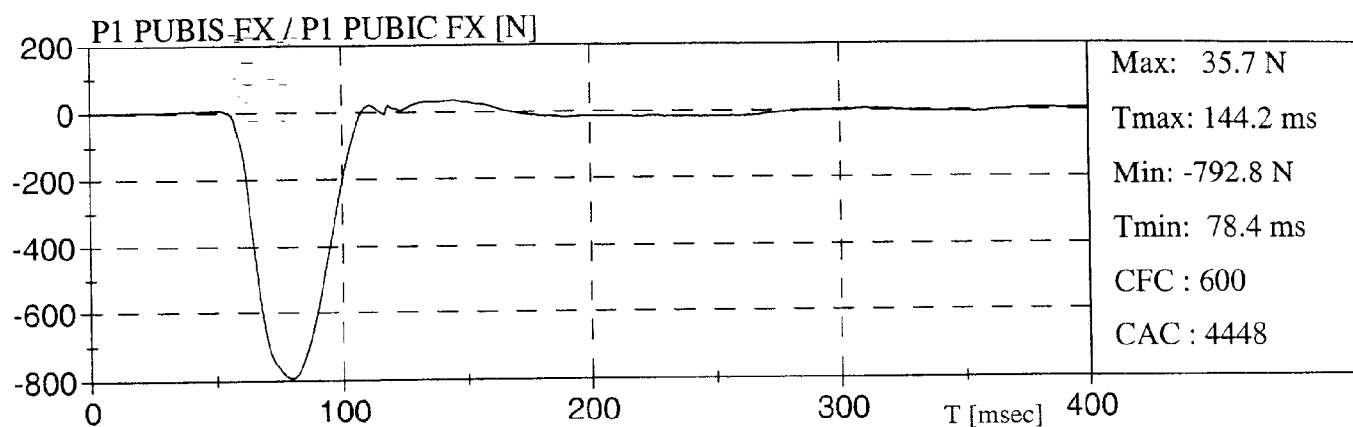














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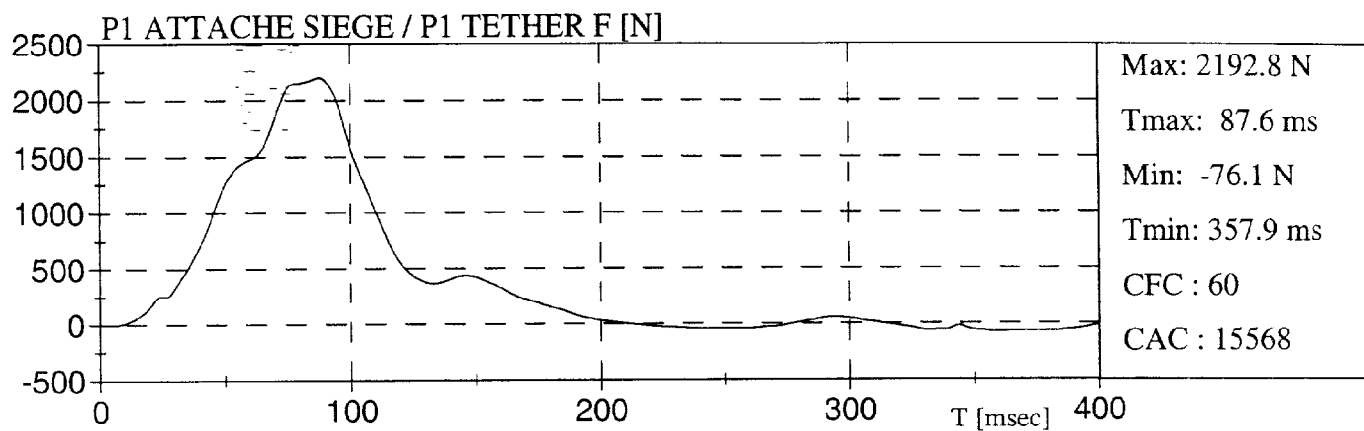
PROTECTION DE L'OCCUPANT EN COLLISION

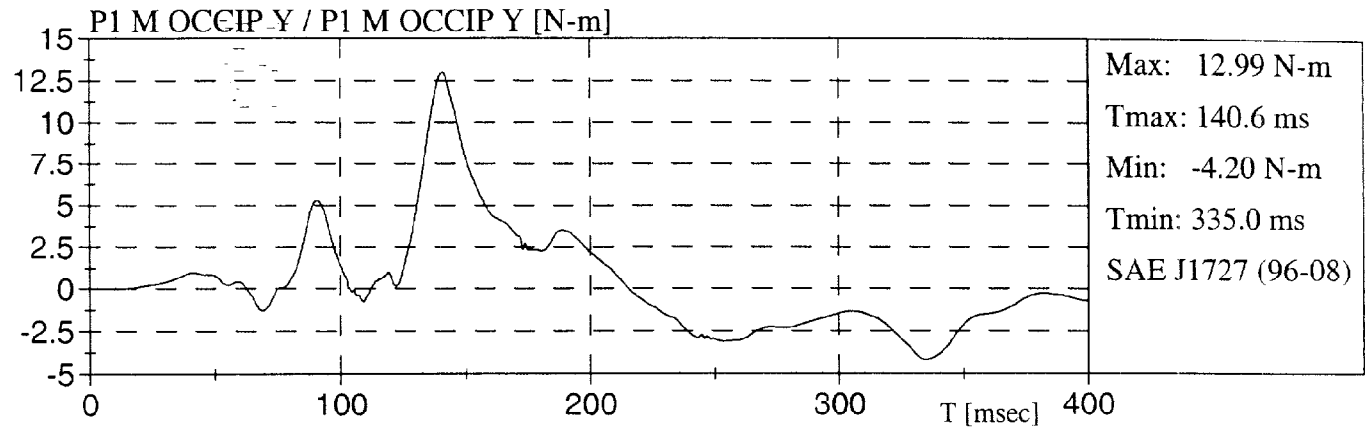
OCCUPANT CRASH PROTECTION

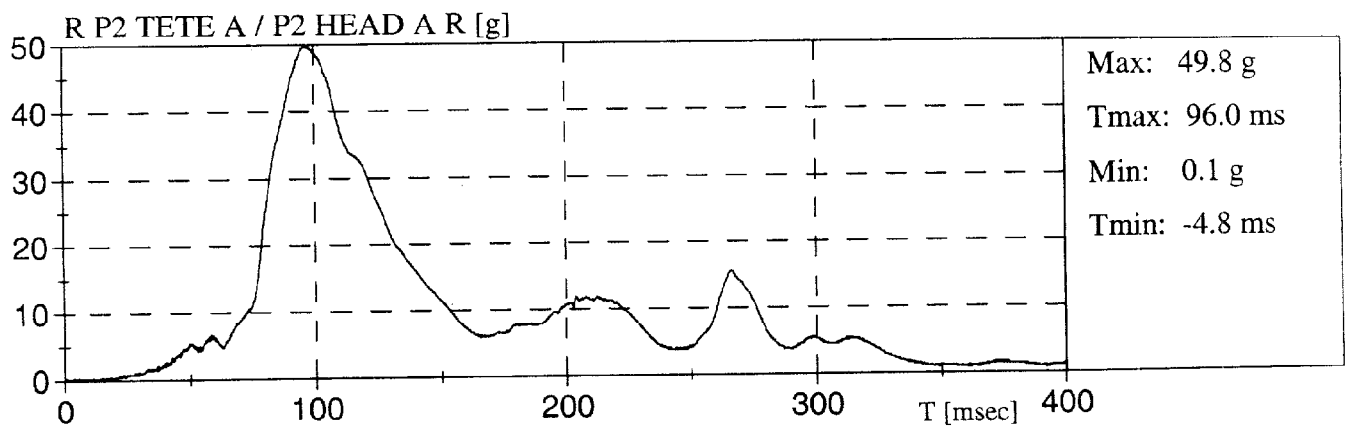
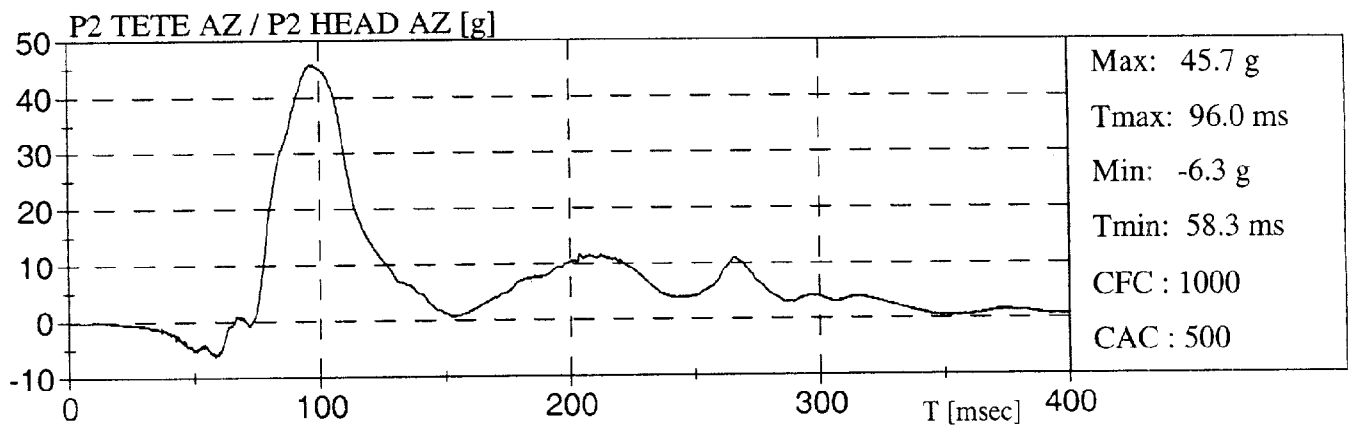
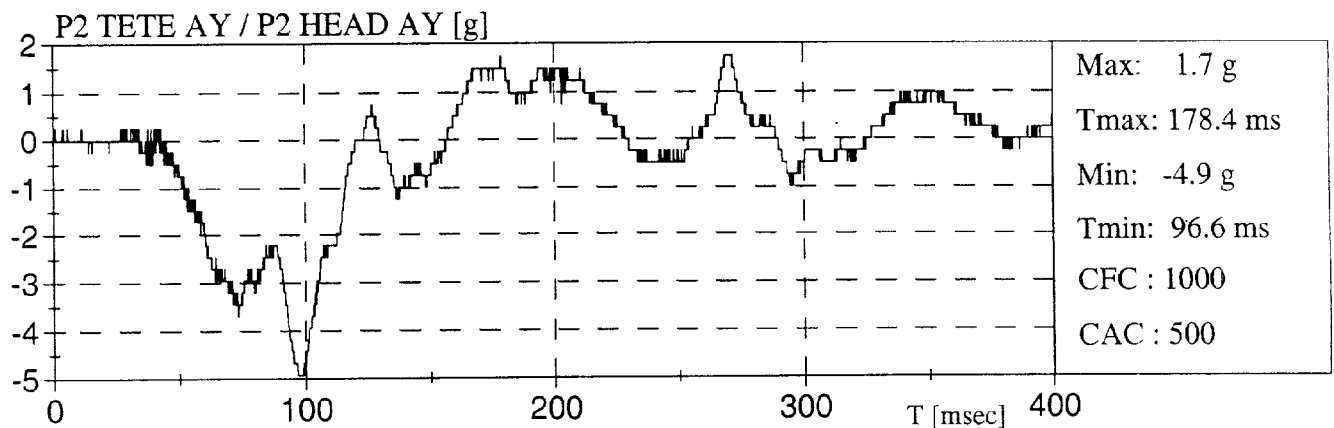
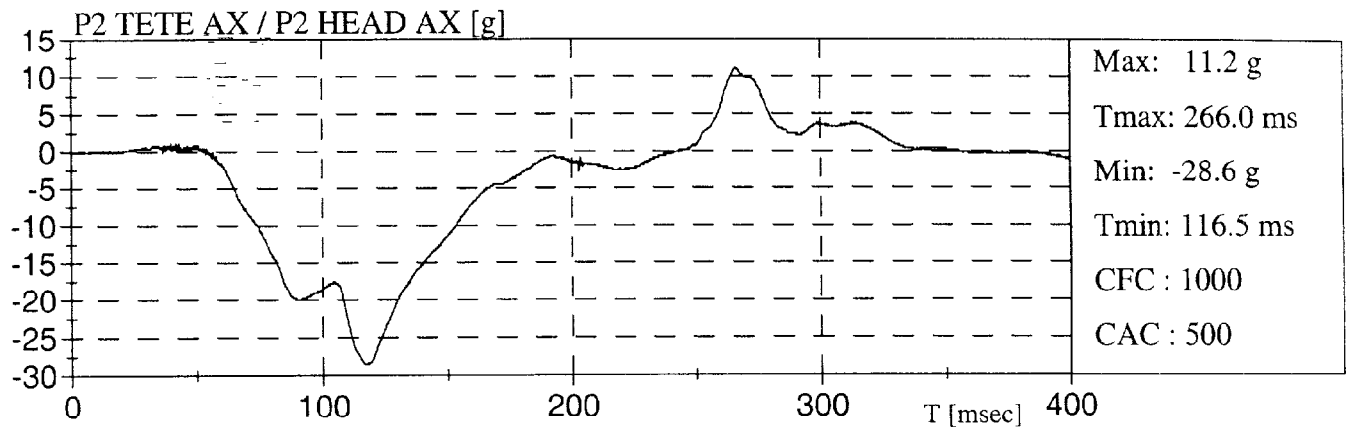
FORD EXPEDITION 99

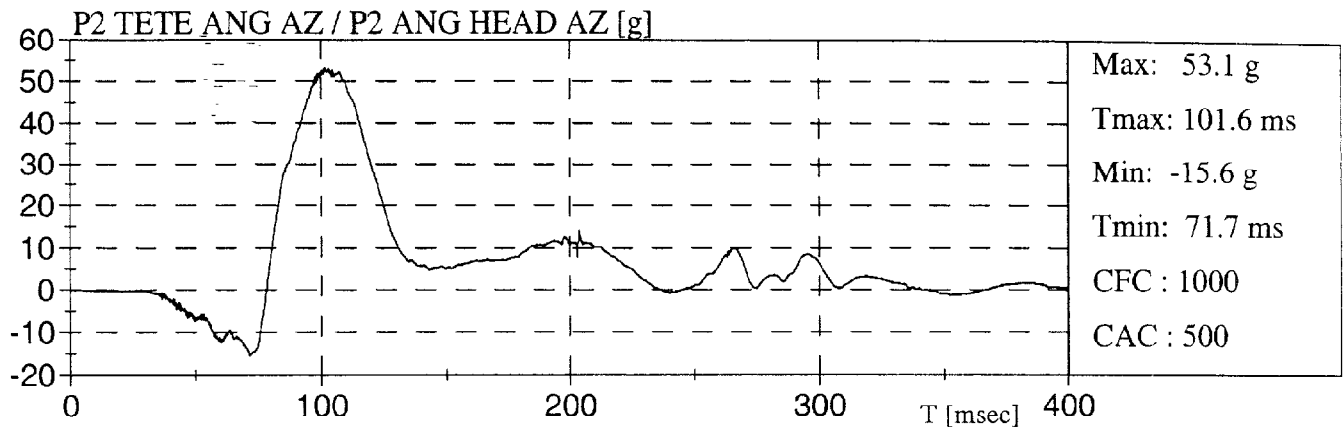
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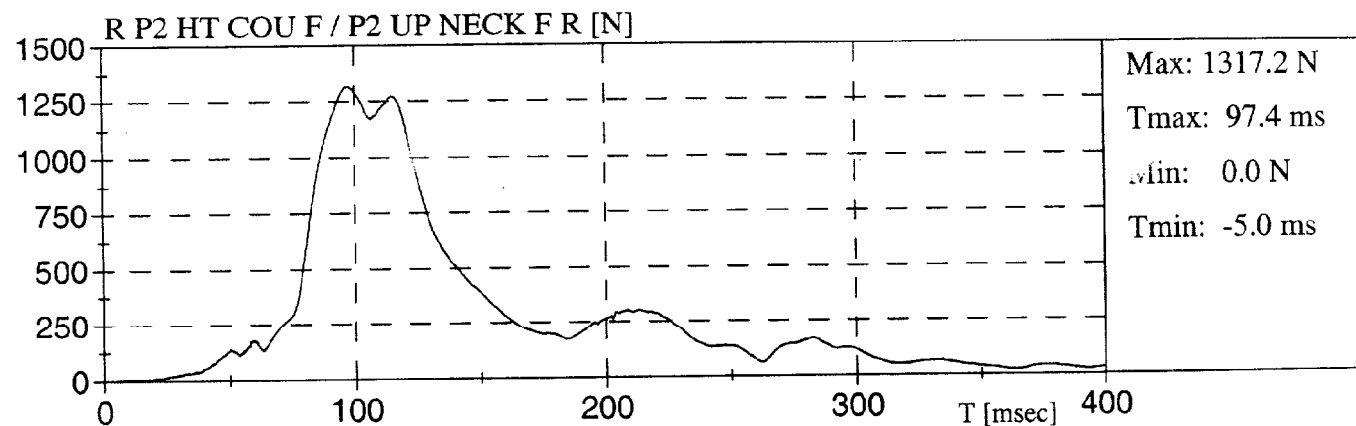
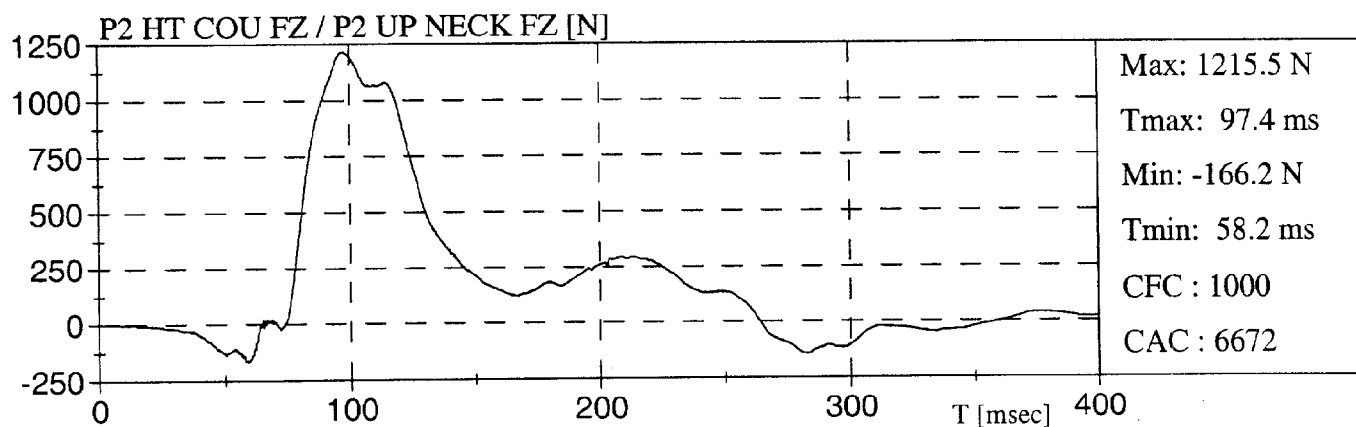
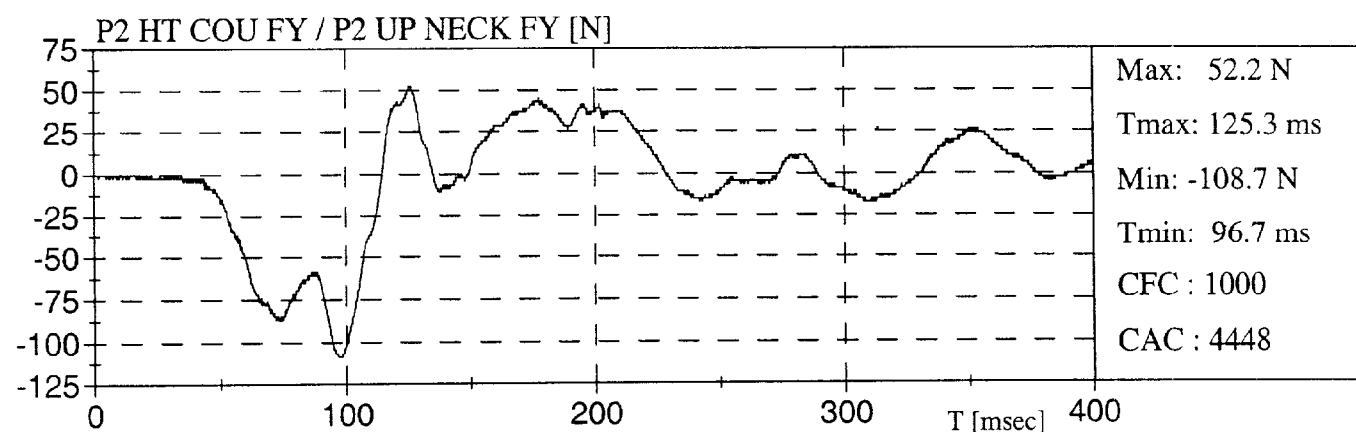
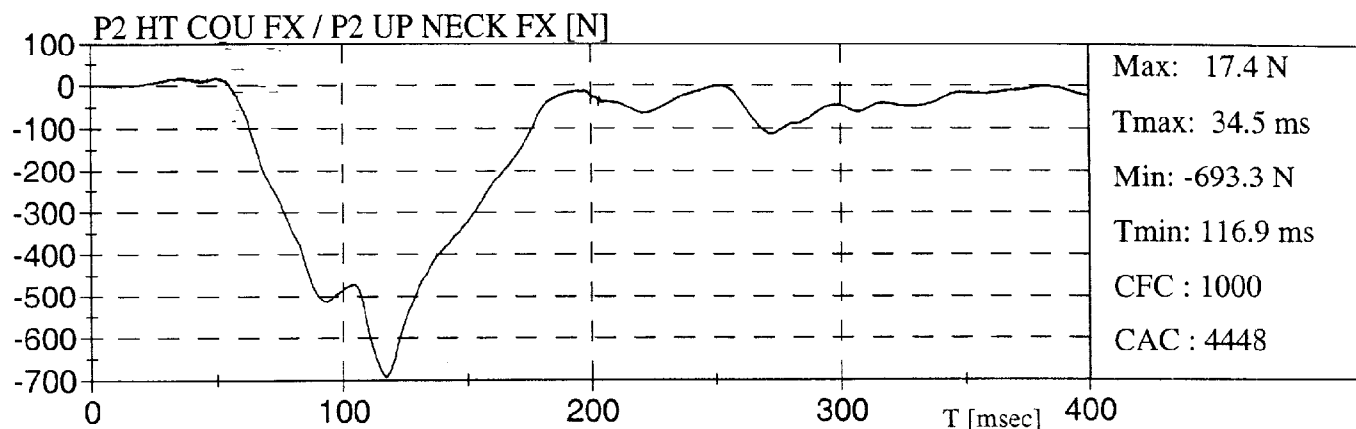
N° TC / TC No.: TC99-108

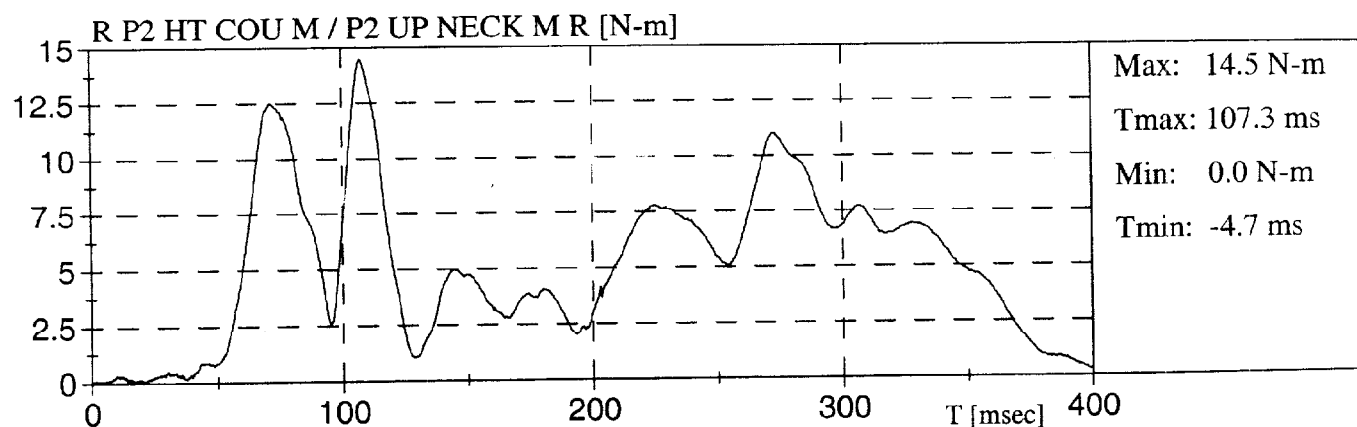
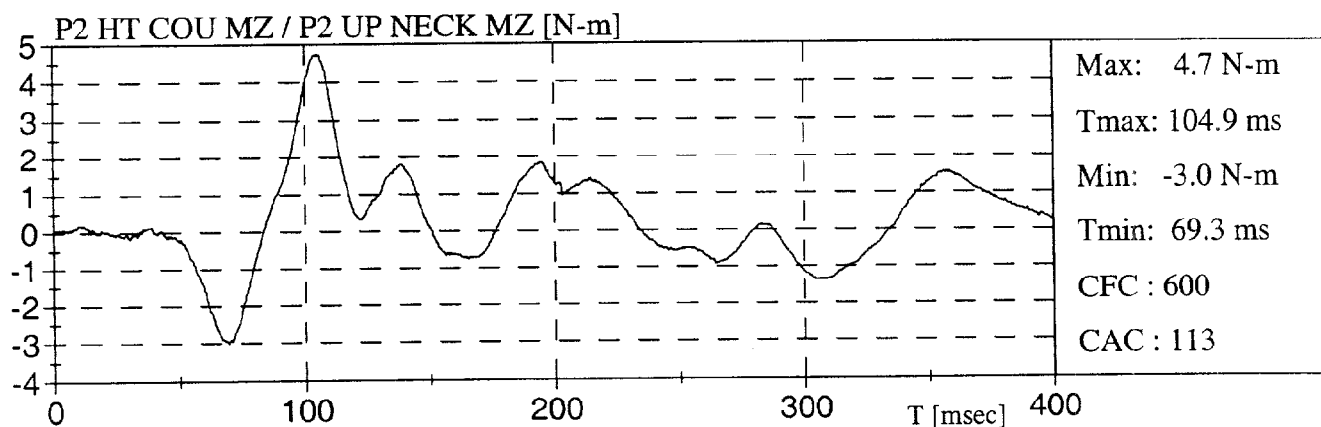
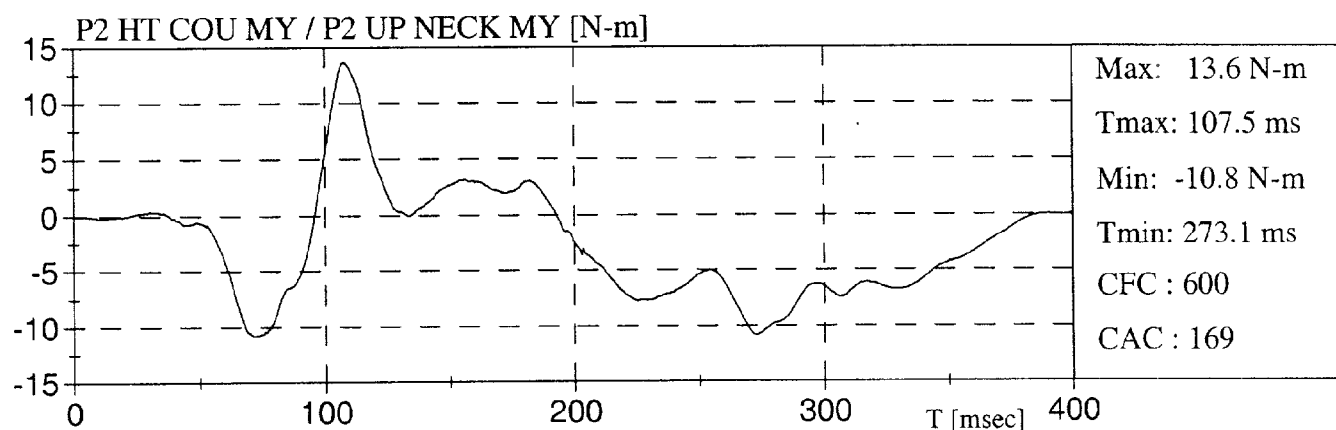
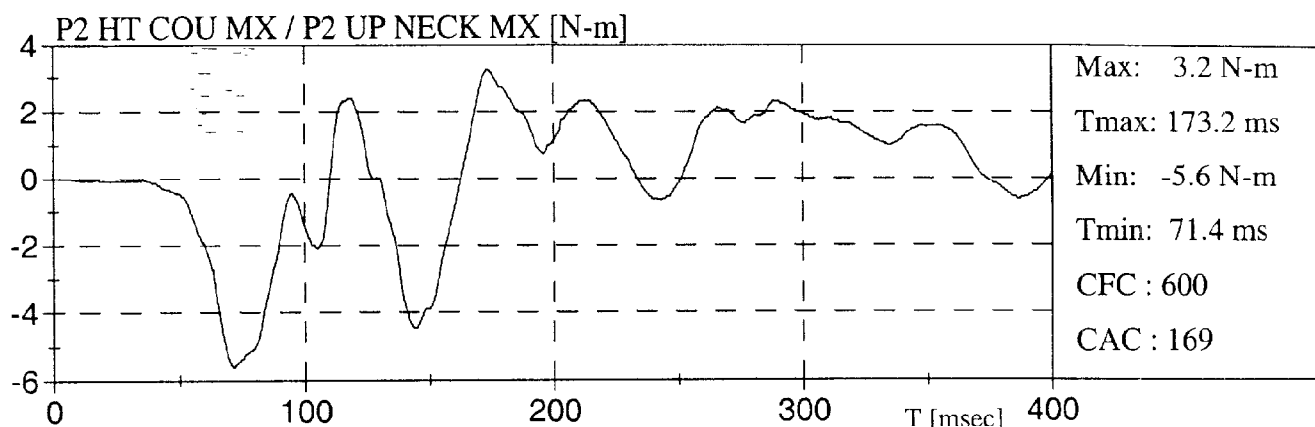


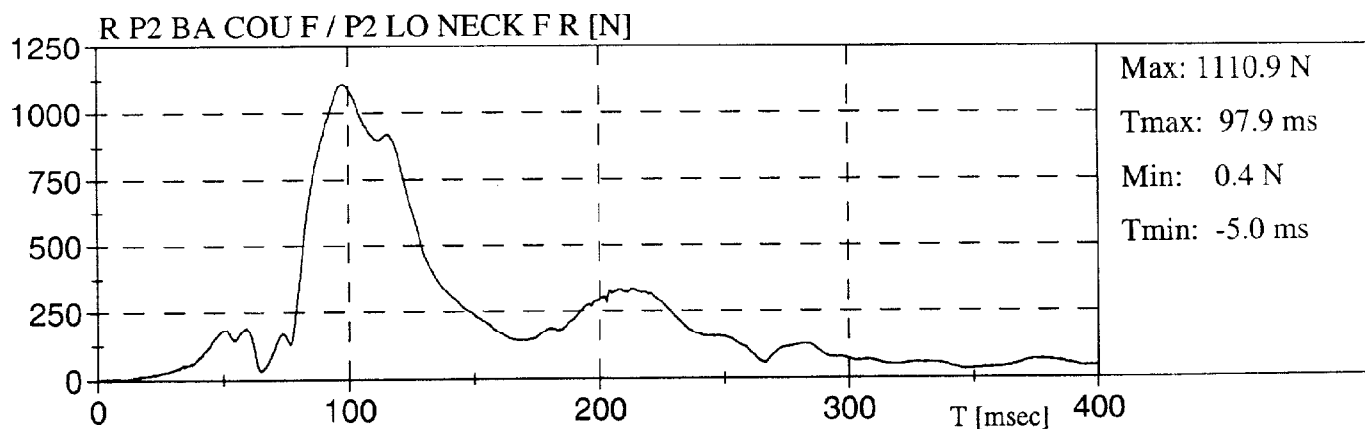
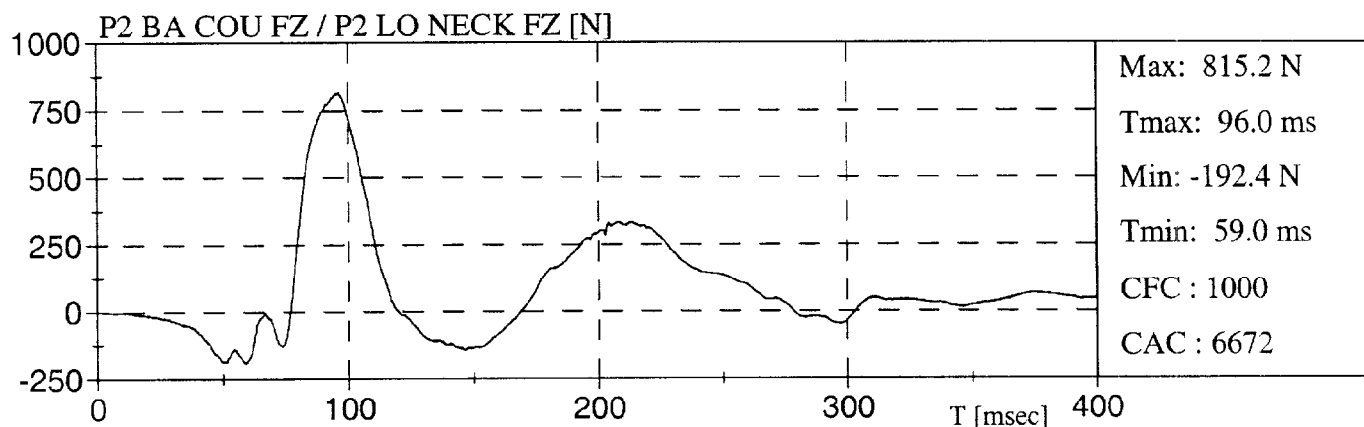
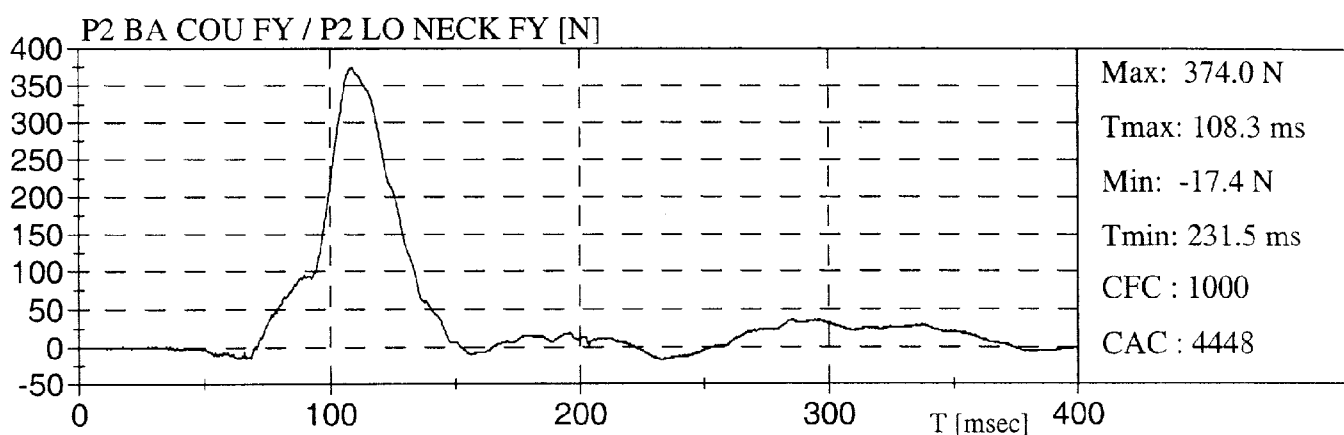
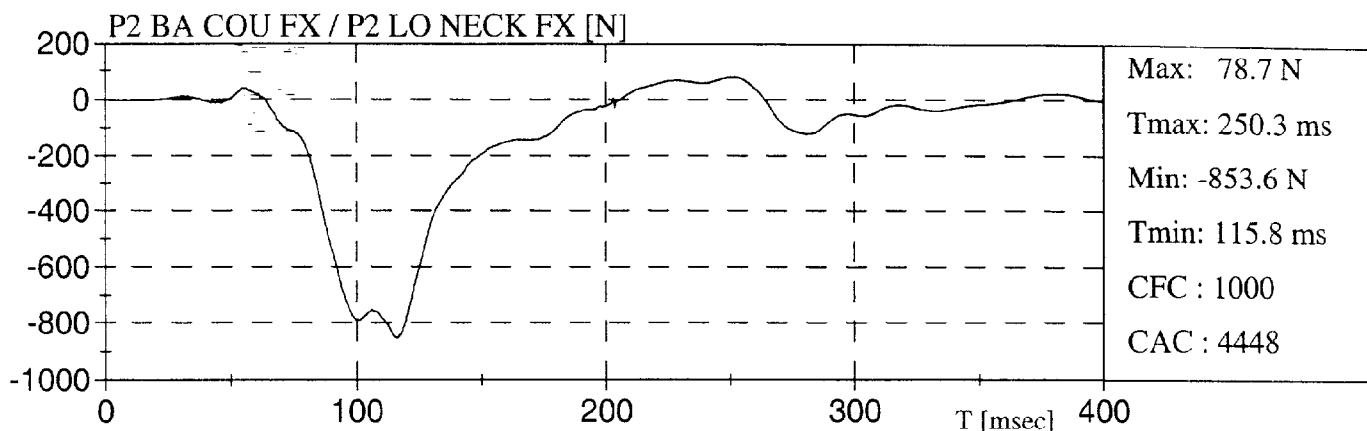


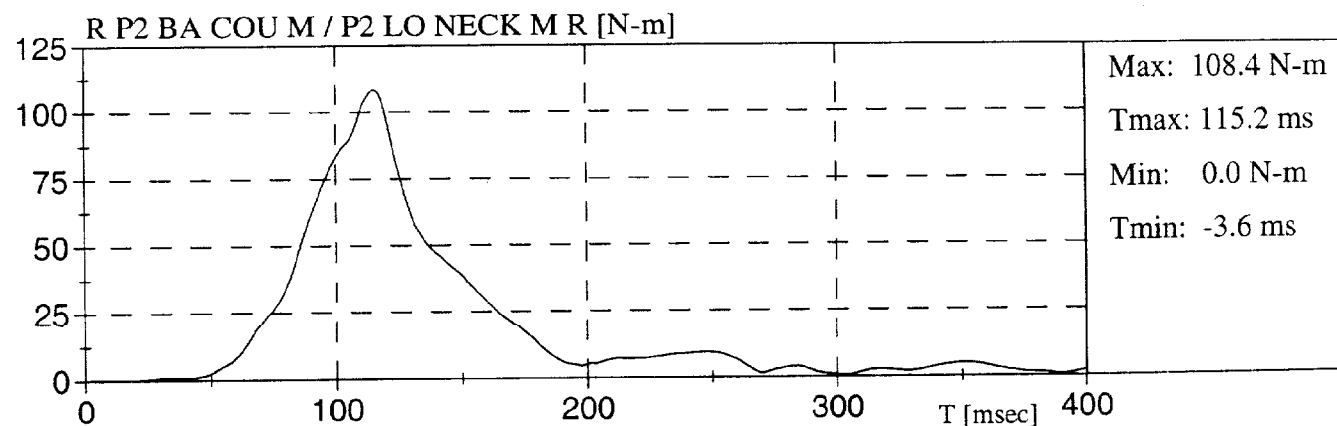
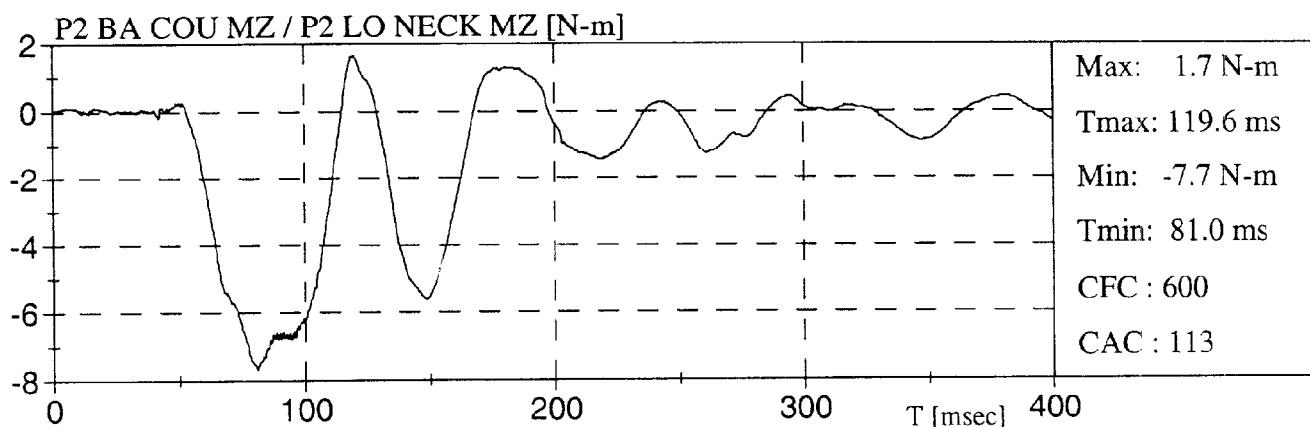
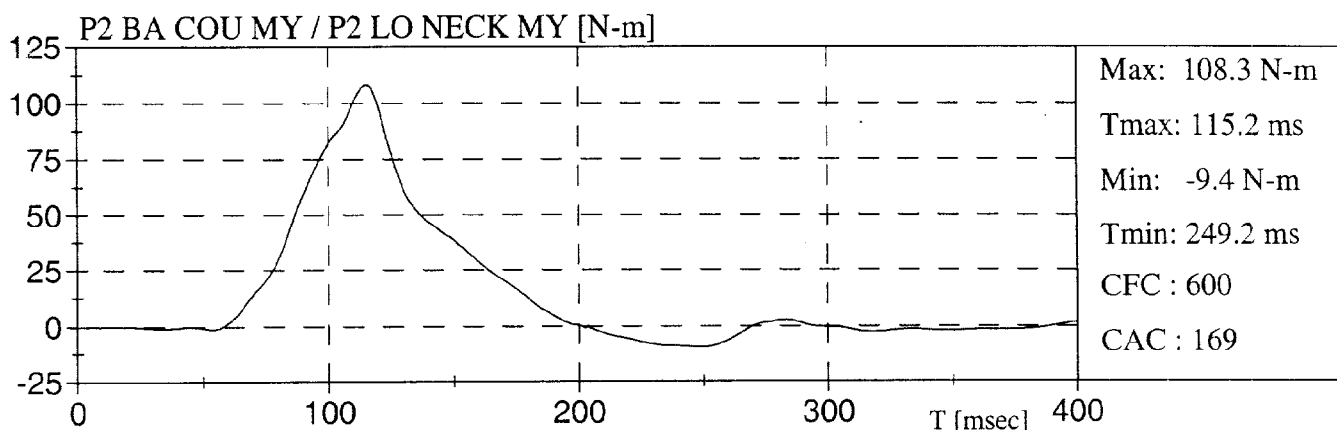
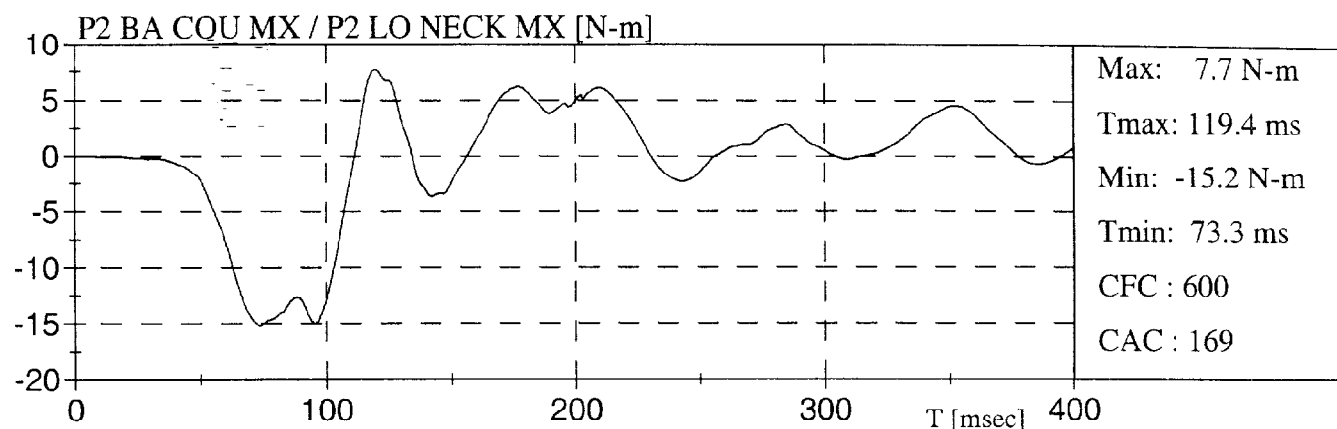


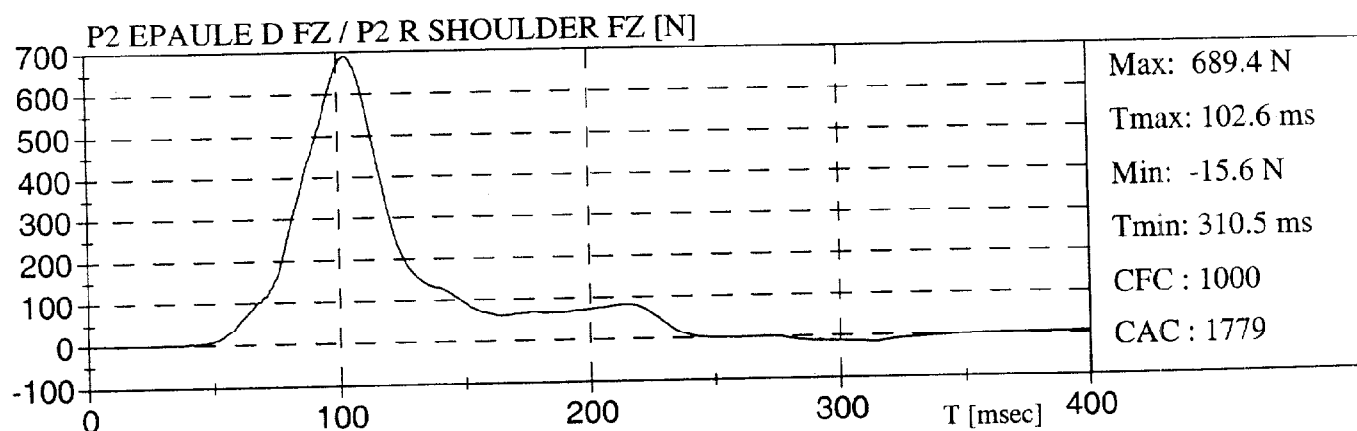
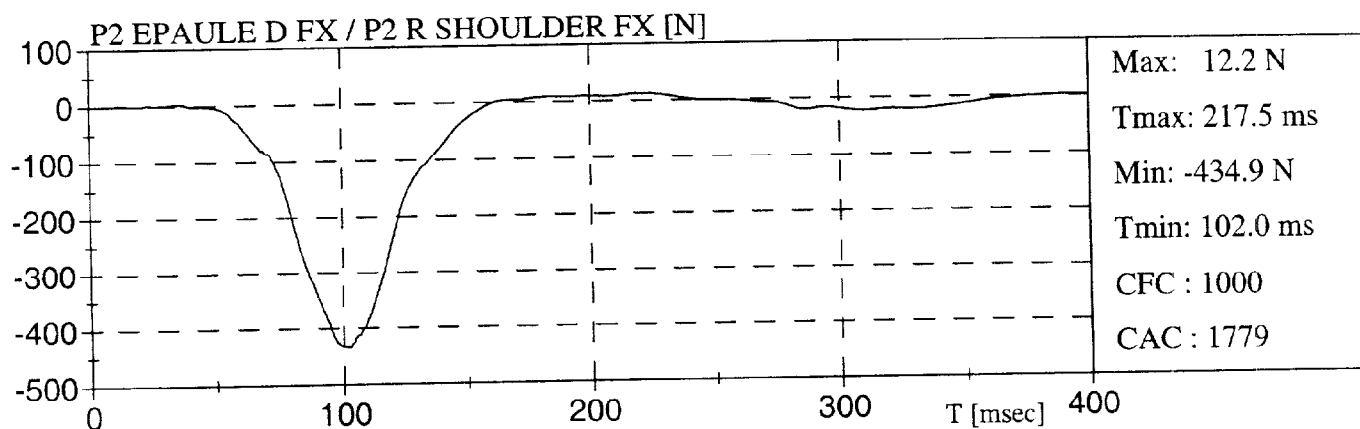
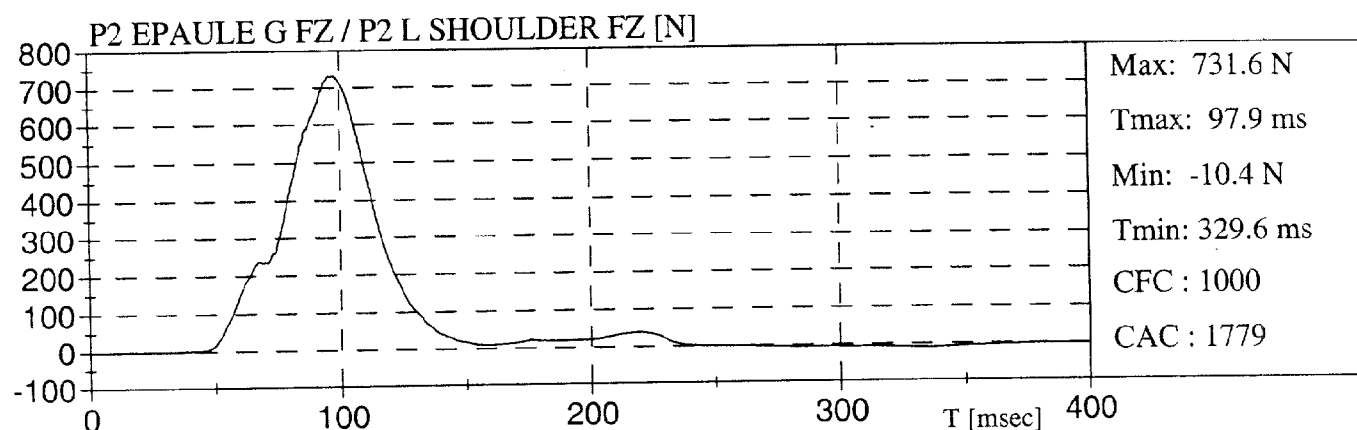
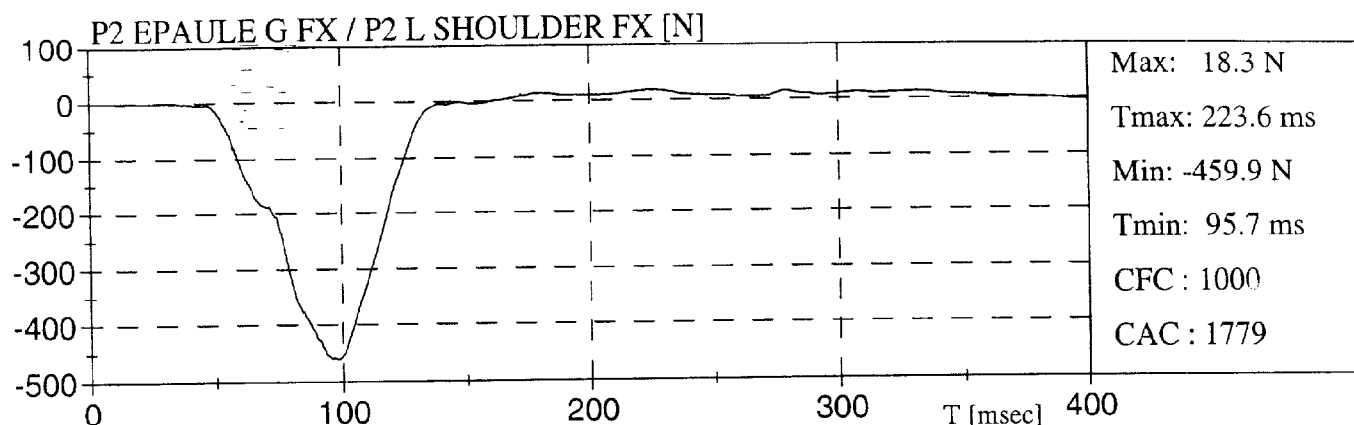


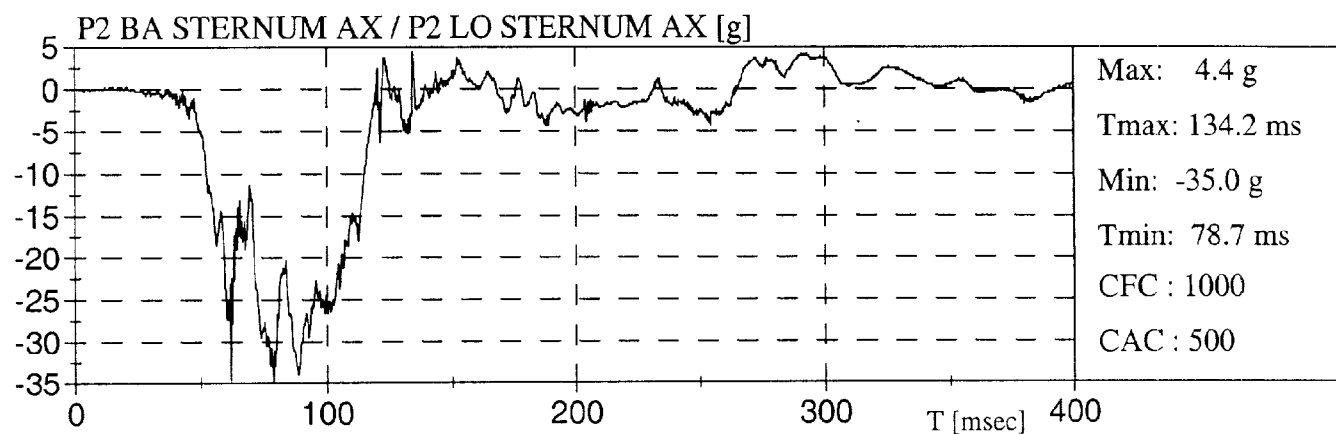
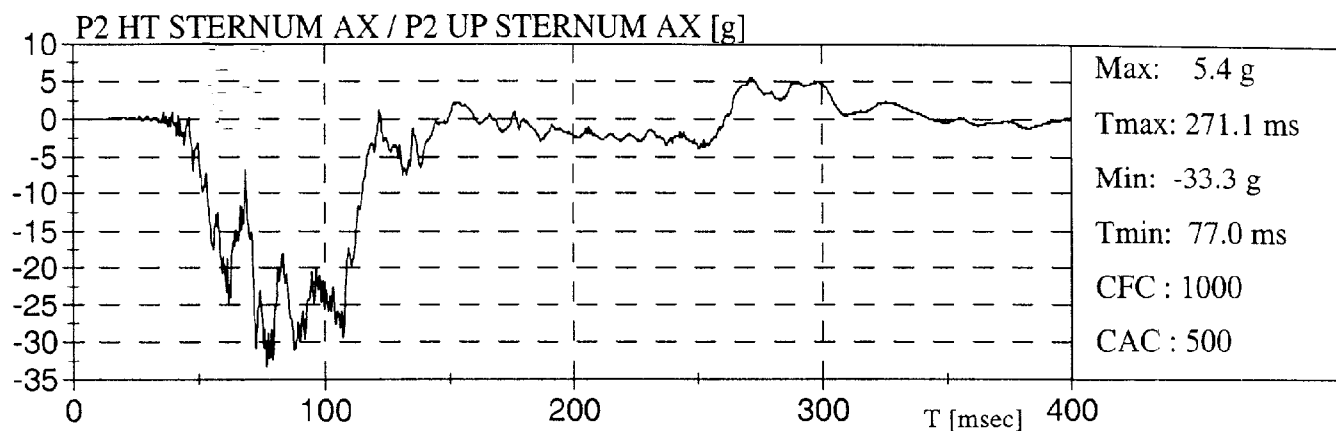


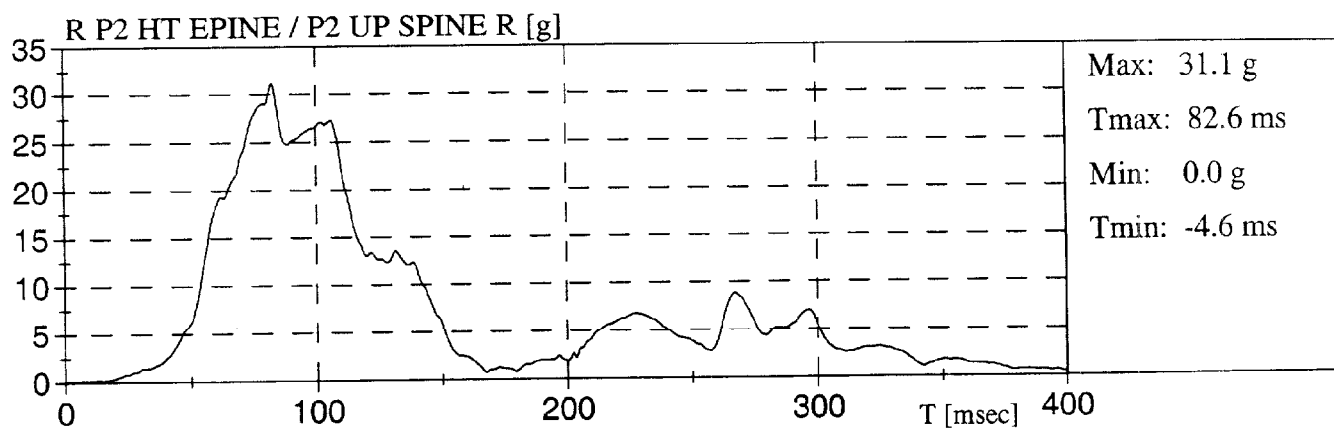
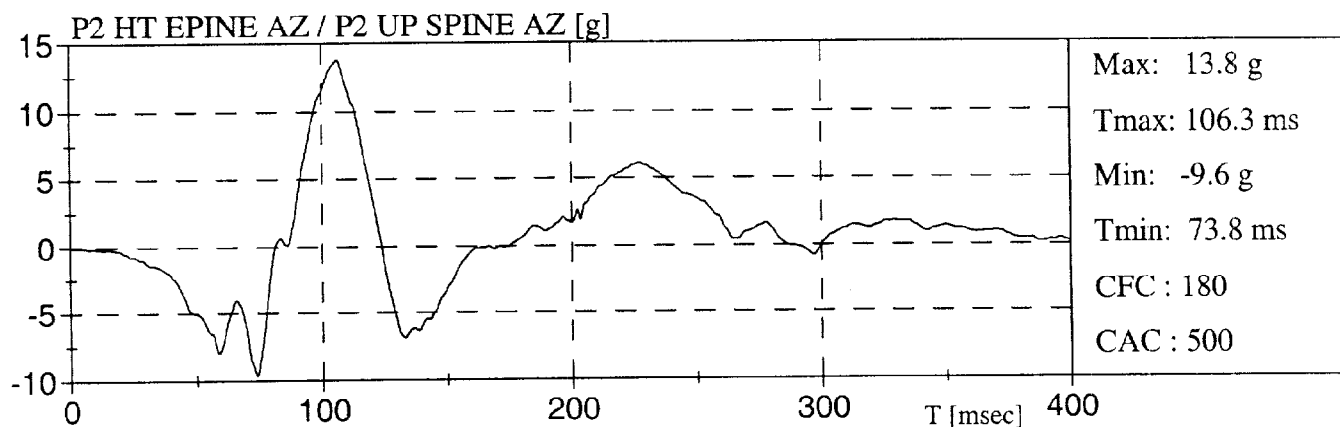
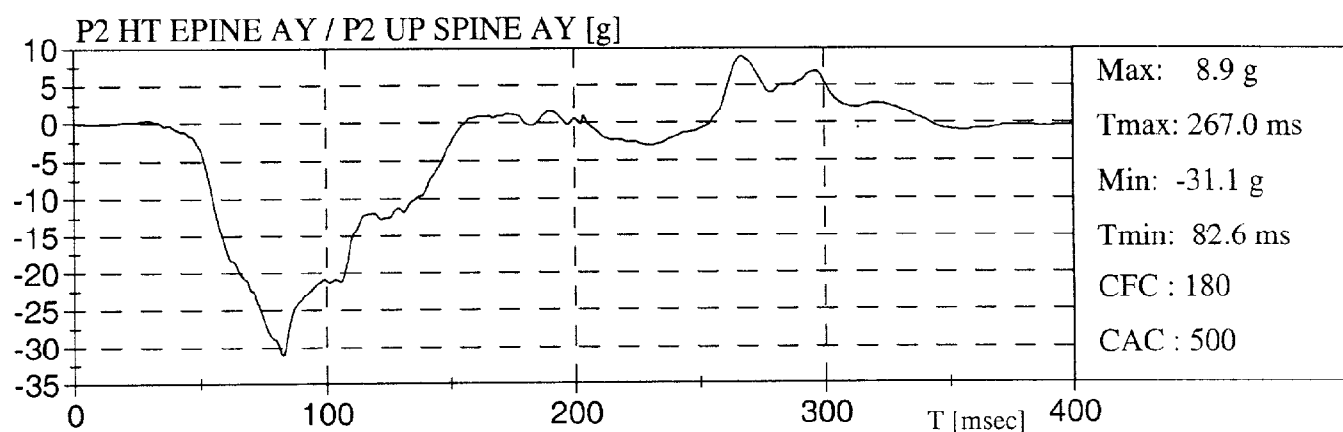
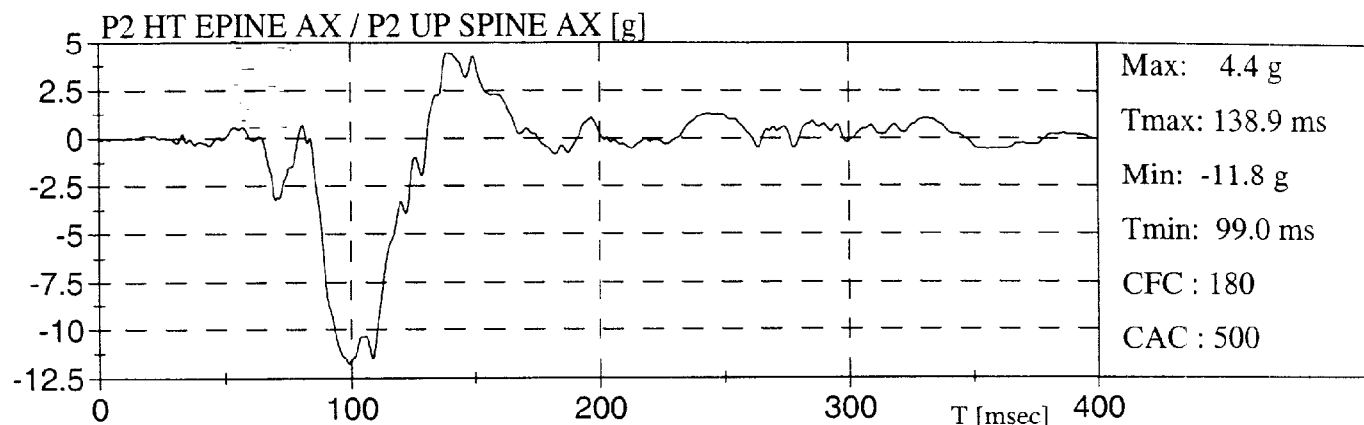


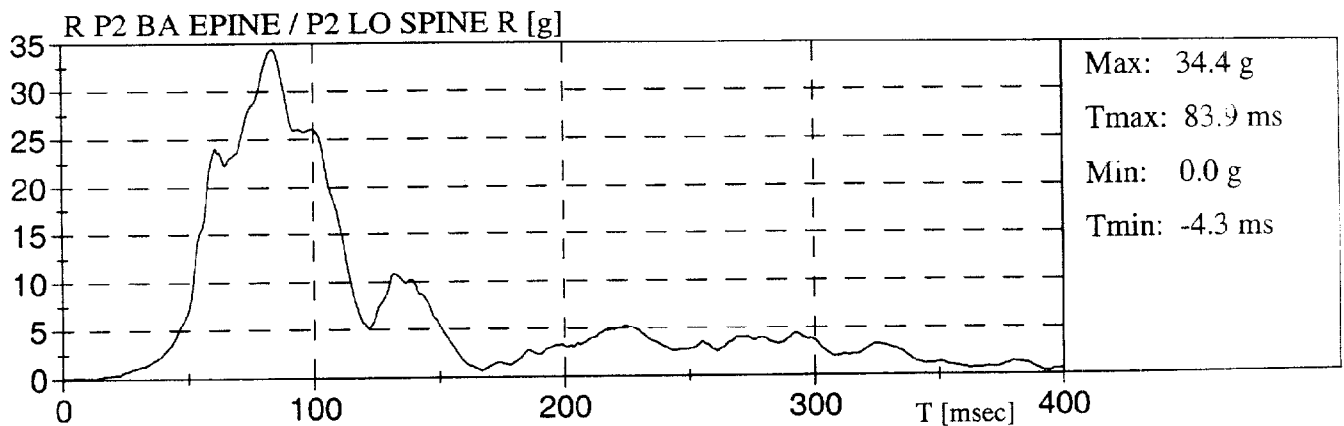
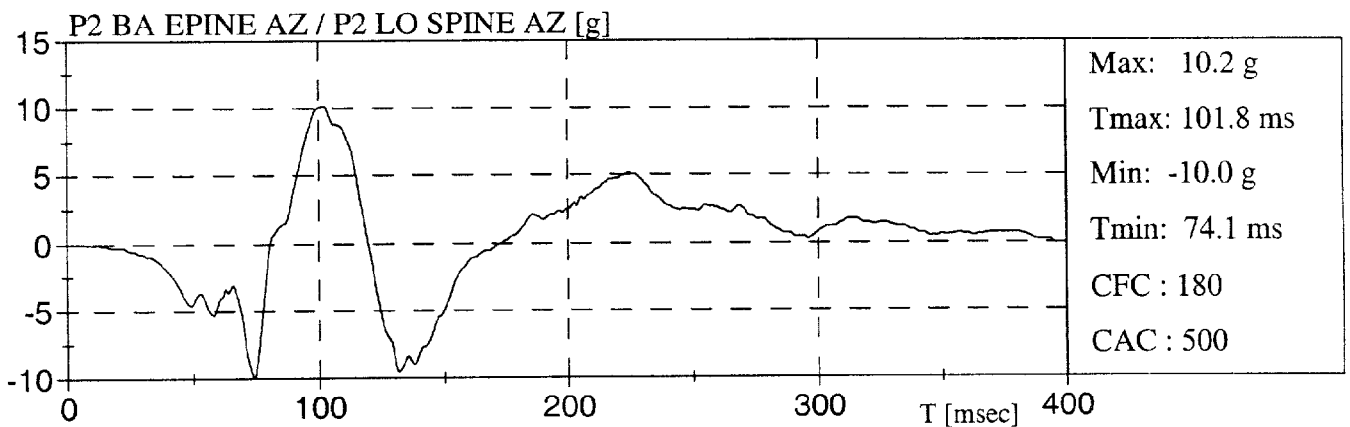
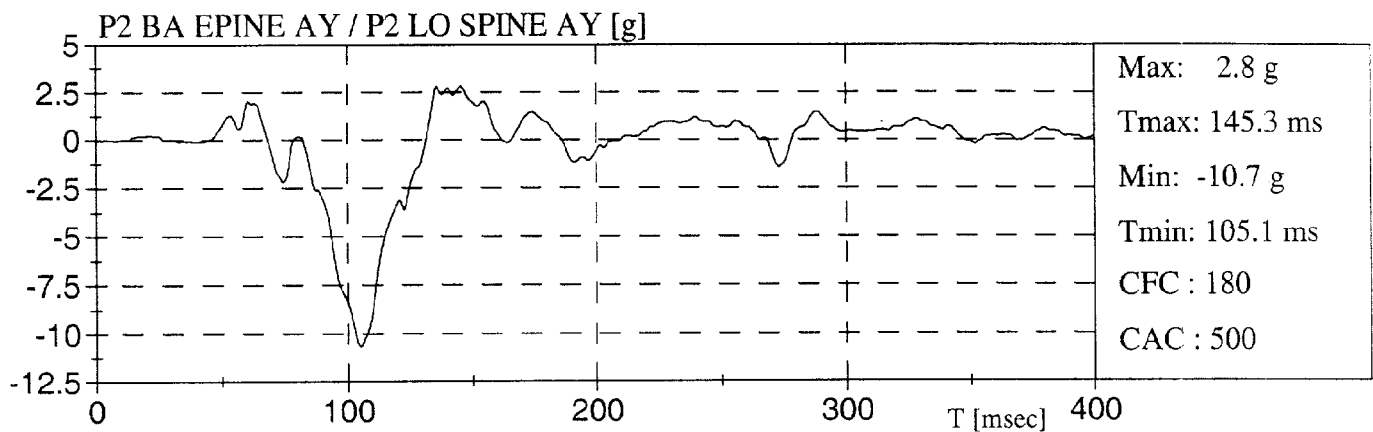
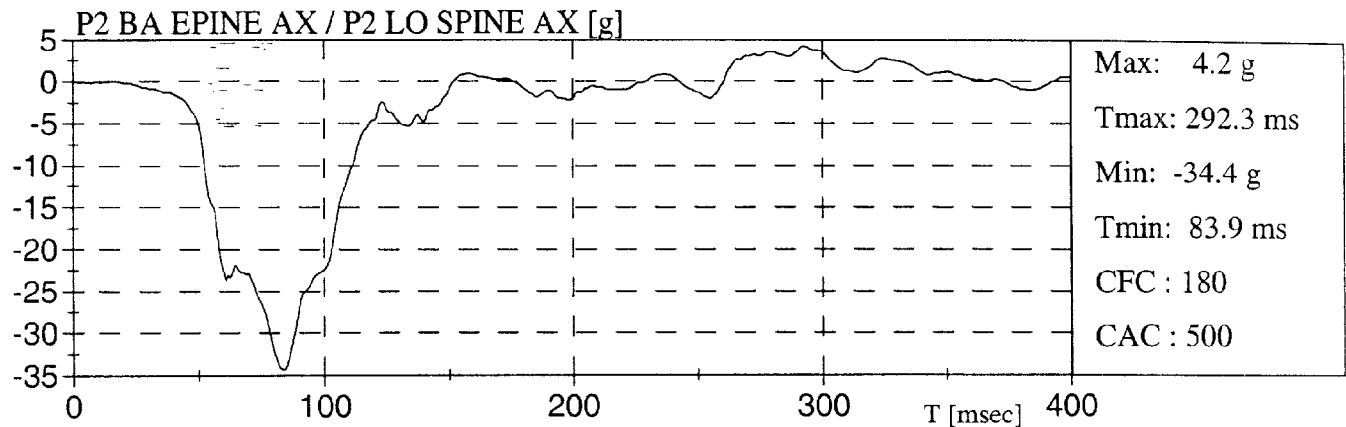


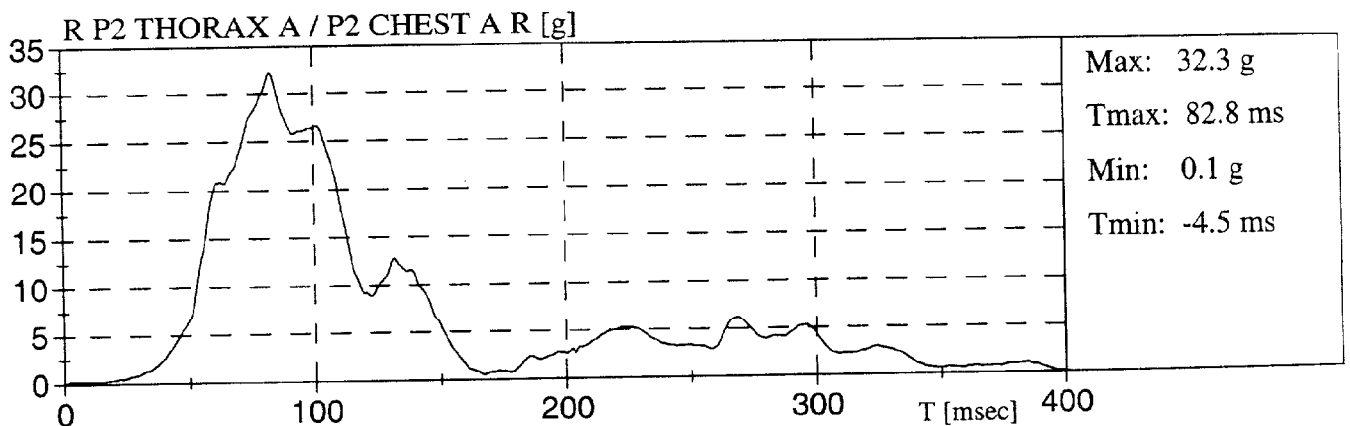
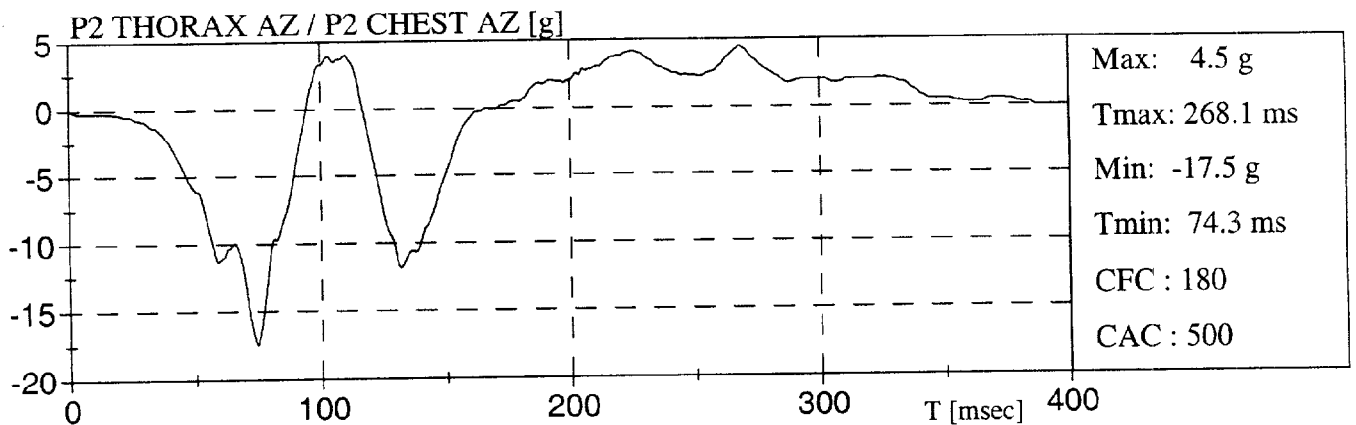
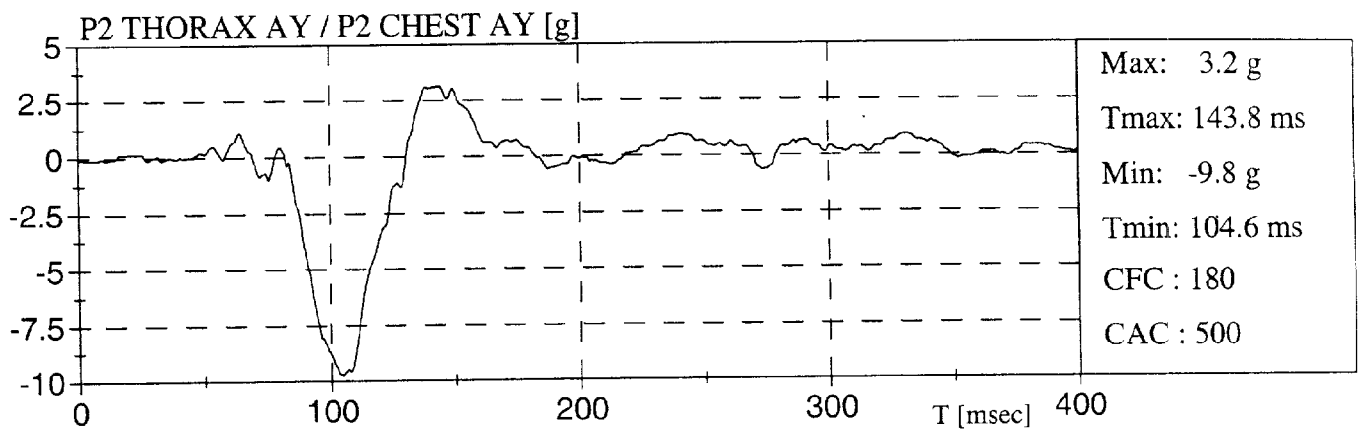
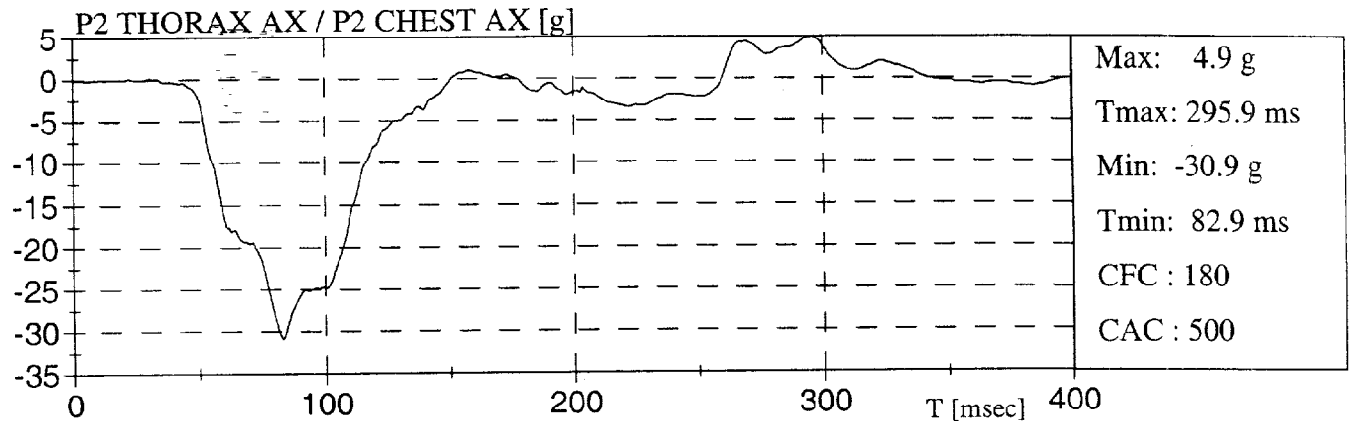


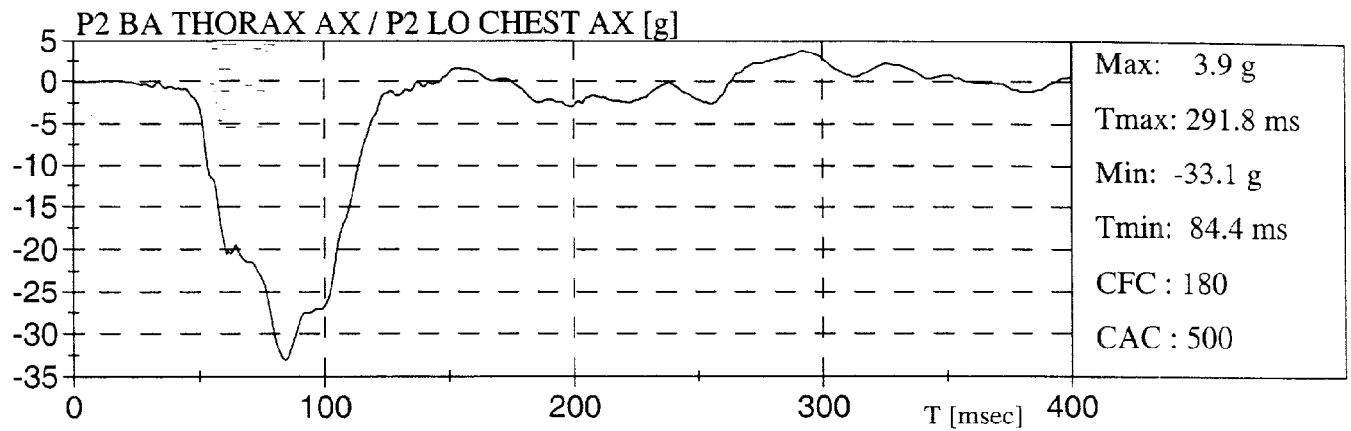


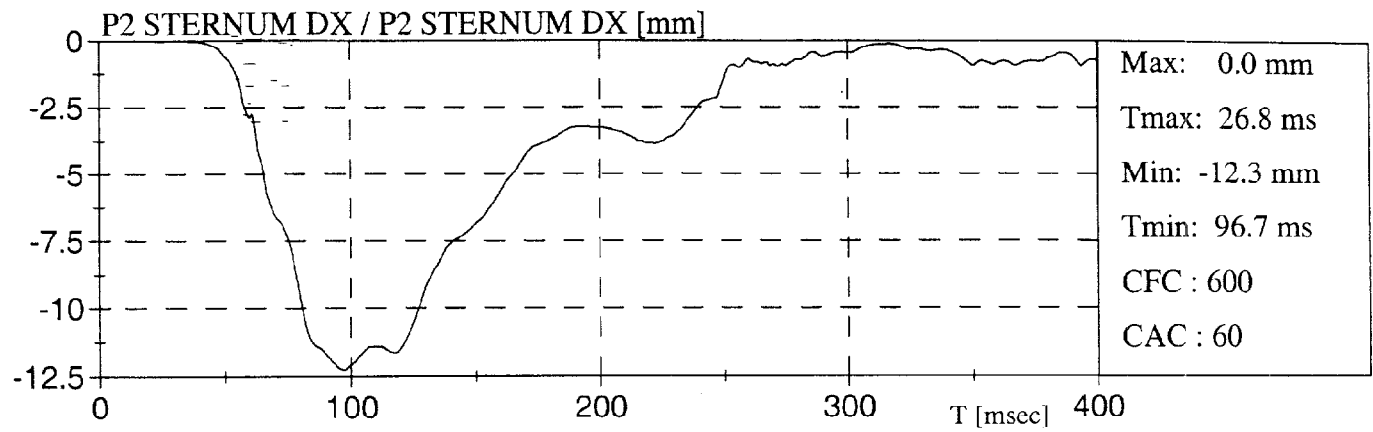


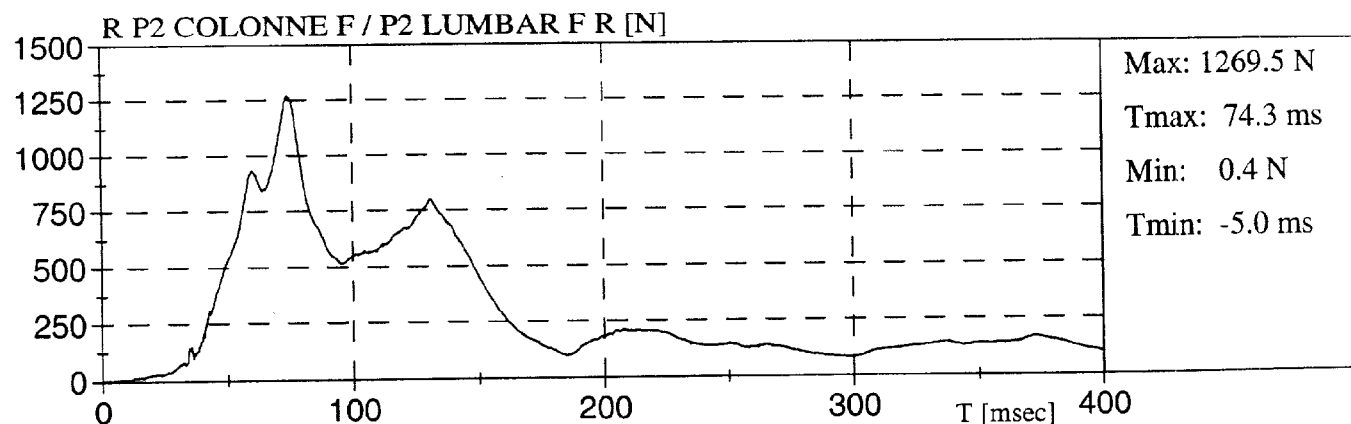
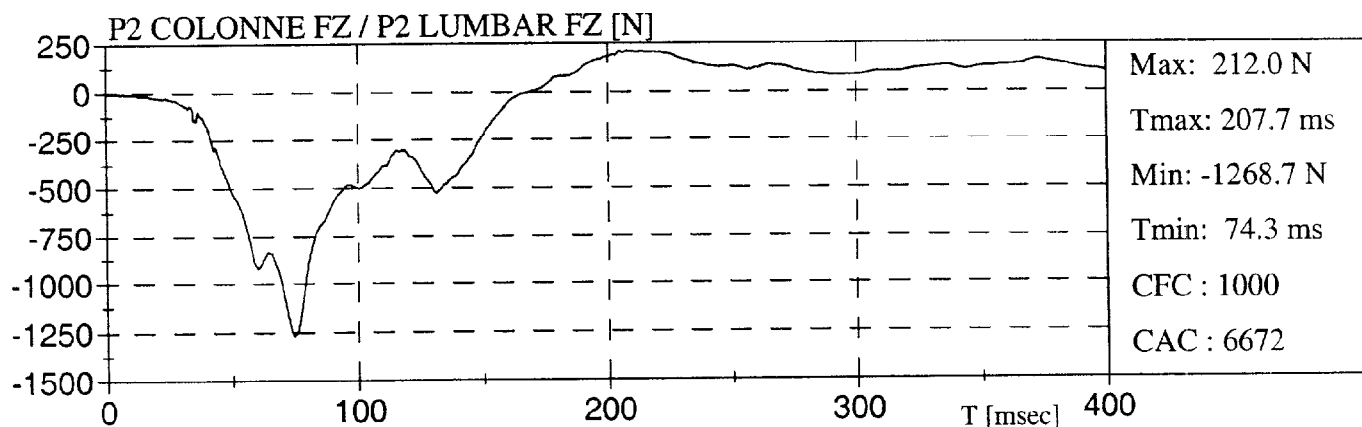
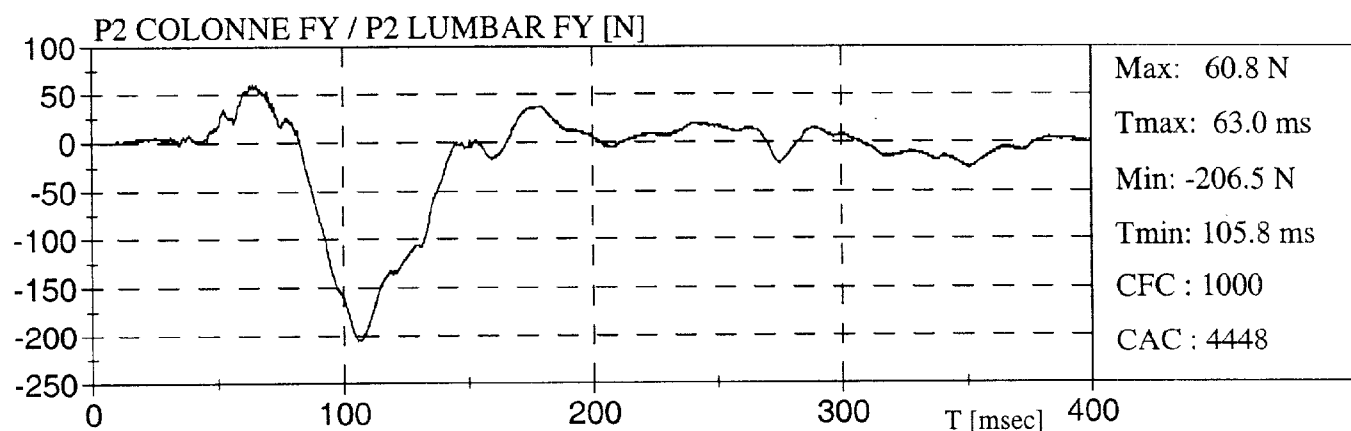
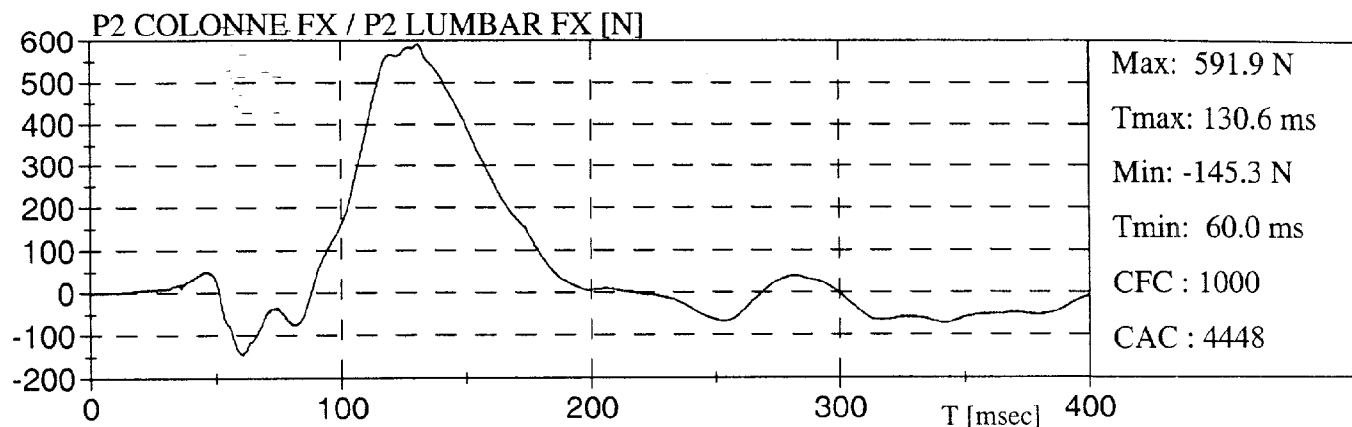


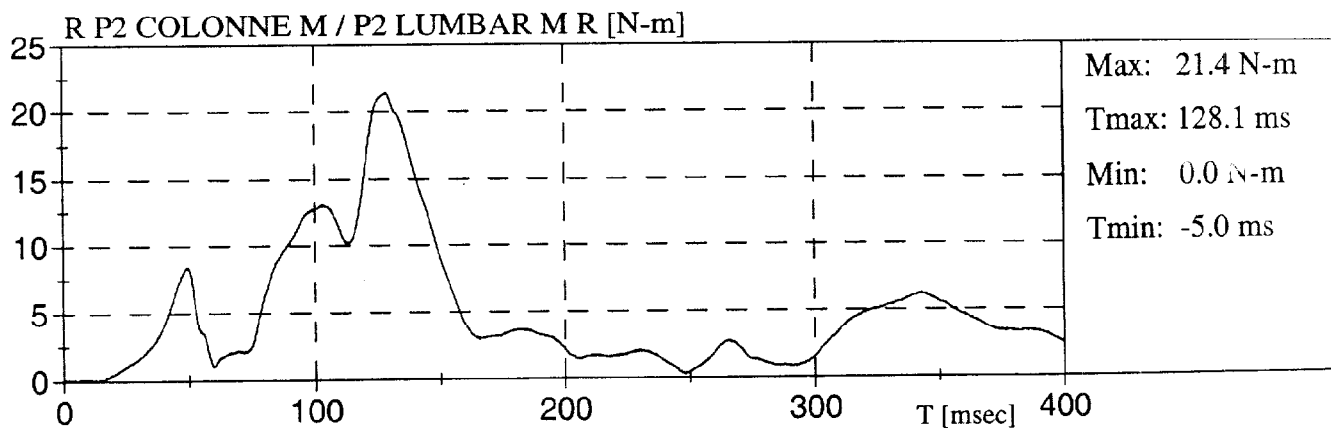
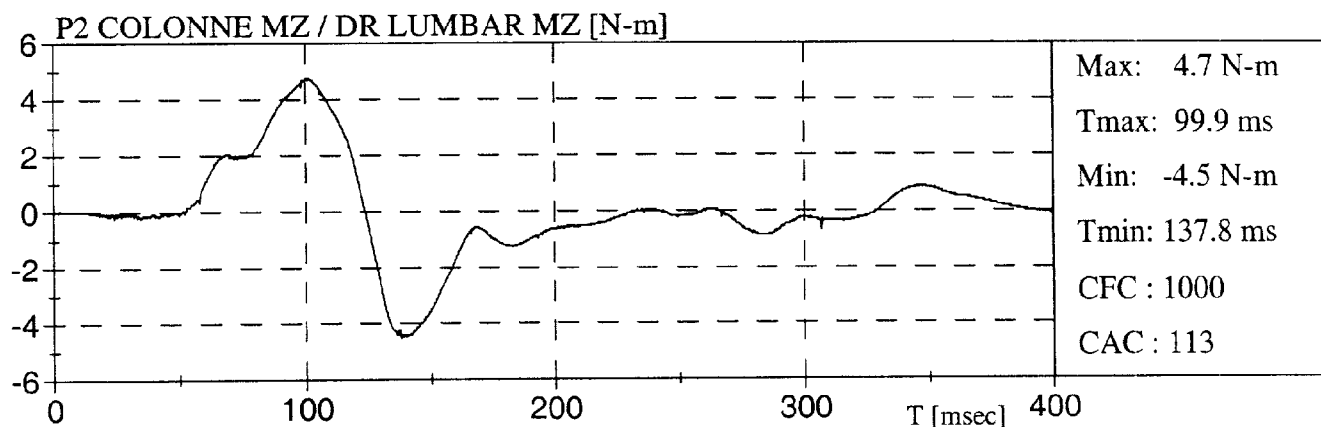
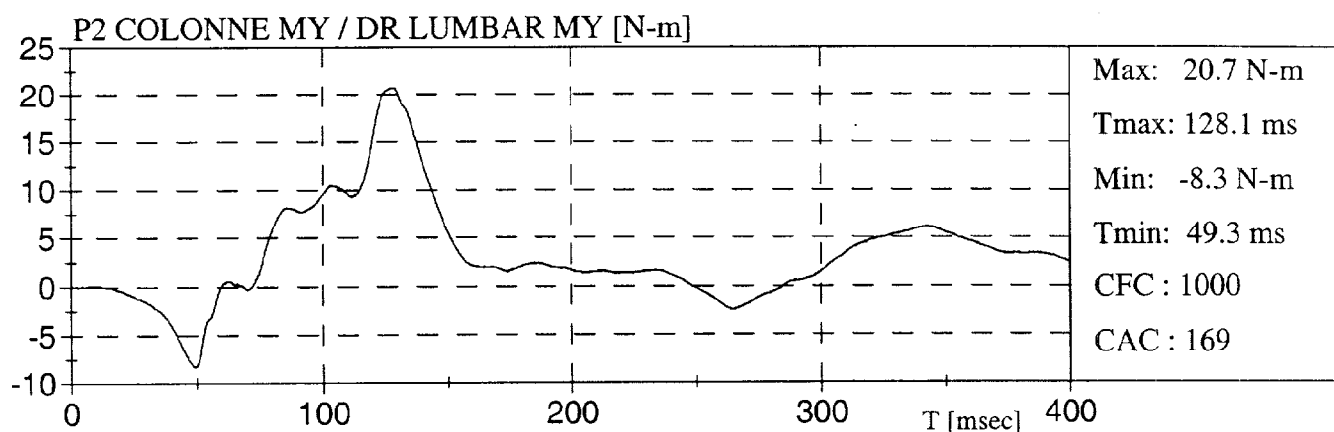
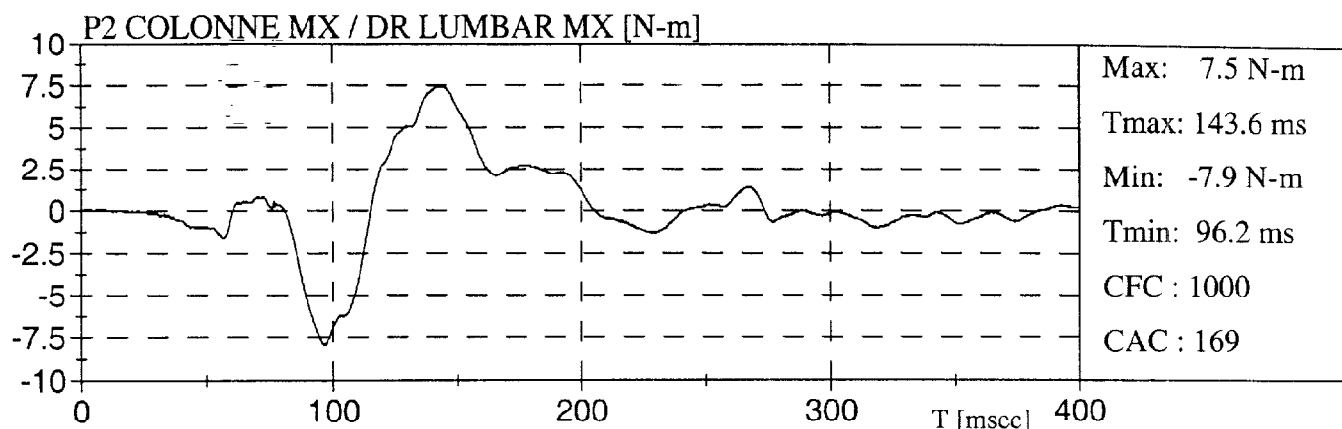


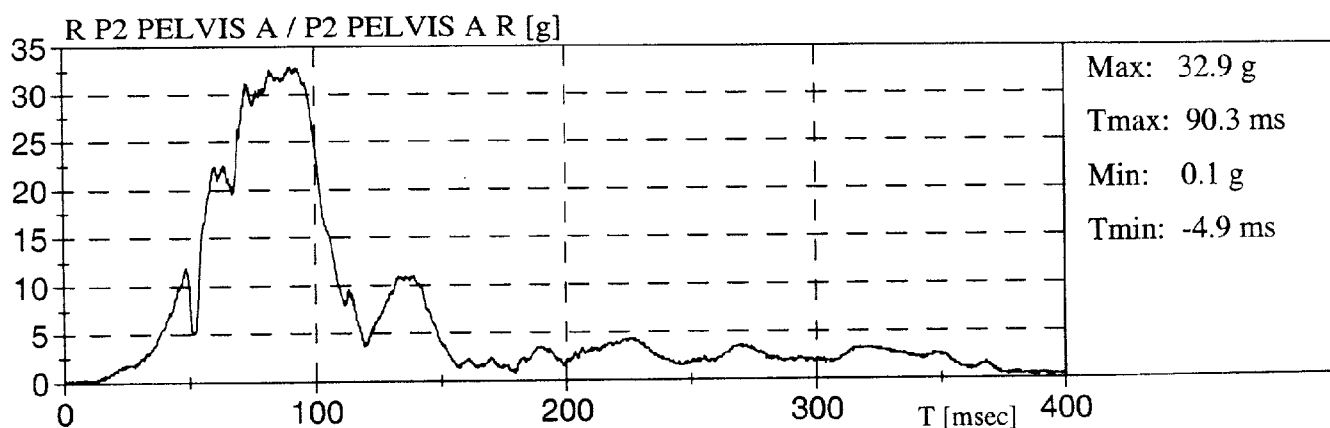
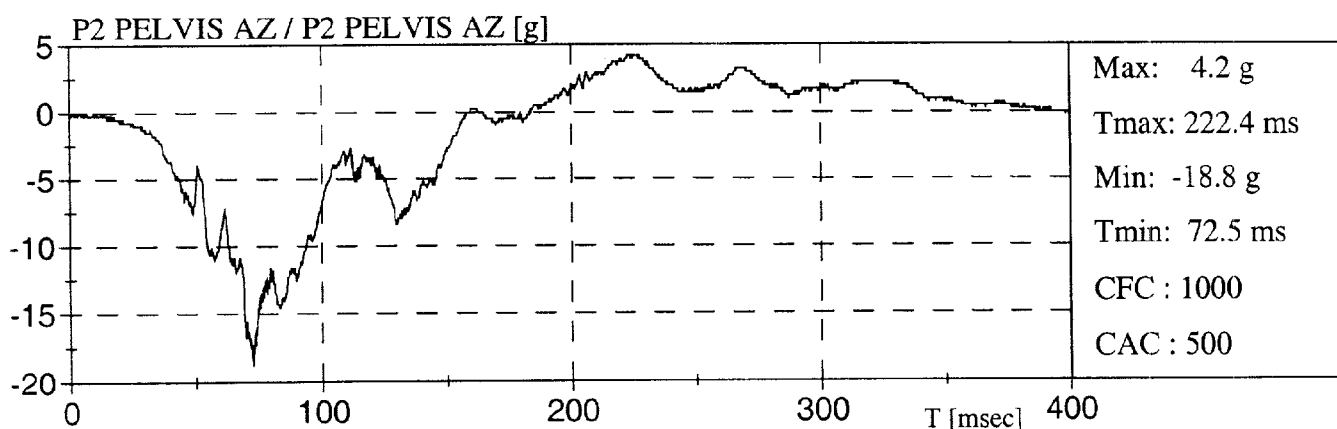
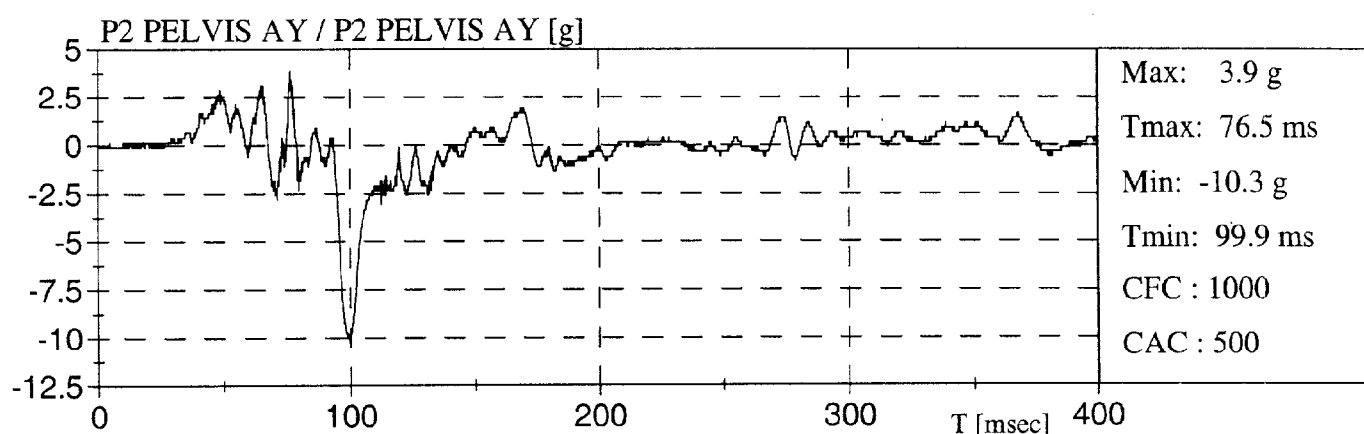
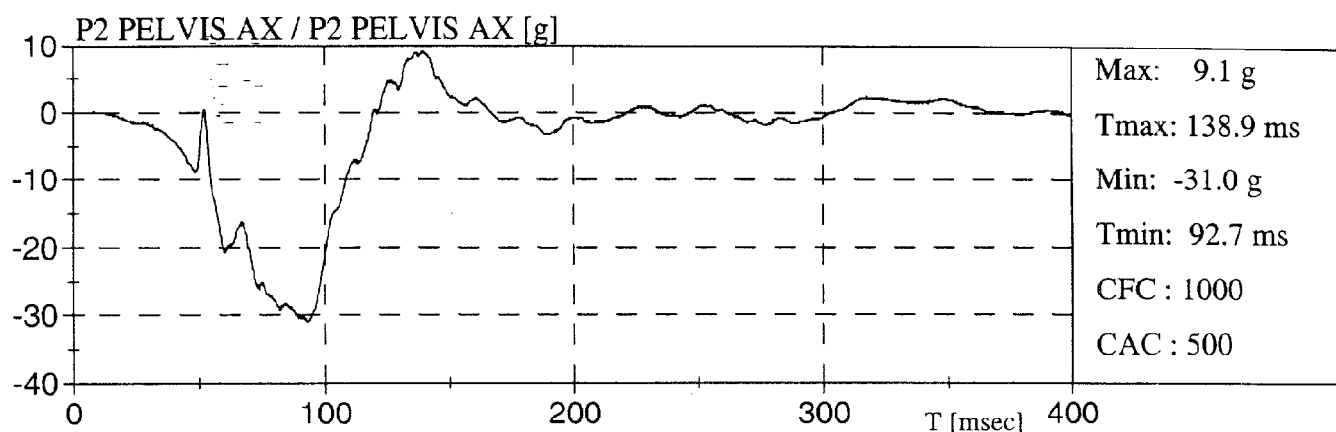


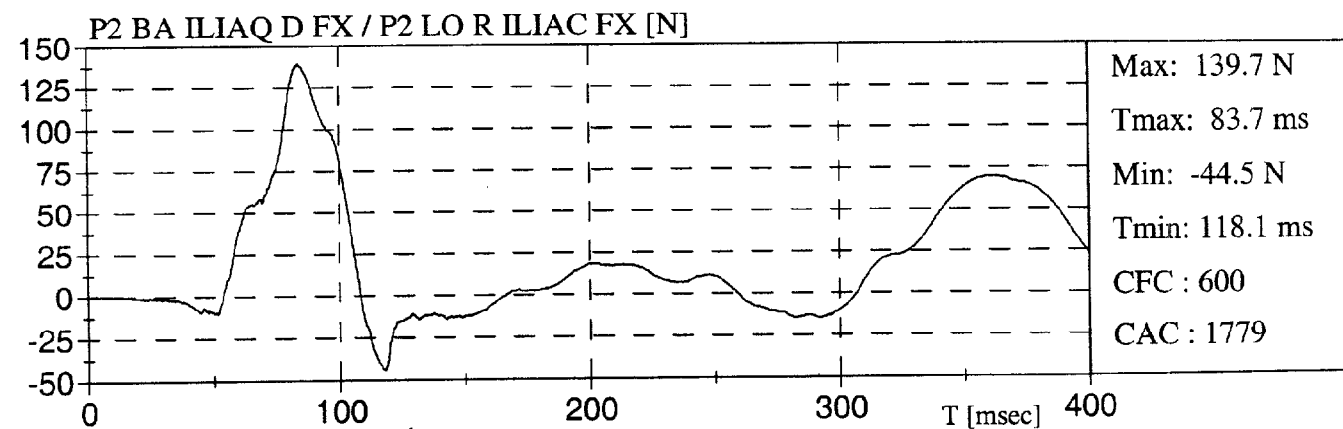
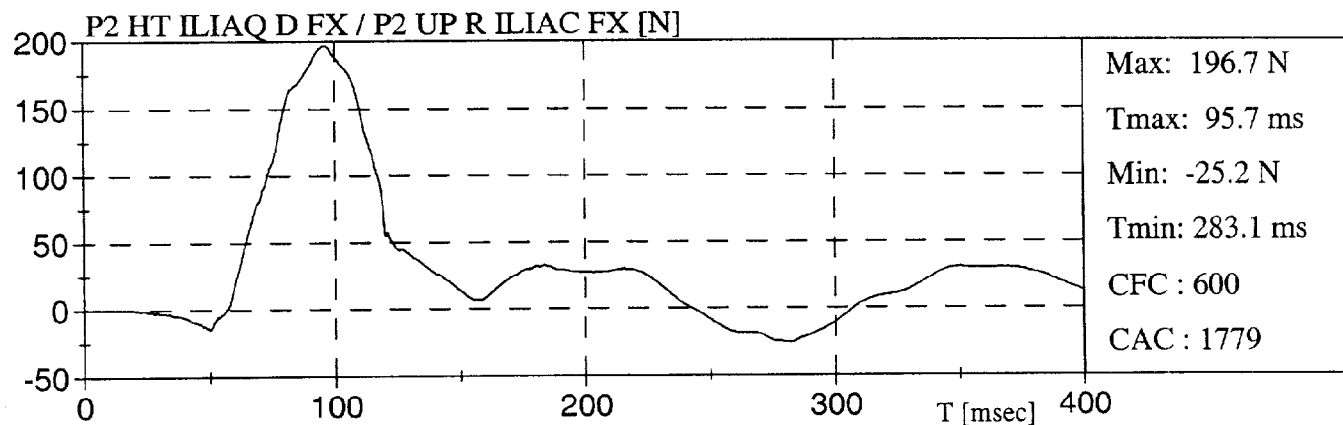
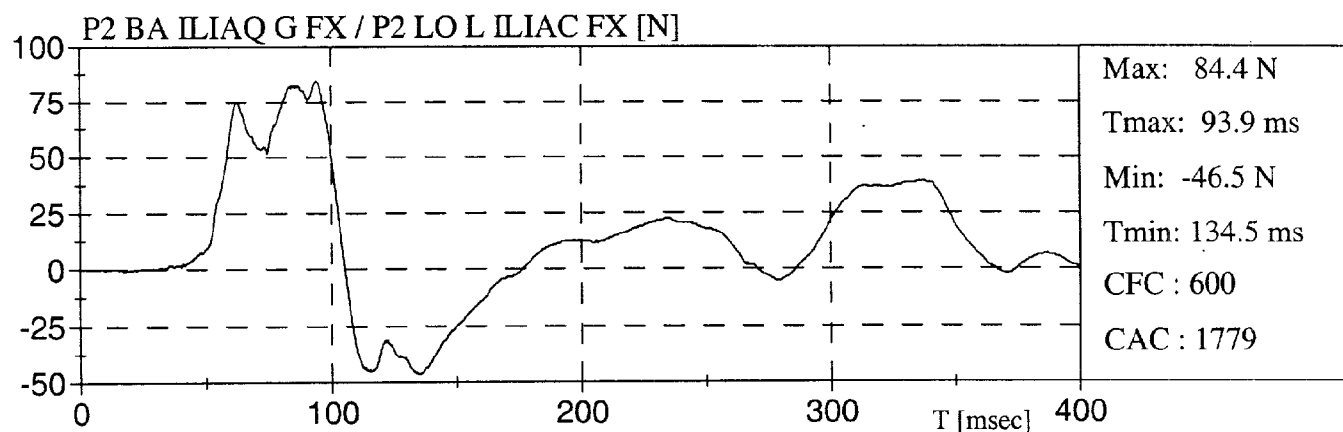
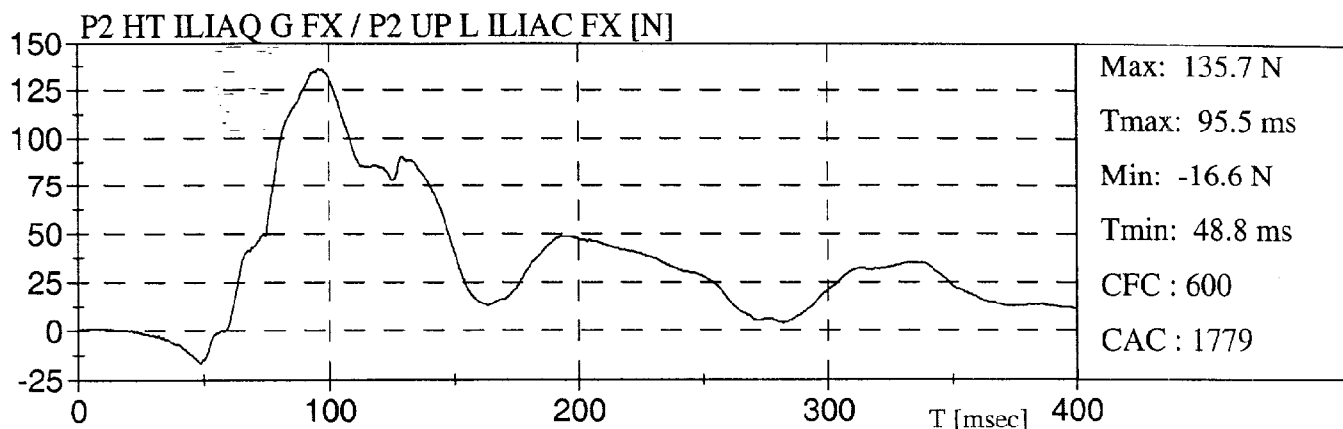


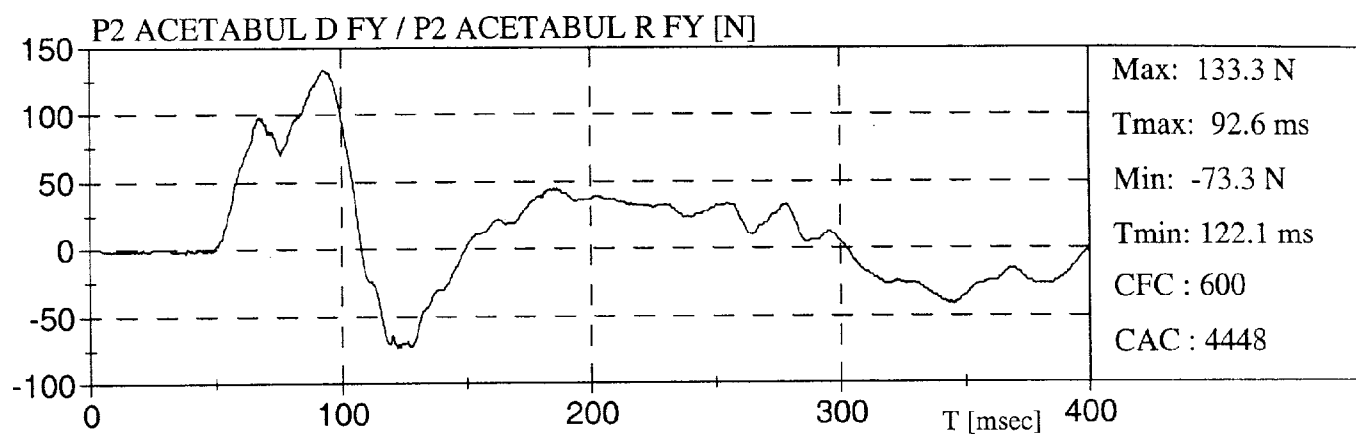
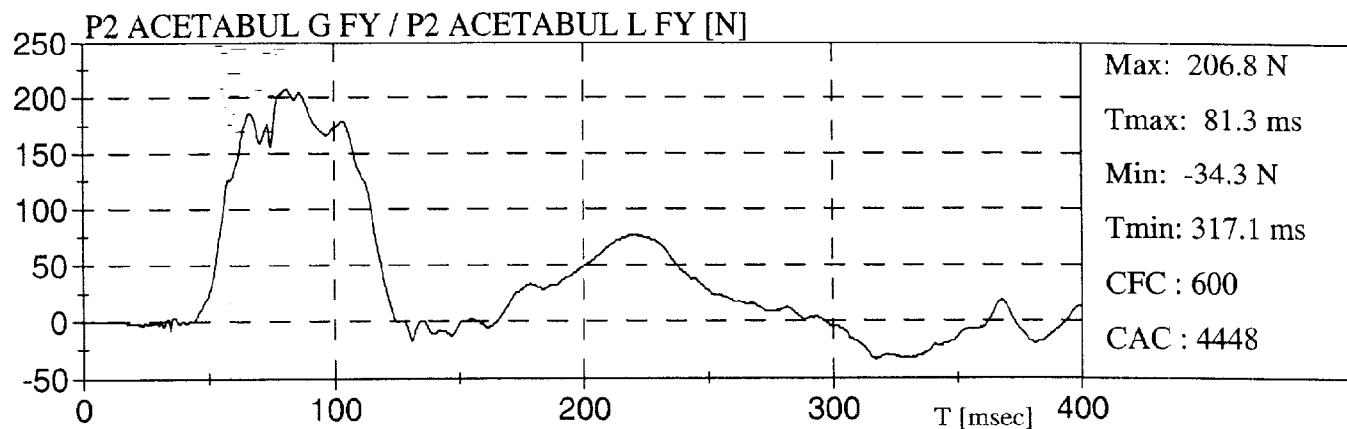


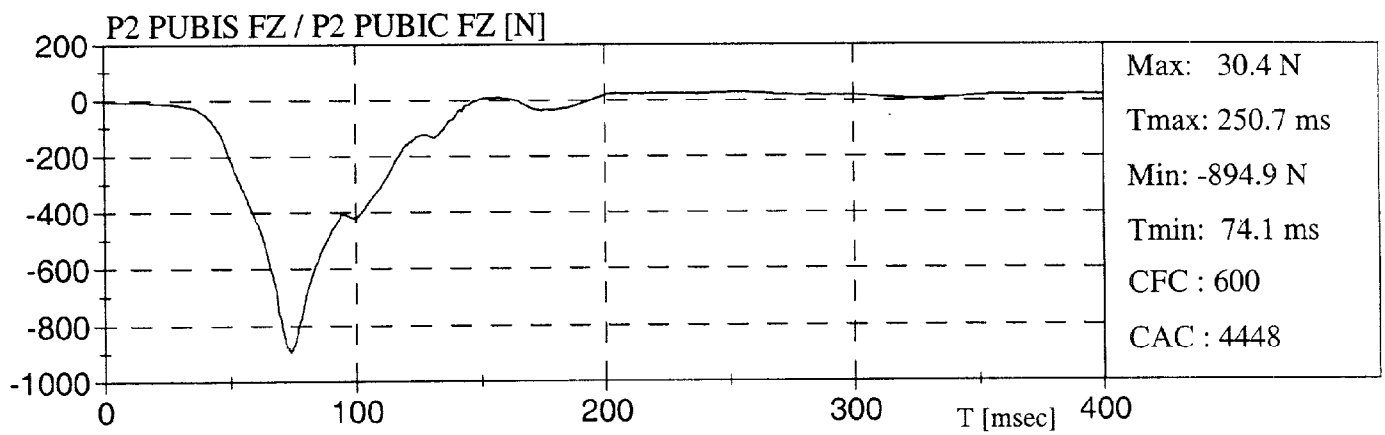
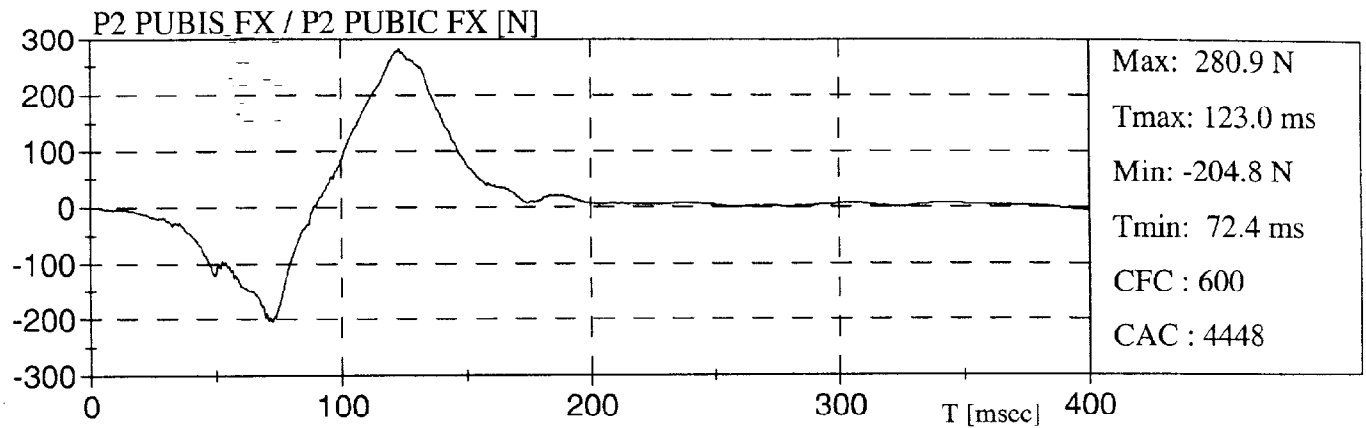


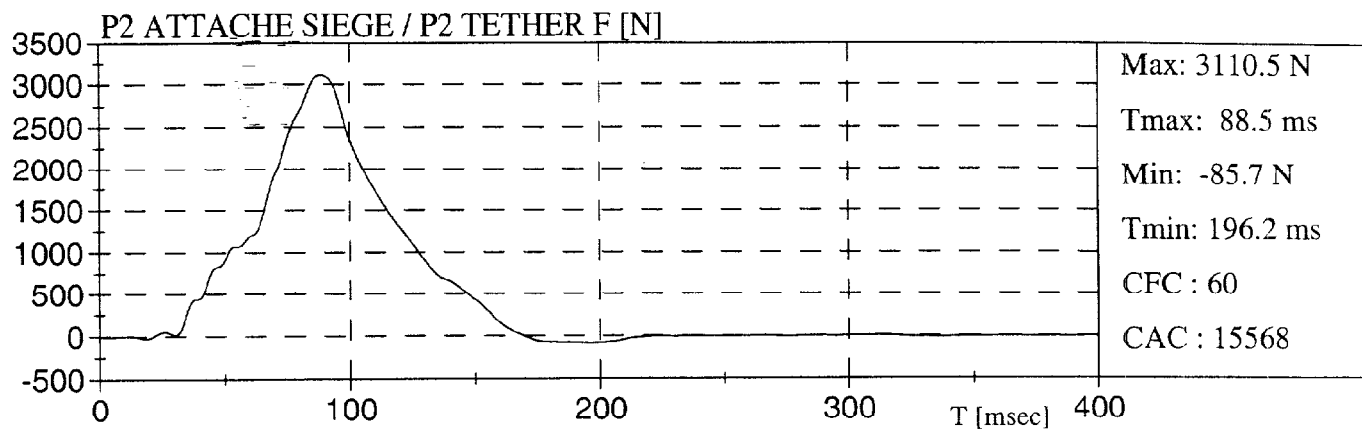


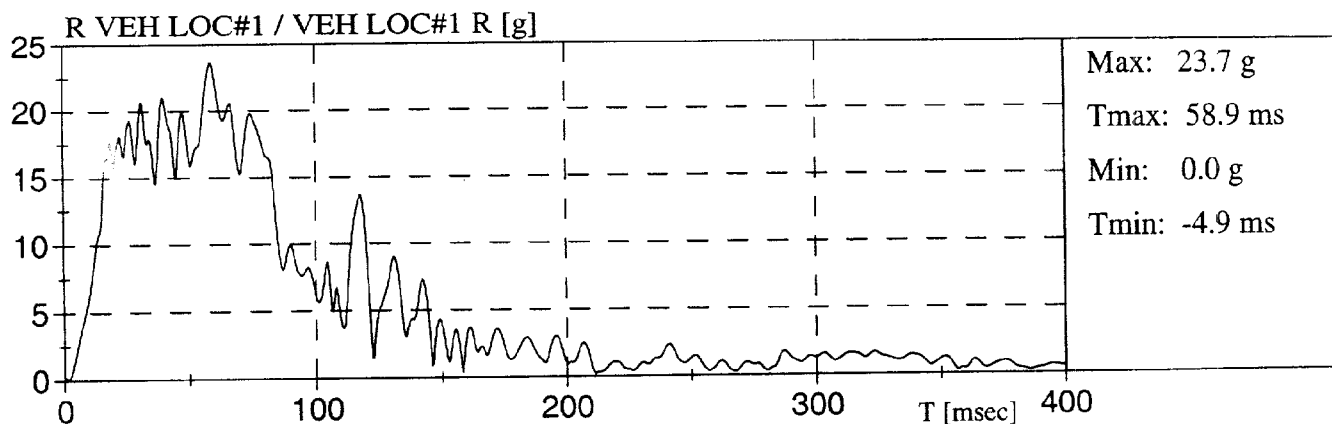
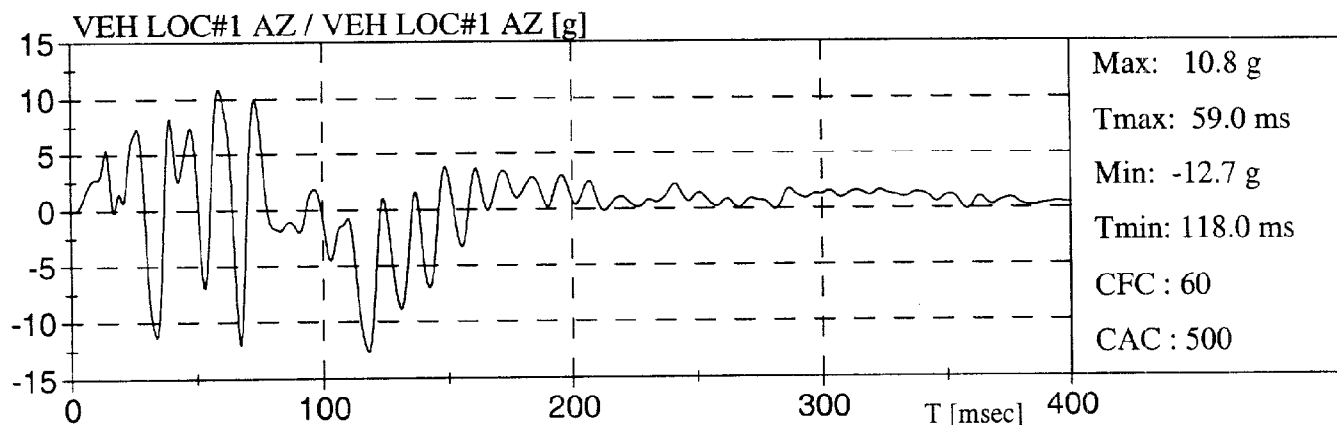
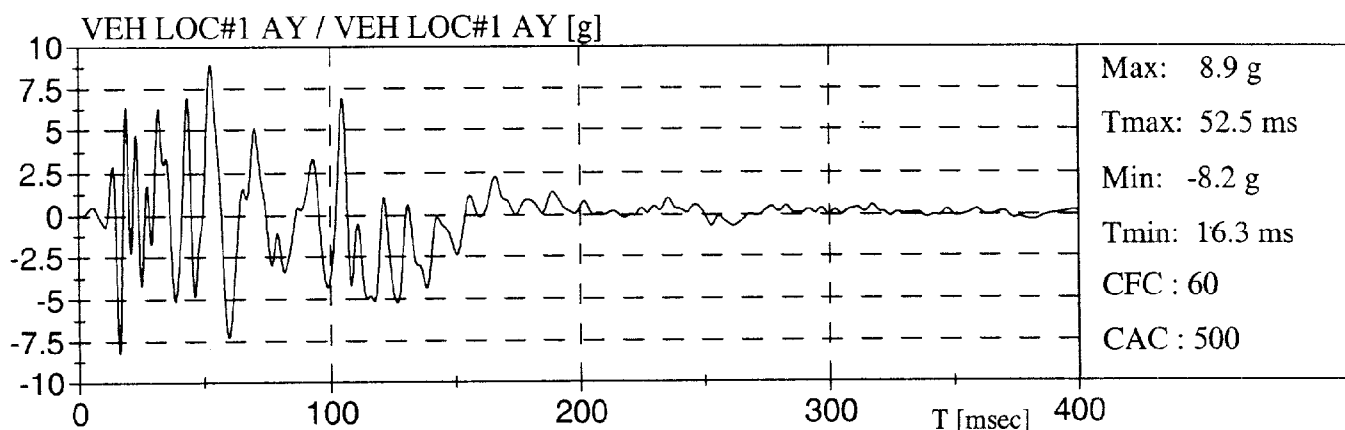
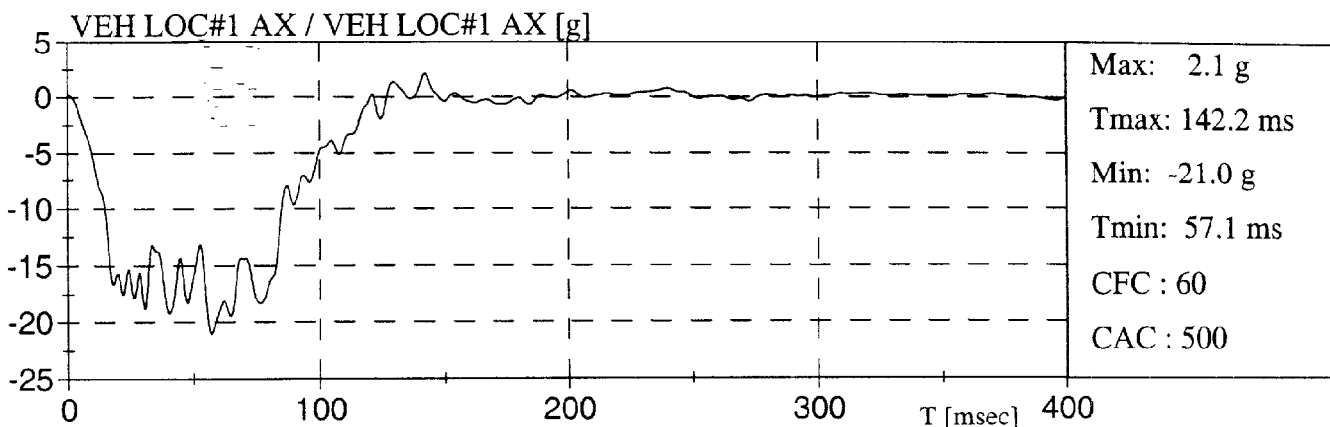


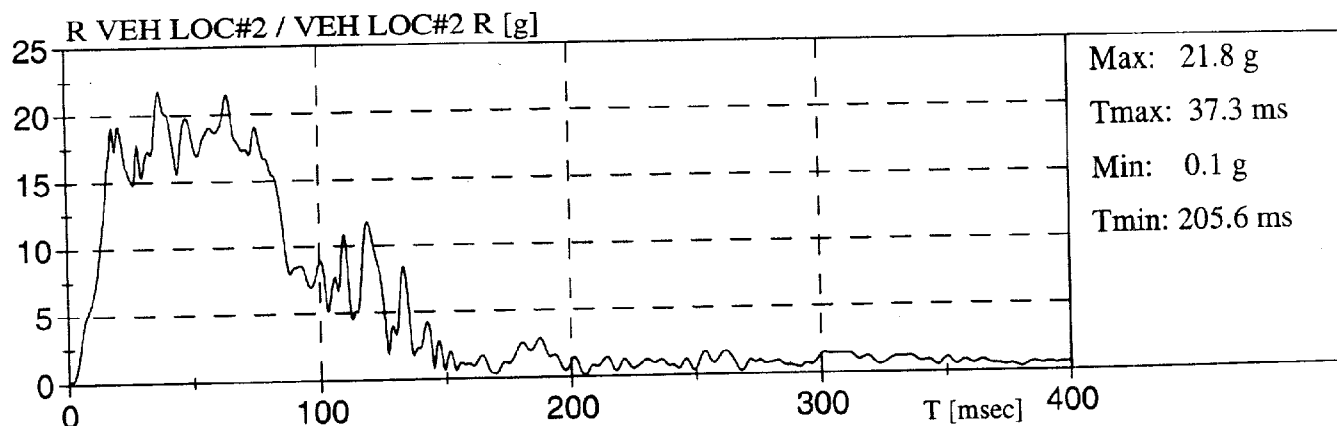
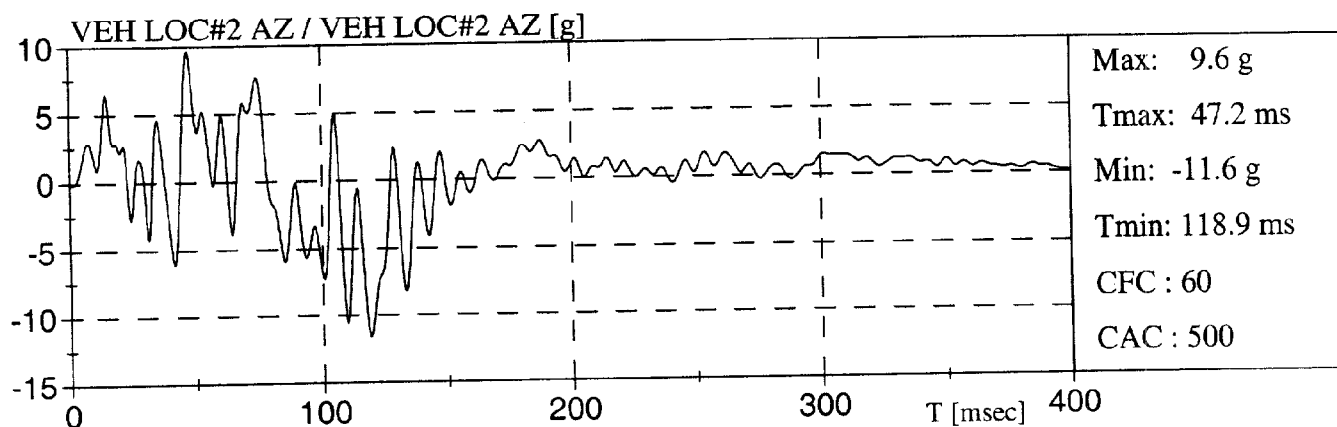
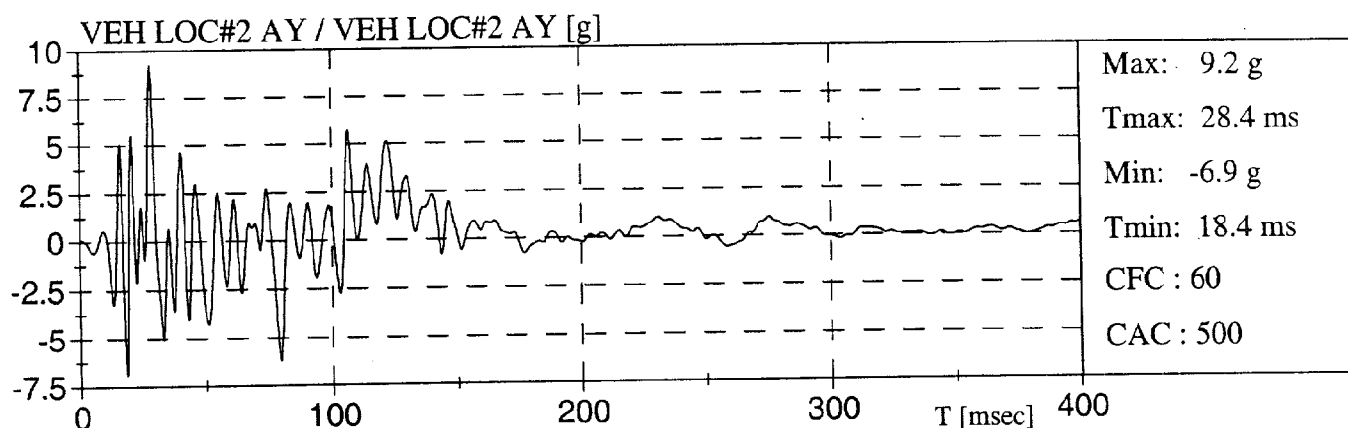
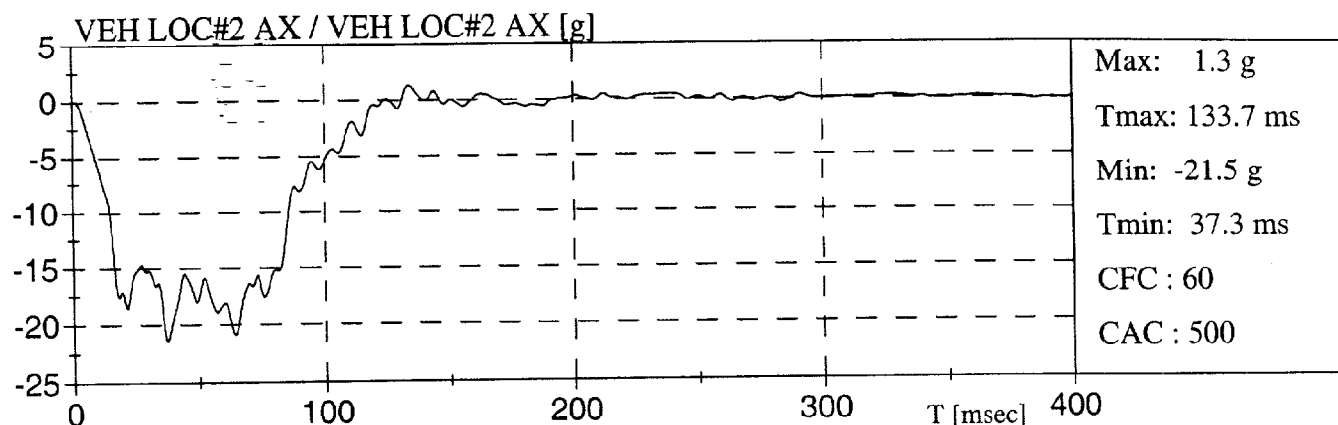


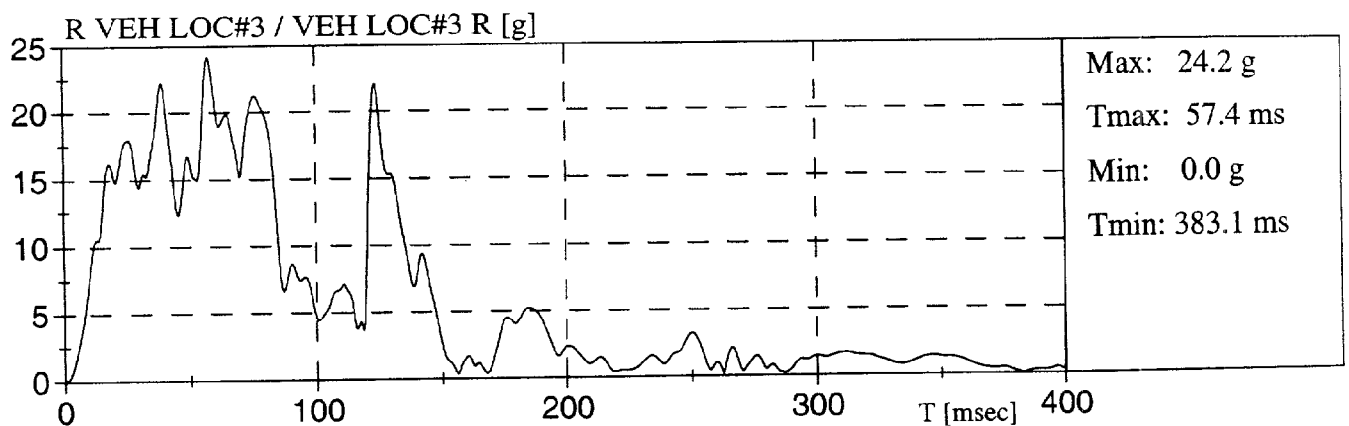
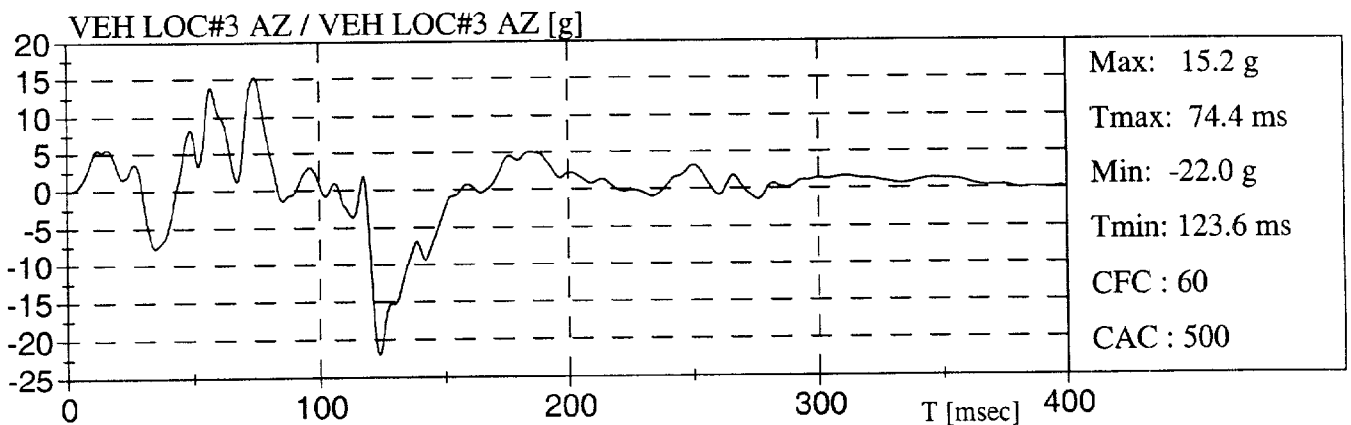
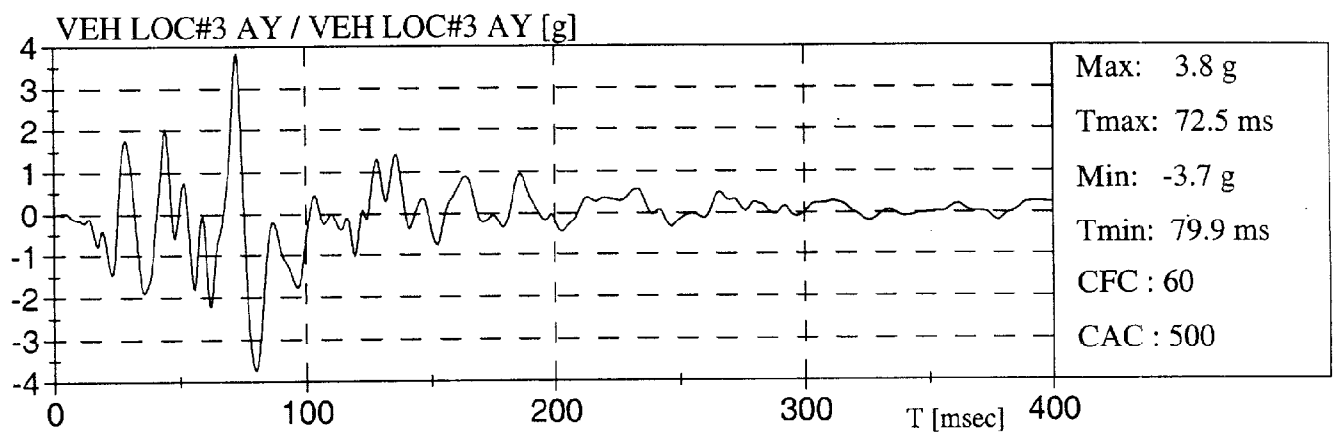
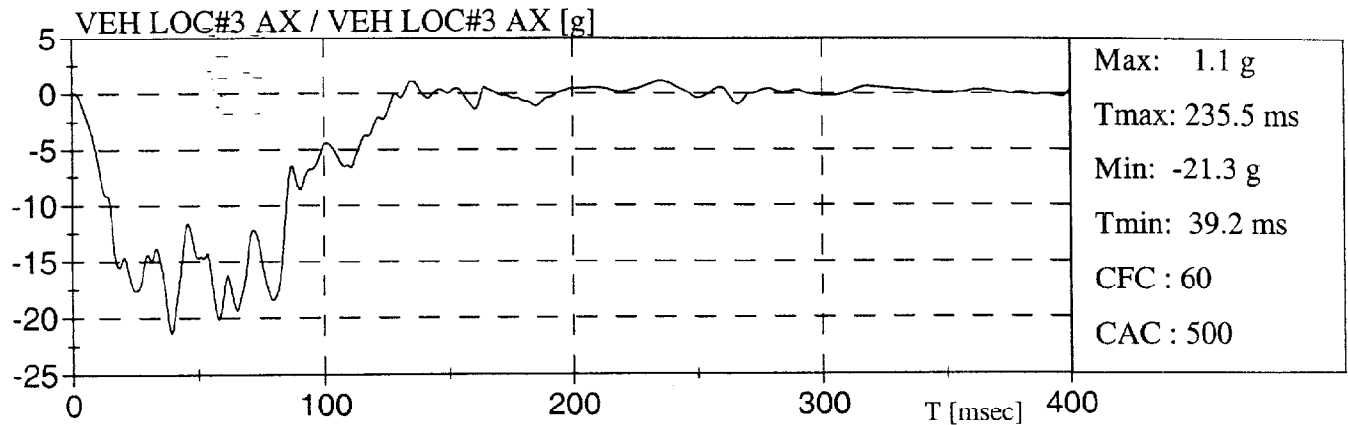


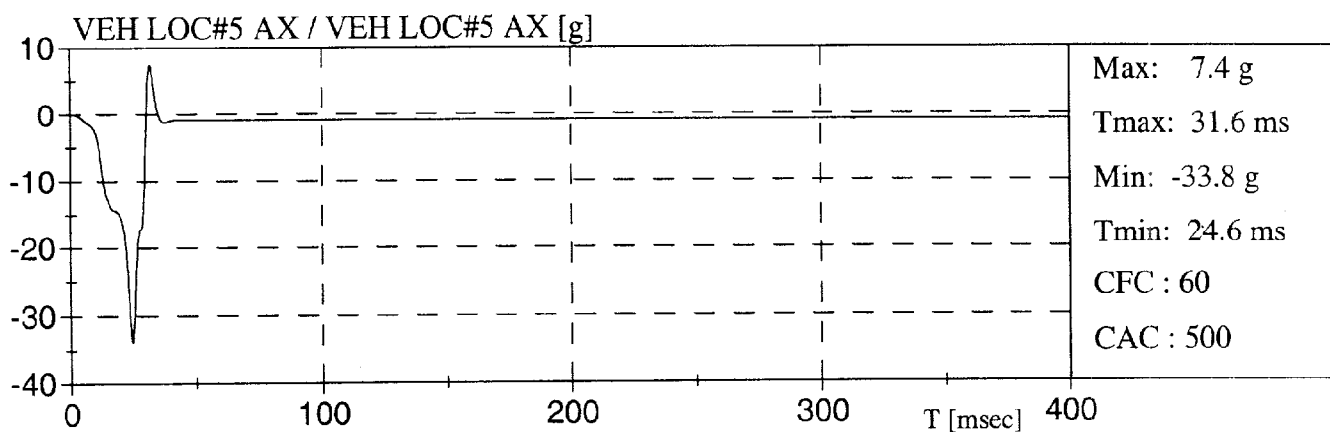
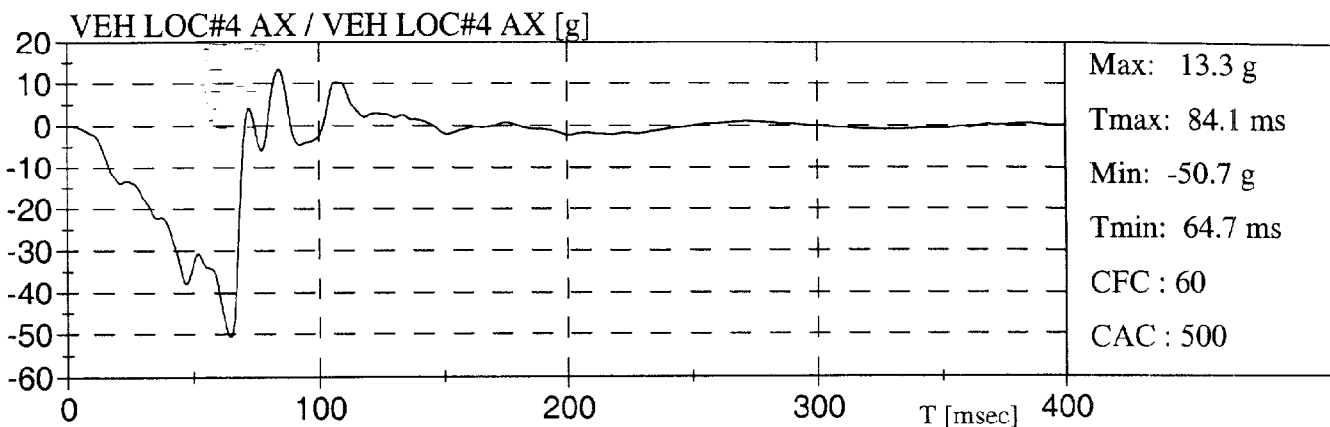


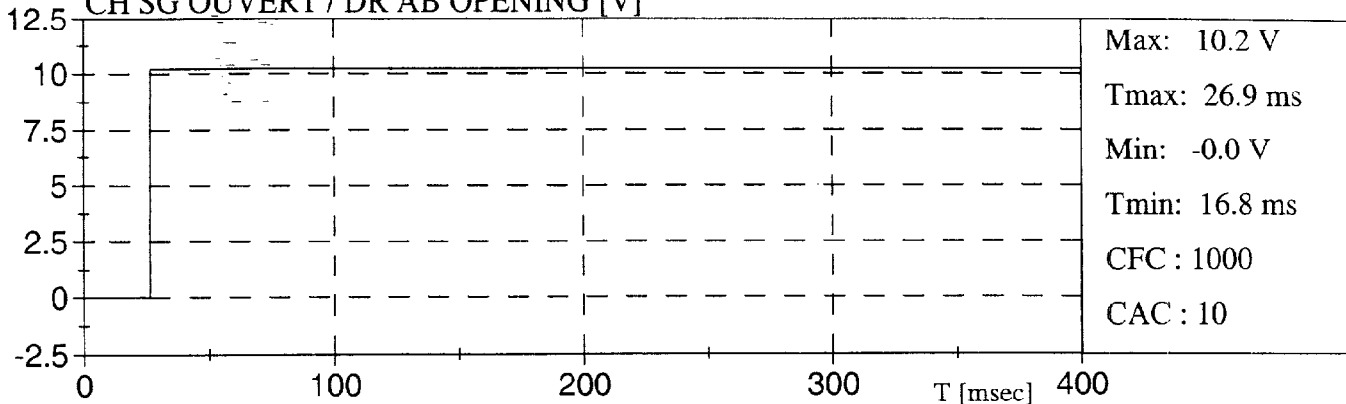
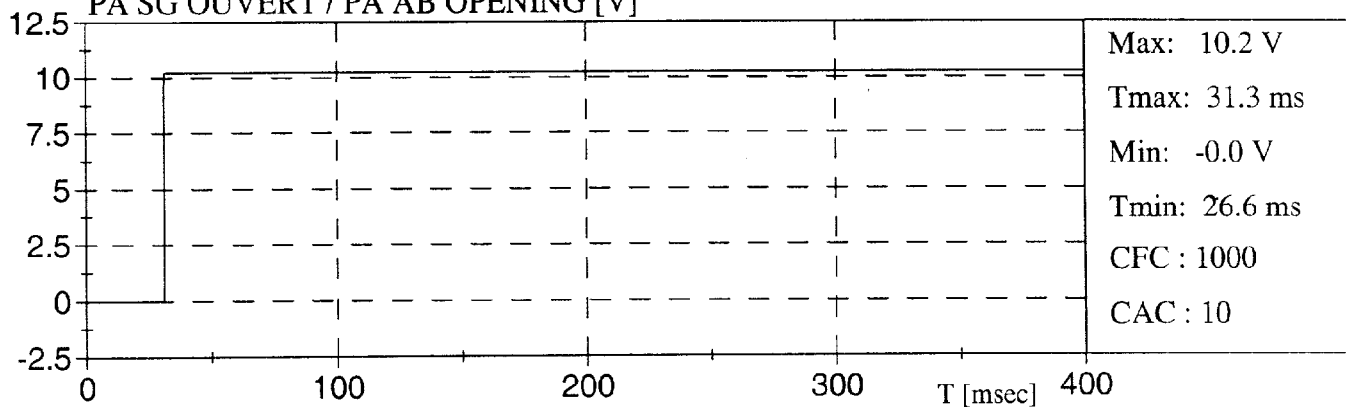


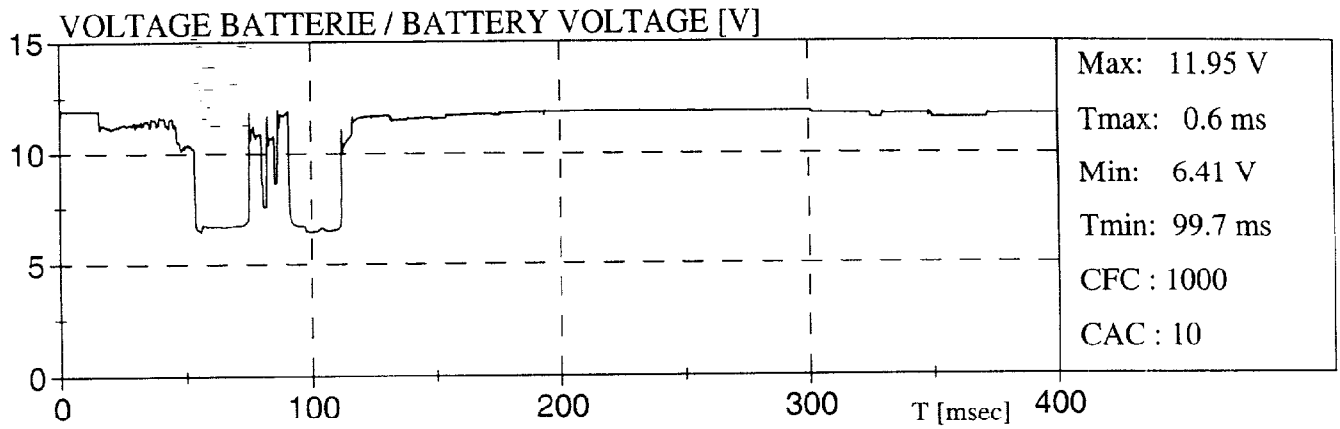


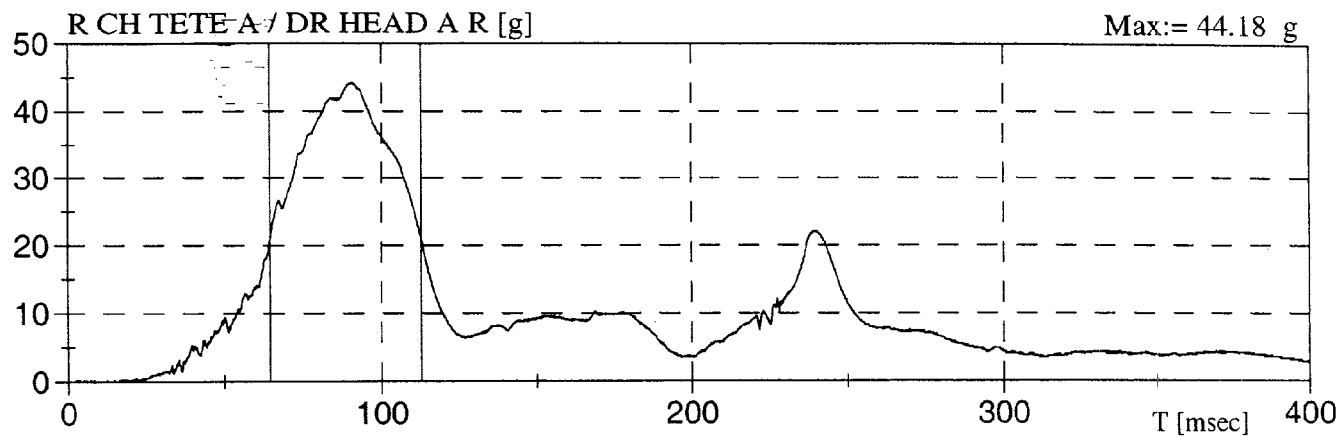






CH SG OUVERT / DR AB OPENING [V]

PA SG OUVERT / PA AB OPENING [V]


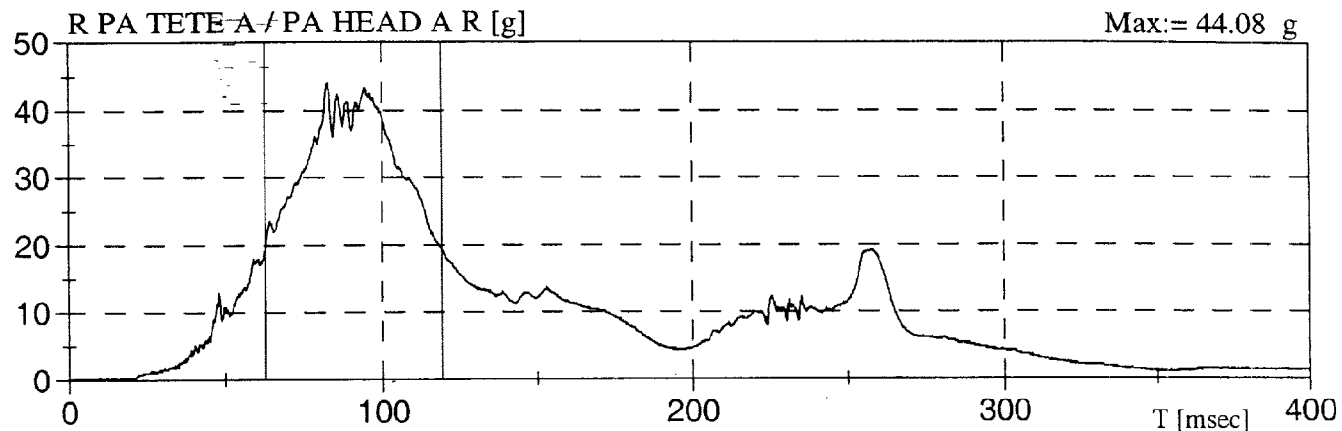




HEAD INJURY CRITERIA (HIC) *
CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 349	HIC(36ms):= 322	HIC(15ms):= 174
T1:= 64.5 ms	T1:= 71.6 ms	T1:= 81.2 ms
T2:= 112.7 ms	T2:= 107.6 ms	T2:= 96.2 ms

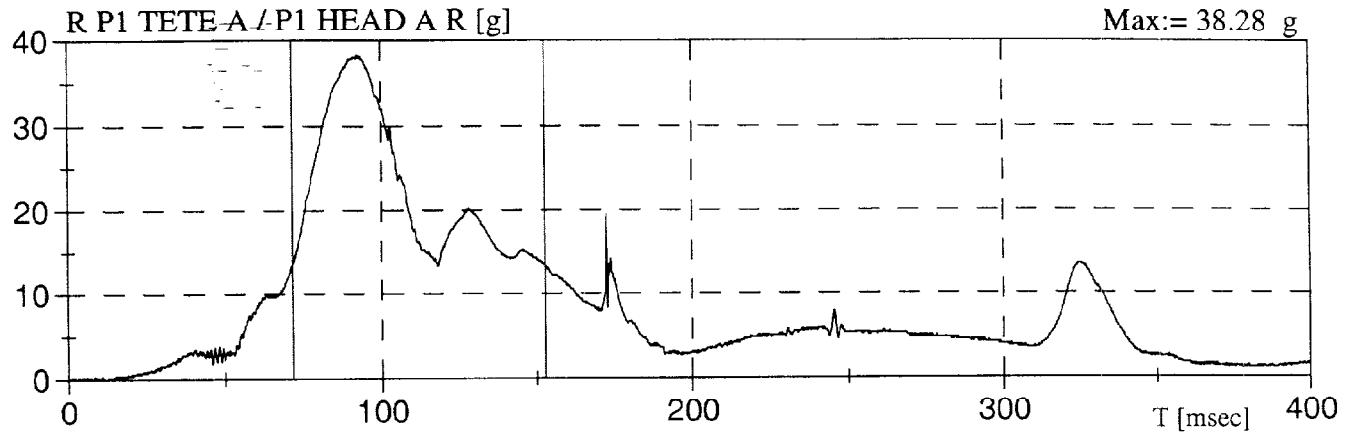
* Selon / According To: SAE J1727 96-08



HEAD INJURY CRITERIA (HIC) *
CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 341	HIC(36ms):= 300	HIC(15ms):= 158
T1:= 62.8 ms	T1:= 73.4 ms	T1:= 81.9 ms
T2:= 119.1 ms	T2:= 109.4 ms	T2:= 96.9 ms

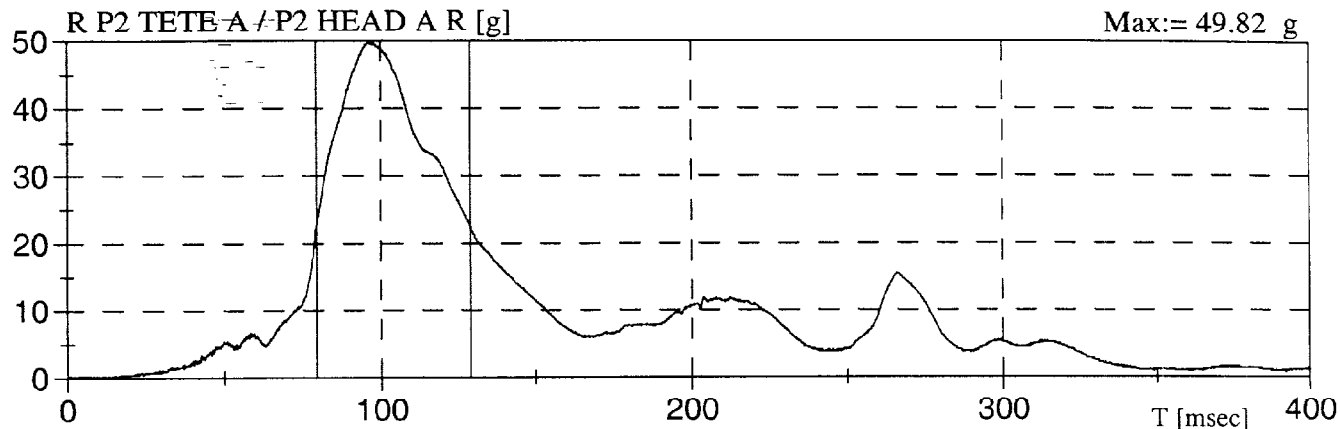
* Selon / According To: SAE J1727 96-08



HEAD INJURY CRITERIA (HIC) *
CRITÈRE DE BLESSURE DE LA TÊTE

HIC:= 193	HIC(36ms):= 182	HIC(15ms):= 119
T1:= 71.6 ms	T1:= 74.7 ms	T1:= 83.9 ms
T2:= 152.8 ms	T2:= 109.8 ms	T2:= 98.9 ms

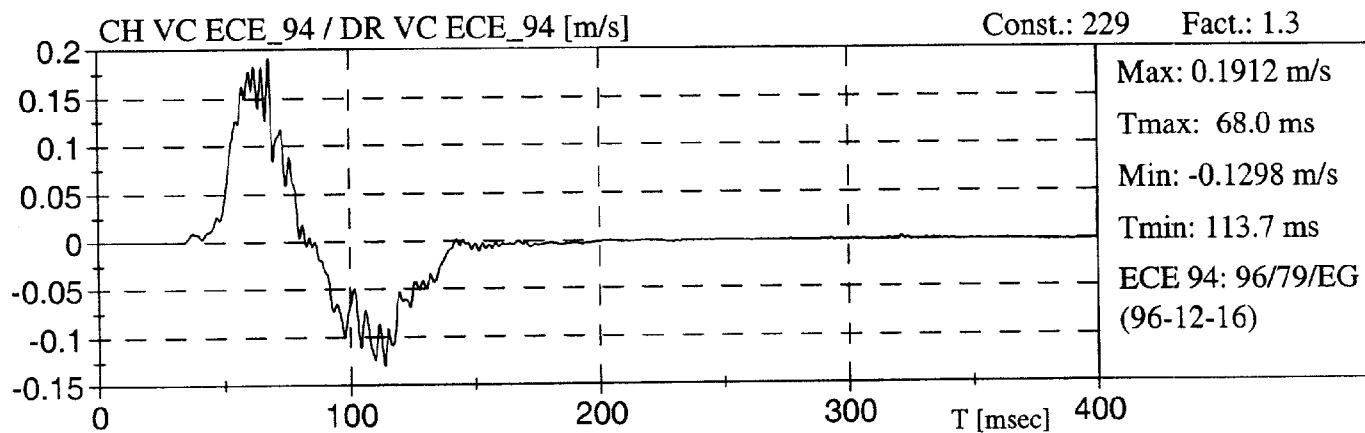
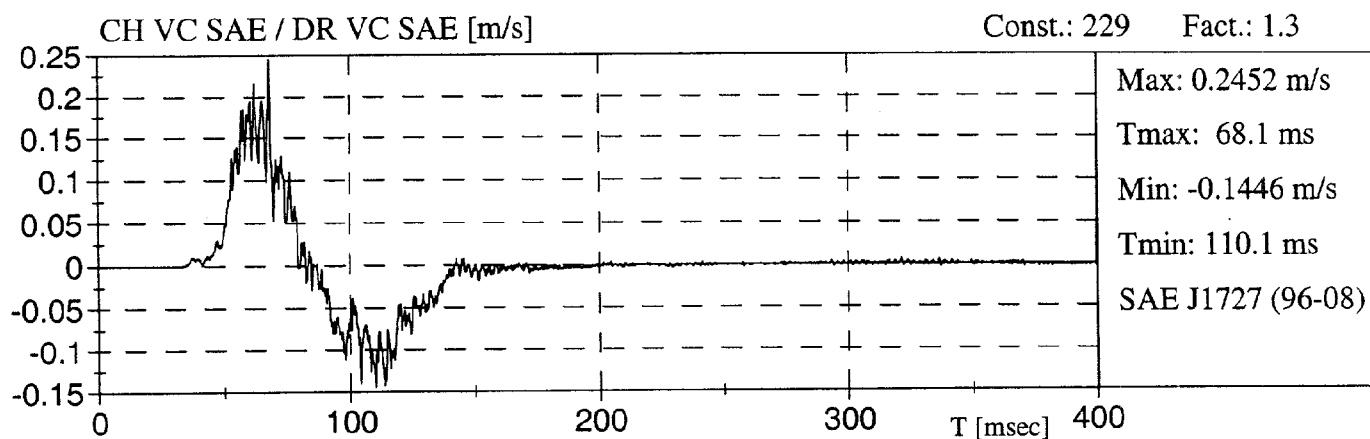
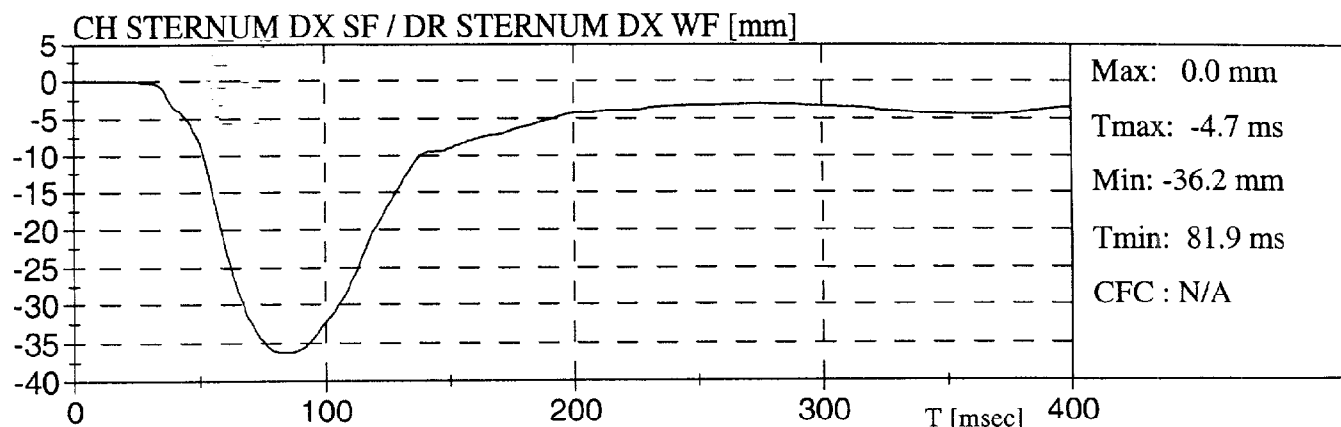
* Selon / According To: SAE J1727 96-08

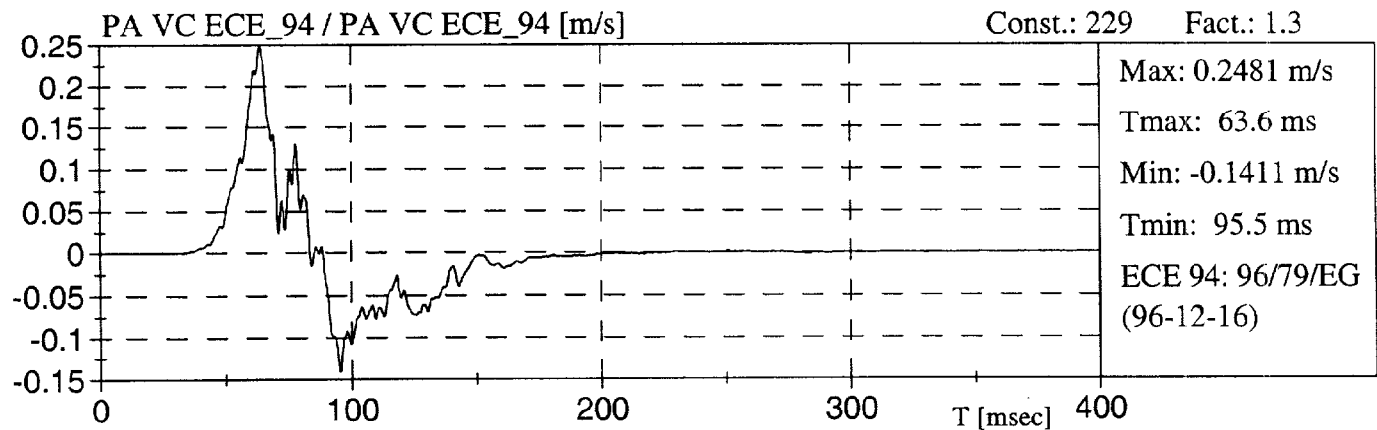
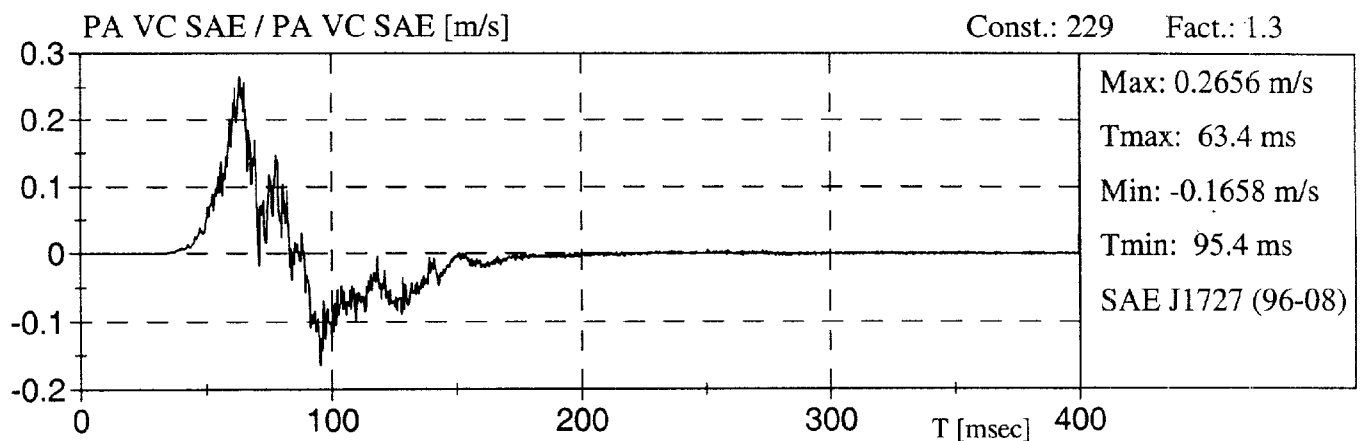
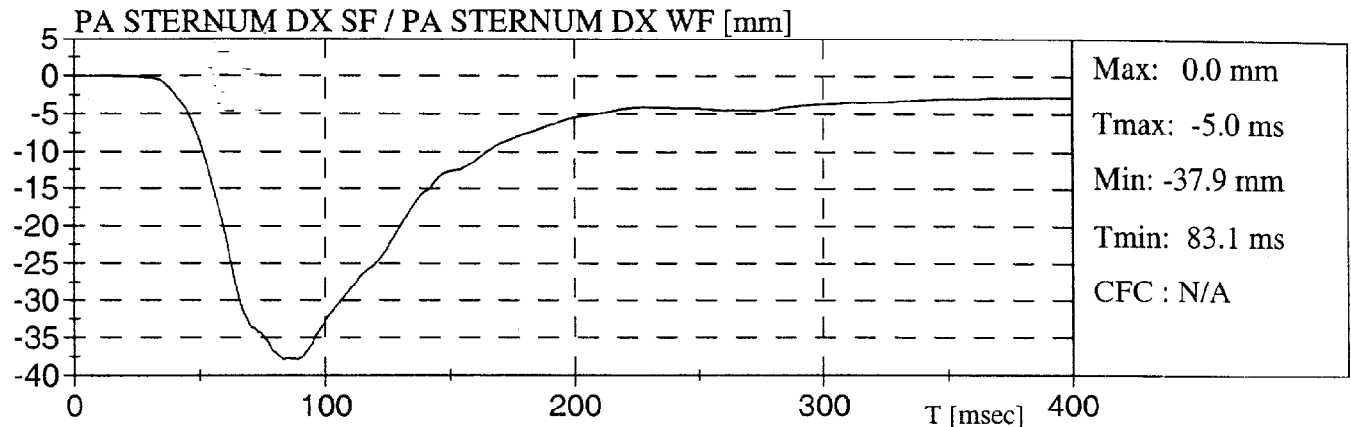


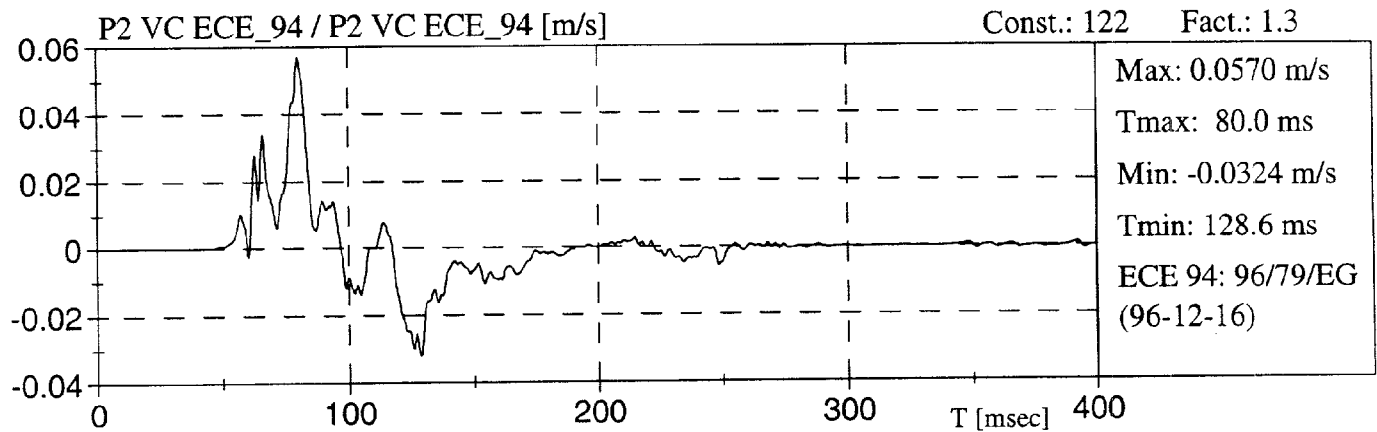
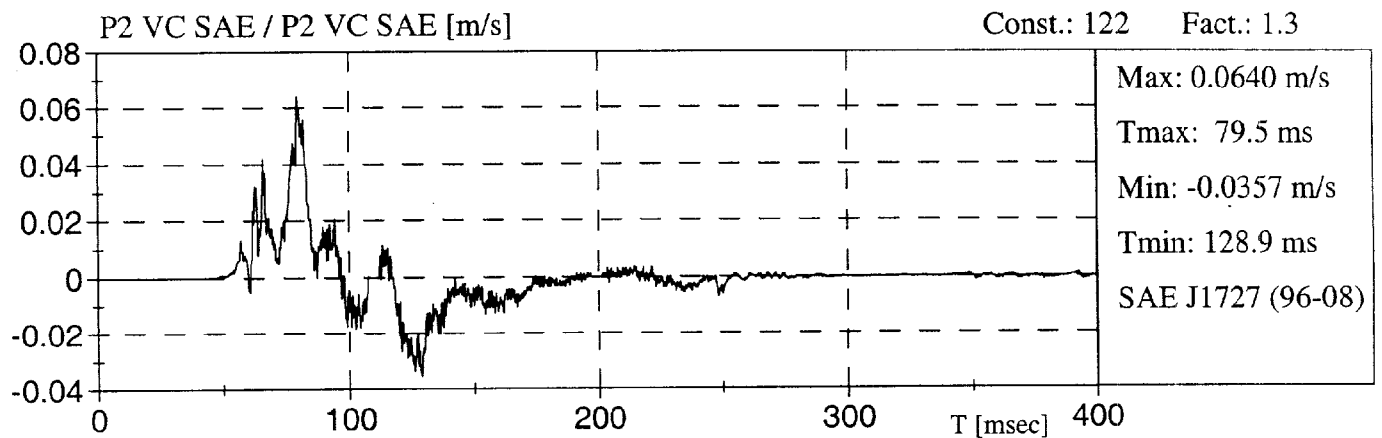
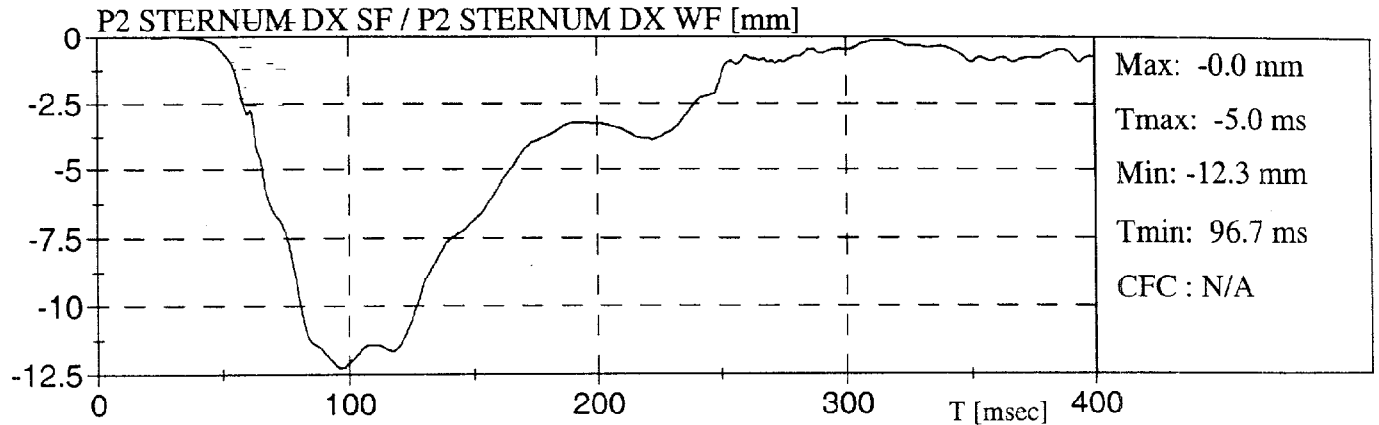
HEAD INJURY CRITERIA (HIC) *
CRITÈRE DE BLESSURE DE LA TÊTE

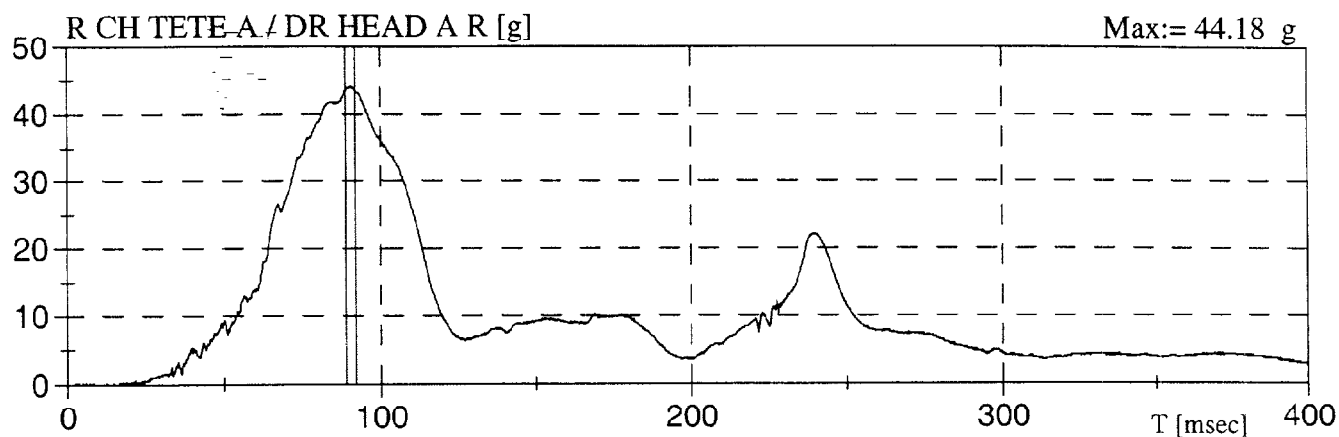
HIC:= 430	HIC(36ms):= 400	HIC(15ms):= 237
T1:= 79.4 ms	T1:= 83.0 ms	T1:= 90.4 ms
T2:= 128.7 ms	T2:= 119.0 ms	T2:= 105.4 ms

* Selon / According To: SAE J1727 96-08



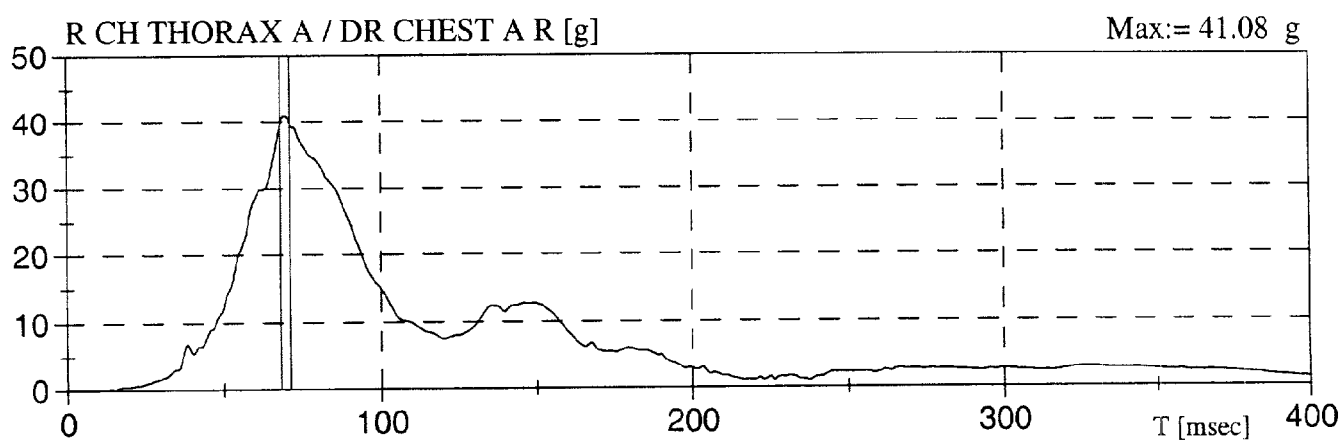






CLIP 3ms *

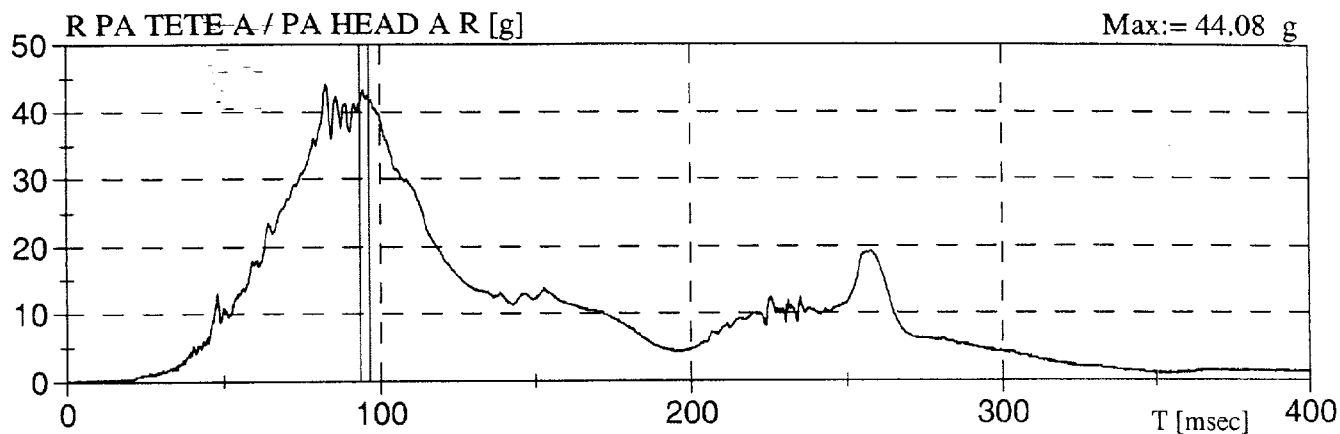
Acc. := 43.61 g	T1:= 89.0 ms	T2:= 92.1 ms
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CLIP 3ms *

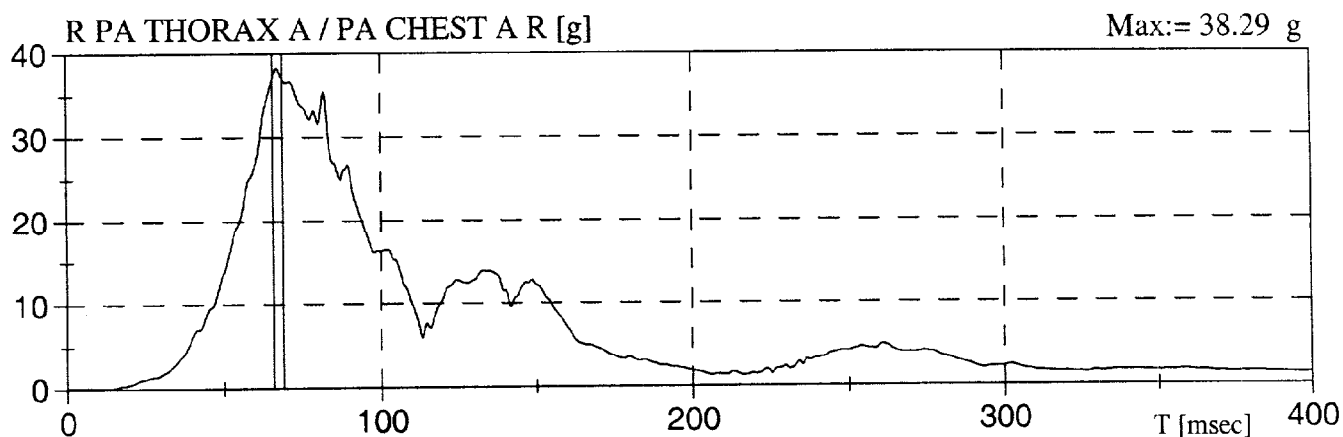
Acc. := 39.65 g	T1:= 68.2 ms	T2:= 71.2 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



CLIP 3ms *

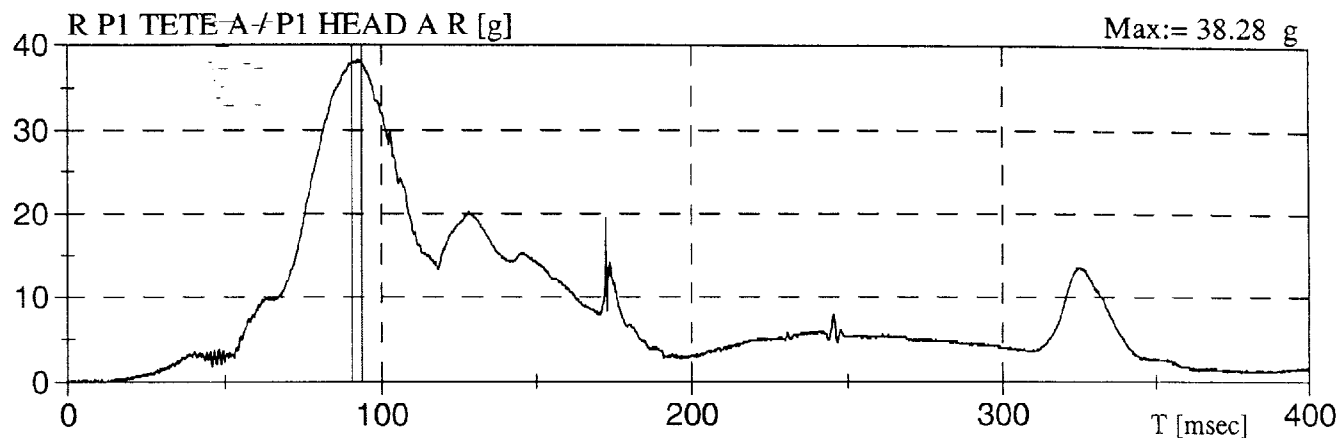
Acc. := 41.55 g	T1:= 93.5 ms	T2:= 96.5 ms
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CLIP 3ms *

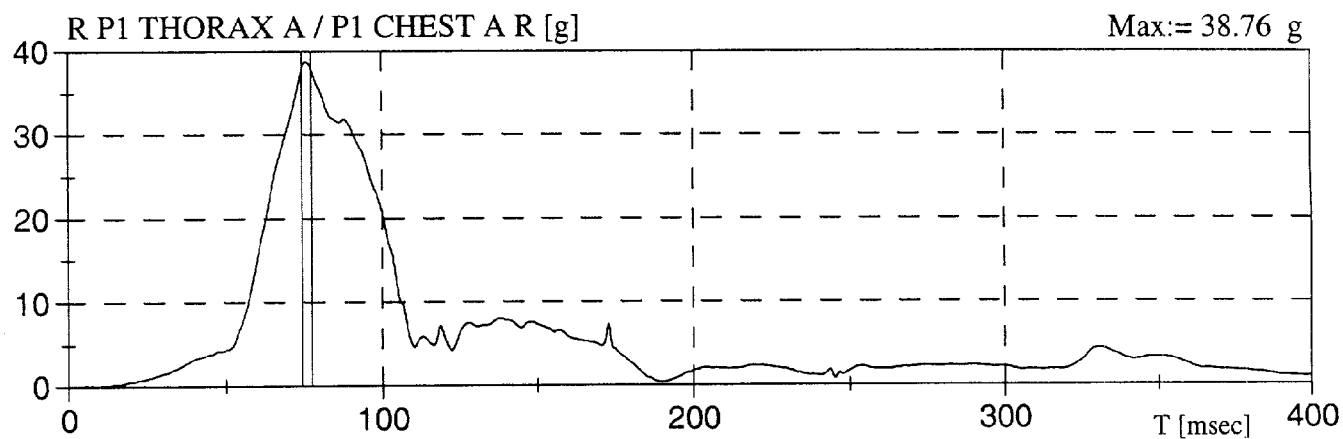
Acc. := 37.03 g	T1:= 65.6 ms	T2:= 68.6 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



CLIP 3ms *

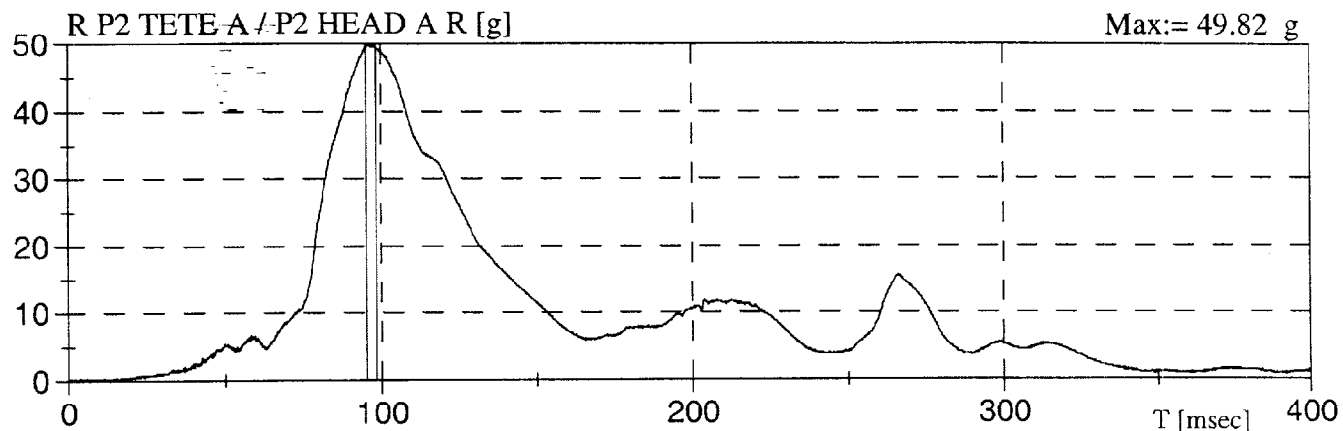
Acc. := 37.89 g	T1:= 90.6 ms	T2:= 93.6 ms
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CLIP 3ms *

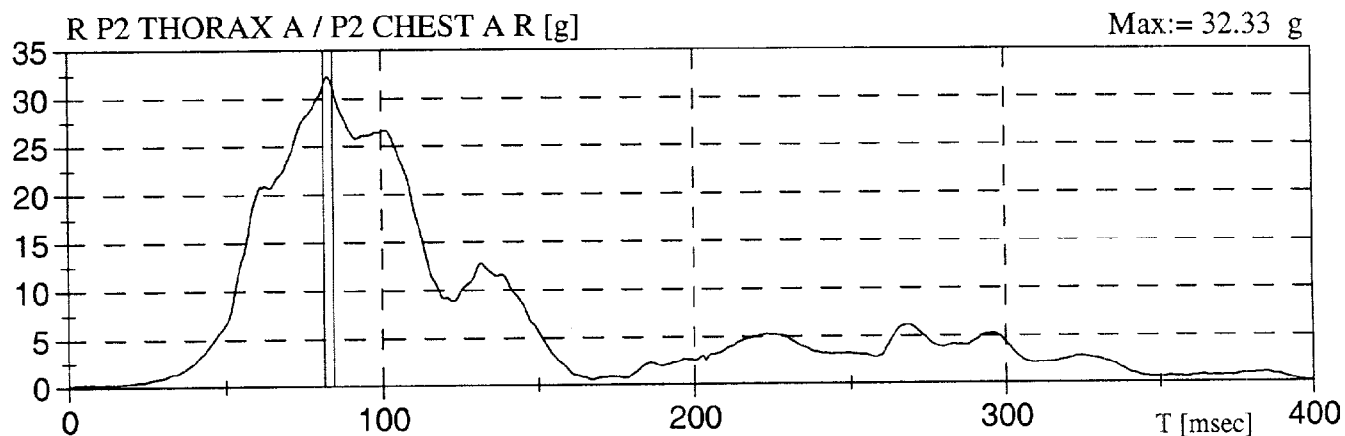
Acc. := 37.84 g	T1:= 74.4 ms	T2:= 77.4 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95



CLIP 3ms *

Acc. := 49.37 g	T1:= 95.2 ms	T2:= 98.4 ms
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CLIP 3ms *

Acc. := 31.31 g	T1:= 81.3 ms	T2:= 84.3 ms
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* Selon / According To: NHTSA CLIP VERSION 2.1 5/95

INDEX DU TIBIA *
TIBIA INDEX *
TI Chauffeur / Driver $M_c := 225 \text{ N-m}$ $F_c := 35.9 \text{ kN}$

TIBIA	GAUCHE / LEFT	DROIT / RIGHT
HAUT / UPPER	0.306	0.440
BAS / LOWER	0.171	0.336

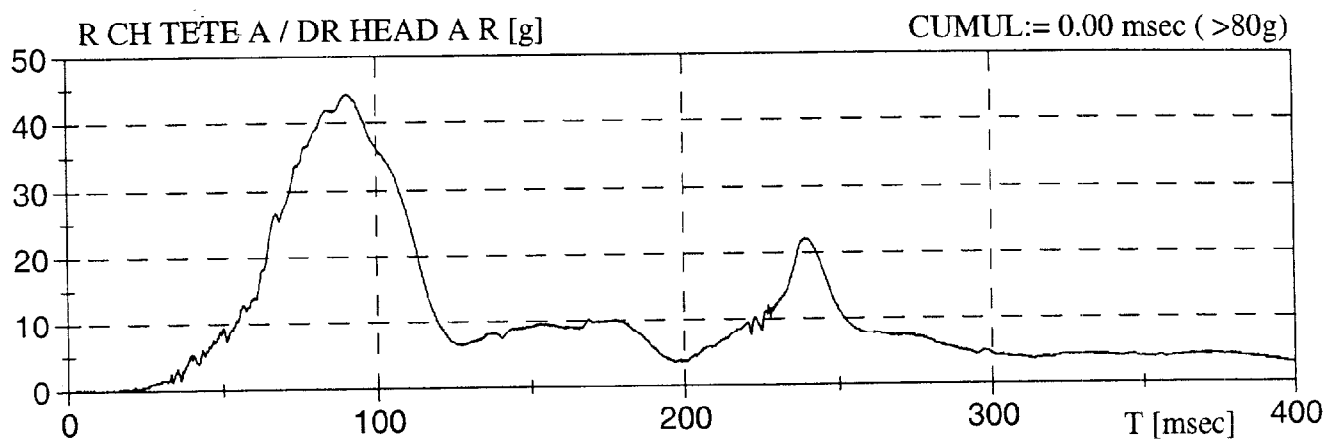
TI Passenger / Passenger $M_c := 225 \text{ N-m}$ $F_c := 35.9 \text{ kN}$

TIBIA	GAUCHE / LEFT	DROIT / RIGHT
HAUT / UPPER	0.360	0.895
BAS / LOWER	0.187	0.662

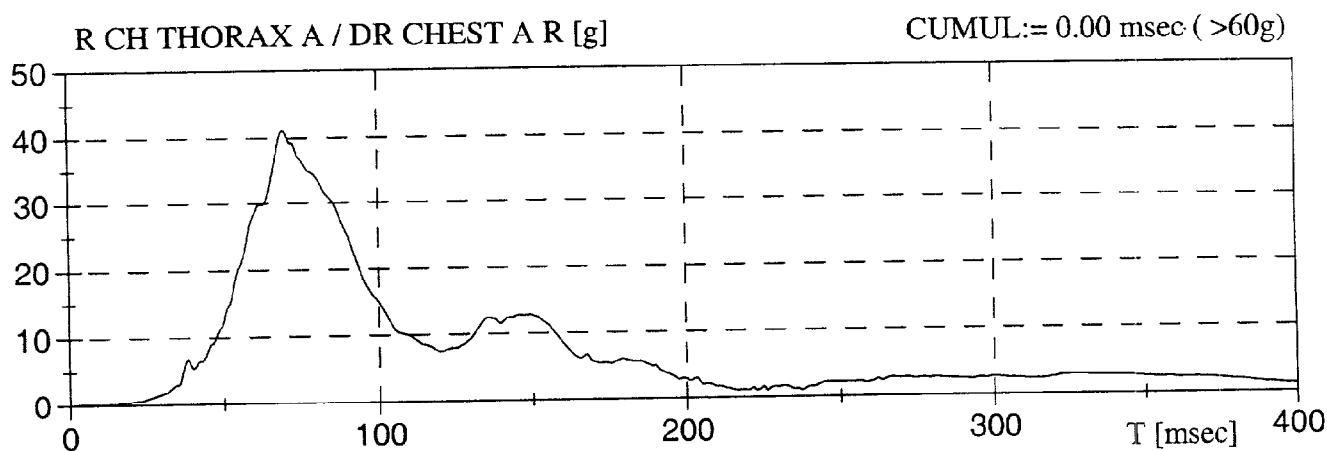
* Selon / According To: SAE J1727 AUG 96



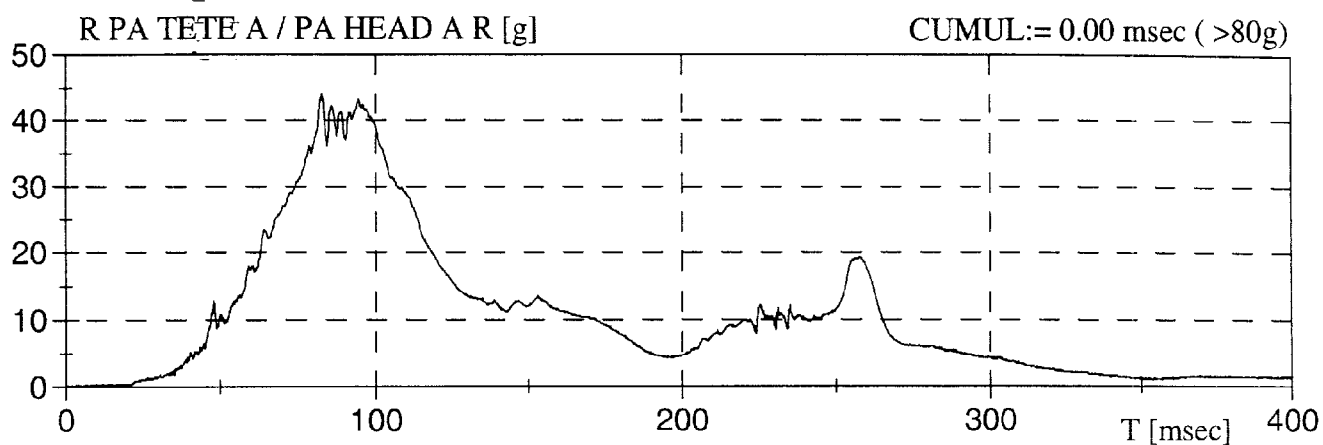
ACCÉLÉRATION DE LA TÊTE >80 g / HEAD ACCELERATION > 80 g



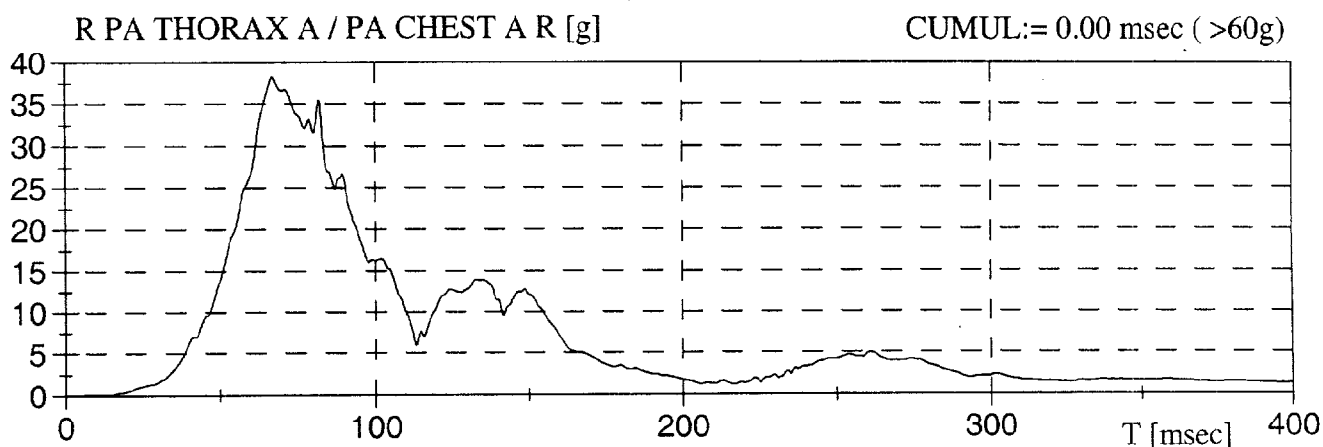
ACCÉLÉRATION DU THORAX >60 g / THORAX ACCELERATION > 60 g



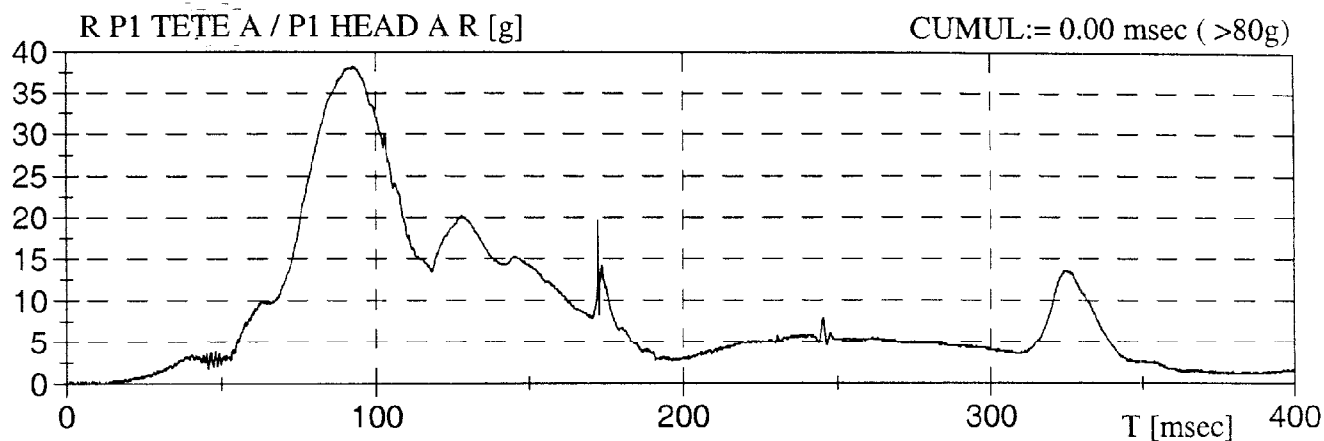
ACCÉLÉRATION DE LA TÊTE >80 g / HEAD ACCELERATION > 80 g



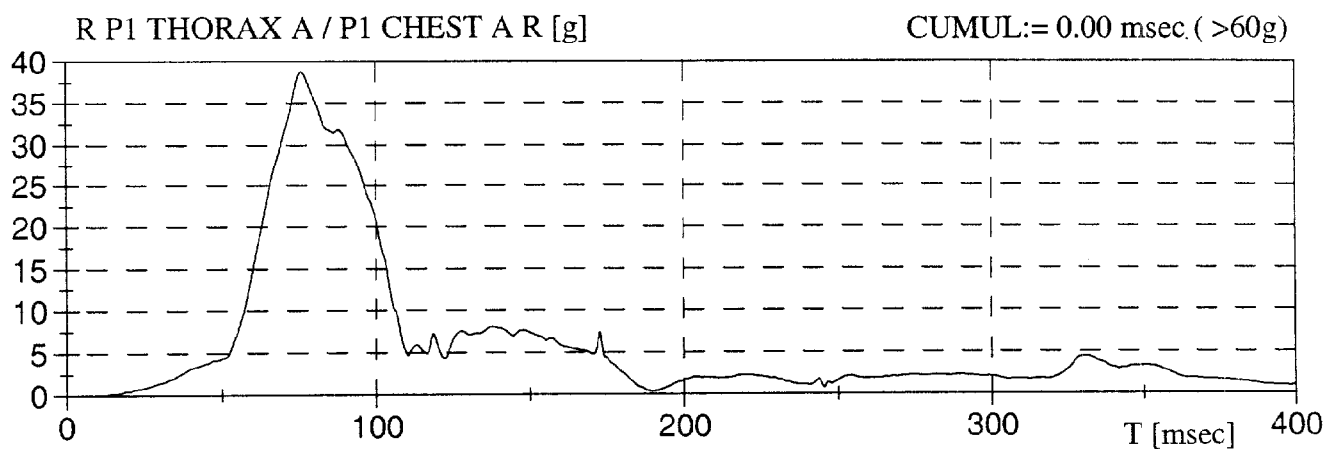
ACCÉLÉRATION DU THORAX >60 g / THORAX ACCELERATION > 60 g



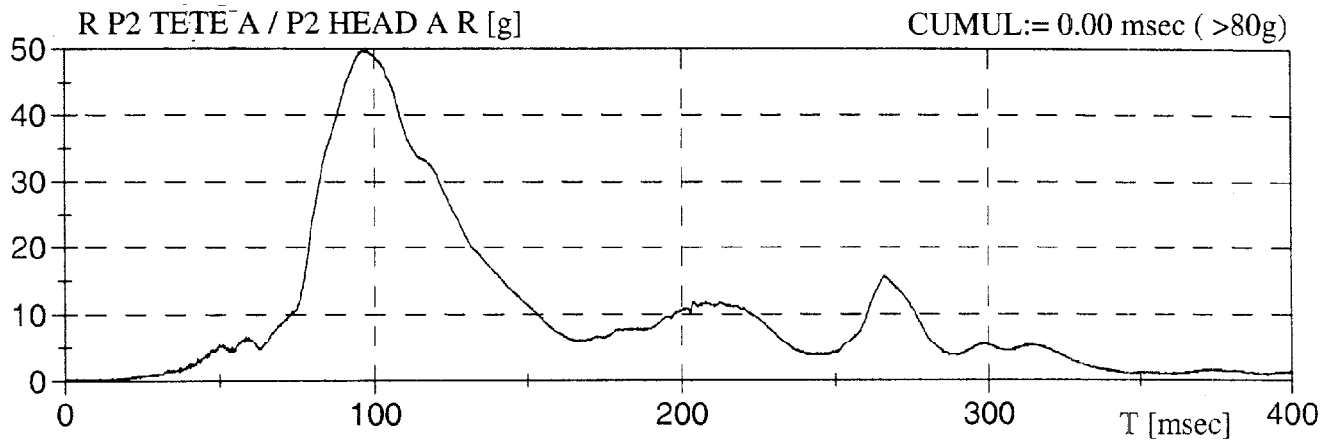
ACCÉLÉRATION DE LA TÊTE >80 g / HEAD ACCELERATION > 80 g



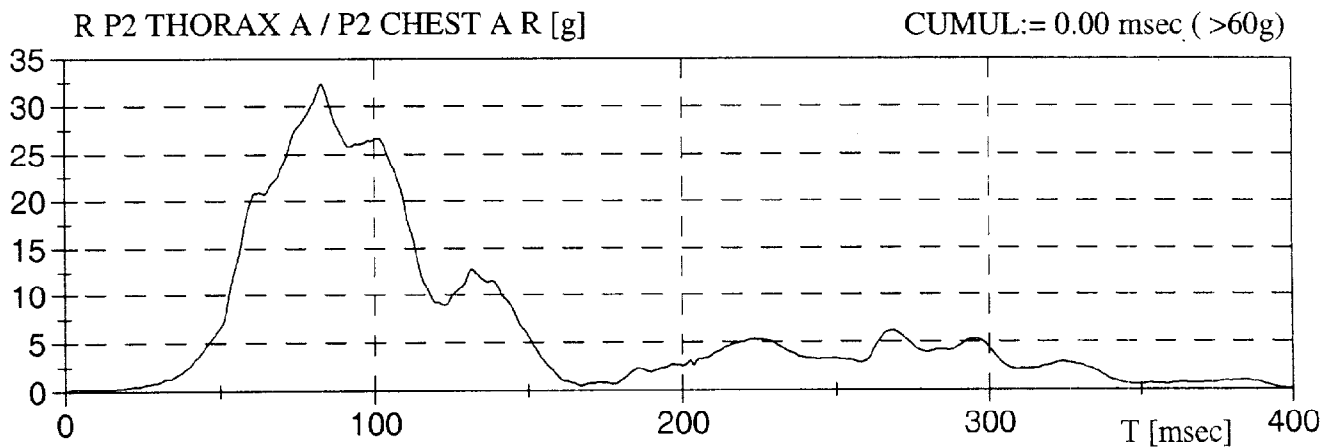
ACCÉLÉRATION DU THORAX >60 g / THORAX ACCELERATION > 60 g



ACCÉLÉRATION DE LA TÊTE >80 g / HEAD ACCELERATION > 80 g



ACCÉLÉRATION DU THORAX >60 g / THORAX ACCELERATION > 60 g





PMG
Technologies

PROTECTION DE L'OCCUPANT EN COLLISION
OCCUPANT CRASH PROTECTION

FORD EXPEDITION 99

Date: 1999-03-12

N° TC / TC No.: TC99-108

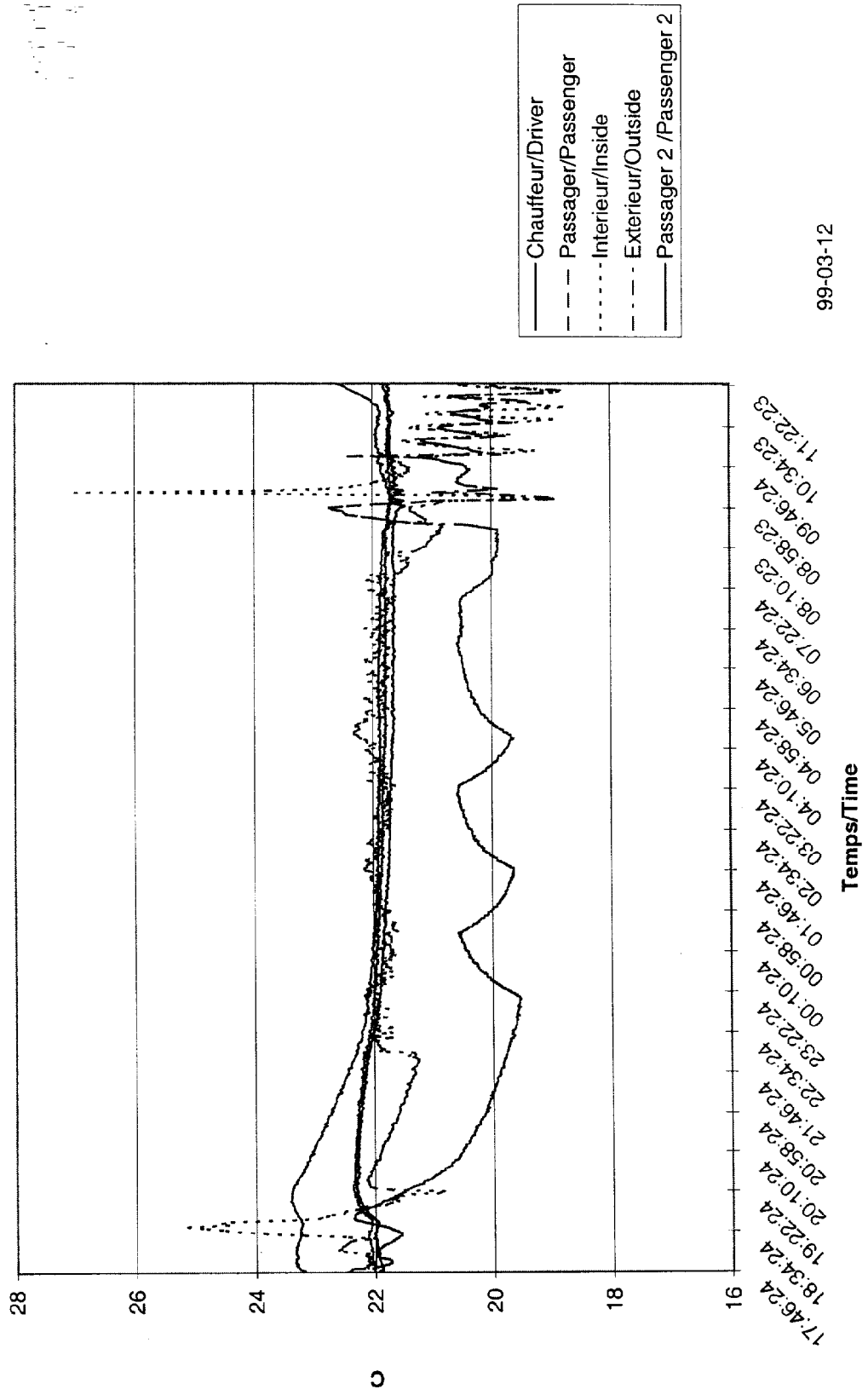
COMMENTAIRES / COMMENTS

LE CANAL (VEH LOC#5 AX) N'EST PAS VALIDE A PARTIR DE 31.1 ms.
THE CHANNEL (VEH LOC#5 AX) IS NOT VALID FROM 31.1 ms.

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APPENDICE /APPENDIX C
DONNÉES DES TEMPÉRATURES
TEMPERATURE DATA

Temperature TC99-108



99-03-12