**CRASH DATA RESEARCH CENTER** 

Calspan Corporation Buffalo, NY 14225

### NOT-IN-TRAFFIC SURVEILLANCE CALSPAN REMOTE BACKOVER INVESTIGATION

SCI CASE NO: CA07-009

## VEHICLE: 1997 HONDA CIVIC LOCATION: TENNESSEE CRASH DATE: FEBRUARY 2007

Contract No. DTNH22-07-C-00043

Prepared for:

U.S. Department of Transportation National Highway Traffic Safety Administration Washington, D.C. 20590

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

# TECHNICAL REPORT STANDARD TITLE PAGE

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# **TABLE OF CONTENTS**

BACKGROUND	1
SUMMARY VEHICLE DATA	
1997 Honda Civic CRASH SEQUENCE	1
REAR VISIBILITY	
VISIBILITY DIAGRAM	
ATTACHMENT A: Not-In-Traffic Surveillance Forms	<b>ว</b>

#### NOT-IN-TRAFFIC SURVEILLANCE CALSPAN REMOTE BACKOVER INVESTIGATION SCI CASE NO: CA07-009

## VEHICLE: 1997 HONDA CIVIC LOCATION: TENNESSEE CRASH DATE: FEBRUARY, 2007

#### BACKGROUND

This investigation focused on the incident dynamics, injury sources, and rear visibility of a 1997 Honda Civic 4 door sedan that was involved in a Not-In-Traffic backover crash with a 2 year old female. The Honda was driven by the nonmotorist's mother, a 22 year old female. The incident occurred in the driveway of a private residence during the daylight hours of February 2007. **Figure 1** is an on-scene police photograph of the vehicle. The 2 year old non-motorist was knocked down and backed over by the Honda. The child sustained multiple soft tissue injuries in the incident.



Figure 1: Front oblique view of the Honda.

This crash was identified by the Crash Investigation Division of the National Highway Traffic Safety Administration (NHTSA) through an Internet News article posted on February 22, 2007. The NHTSA forwarded the article to the Calspan Special Crash Investigations team on February 23 and the SCI team initiated follow-up investigation. An investigation of the incident was assigned on February 28, 2007 due to the agency's interest in the documentation of backover incidents. Cooperation was established with the investigating police department and a copy of the Police Crash Report and on-scene photographs were obtained. The crash was documented by the local police on the Tennessee Uniform Traffic Crash Report Form. An interview of the investigating police officer and a first responder provided the basic facts for this investigation. The driver declined participation in the SCI investigation prompting a remote crash investigation. An exemplar 1997 Honda Civic was inspected and provided the source of comparison measurements.

#### **SUMMARY**

#### VEHICLE DATA

The 1997 Honda Civic was identified by the Vehicle Identification Number (VIN): 2HGEJ6570VH (production sequence deleted). The four-door sedan was powered by a 1.5 liter I4 engine linked to a five-speed manual transmission and was equipped with the LX model trim. The front row consisted of manual bucket seats with height adjustable head restraints. Both head restraints were in the full down position. The second row consisted of a fixed three-passenger bench seat with integrated head restraints in the outboard positions. A child safety seat was positioned in the right rear of the vehicle. The side windows and backlight were OEM AIS2

glazing. There were no stickers or decals present on any of the windows. A review of the police photographs indicated the driver's (left front) window was open at the time of the incident. The manufacturer's recommended tire size was P185/65R14 tires. The subject Honda's tire appeared to be the recommended size.

**Figure 2** is a back view of the Honda at final rest in the driveway. A swipe mark (road film removed) was present on the left aspect of the rear bumper fascia. **Figure 3** is a close-up view of the left rear corner. The swipe mark was an indicator of probable contact with the child during the backing maneuver. The mark began 28 cm (11 in) left of center and extended 29 cm (11.5 in) left. The elevation of the rear bumper on the exemplar Honda Civic measured 39 cm to 58 cm (15.5 in to 22.8 in) above the ground. The center of the swipe mark was an estimated 51 cm (20 in) above the ground.



Figure 2: Rear view of the Civic at final rest.



Figure 3: Close-up view of the left rear corner.

## **CRASH SEQUENCE**

This back-over crash occurred during the daylight hours of February 2007. The weather at the time of the crash was clear and dry; the temperature was approximately 19 degrees C (66 degrees F). The crash occurred on a straight/level concrete driveway of a private residence in a suburban setting. Reportedly, the crash occurred in the following manner.

The 22 year old female and her 2 year old daughter had traveled in the 1997 Honda Civic to the crash location an unknown time before the incident to visit family members. During the course of the visit, the driver of the Honda had to leave the residence for a short time (presumably) to run errands. The non-motorist child was playing in the yard with an unknown number of other children at that time. The driver stated to the police that right before she left that she told the children to enter the house. The driver then proceeded to enter the Honda Civic and began to back-up the driveway to leave. During this time (unknown length), the non-motorist approached the vehicle from the left rear. The driver reportedly felt a bump as she was backing and stopped. She exited the Honda and found the child underneath the vehicle at the approximate depth of the left B-pillar. The B-pillar was located 107 cm (42 in) forward of the rear axle.

The driver called for help and a neighbor reportedly jacked up the vehicle and was able to slide the child to the left side of the Honda. A first responder to the crash indicated that the child was located approximately at the B-pillar location on the centerline of the vehicle. She apparently was contacted by the rear bumper, straddled by the rear tires and dragged a short distance. The child was transported to a trauma center as a precaution for a possible head injury. Reportedly, she sustained multiple soft tissue injuries to the face, trunk and arms. There were no skeletal fractures and no brain injury. The child was hospitalized overnight and released. The prognosis was for a full recovery.



Figure 4: Final rest location of the child.

# REAR VISIBILTY

#### 1997 Honda Civic

The rear visibility of an exemplar Honda Civic was measured in a level parking lot and depicted in a diagram attached to the end of this report (**Figure 5**). The substitute driver's standing height measured 173 cm (68 in) with a seated eye height 112 cm (44 in) above the ground. The substitute driver had no real relationship to the height of the actual driver, since her demographics were unknown. The height listed on the attached diagram is for reference information only. A 71 cm (28 in) tall red reflective target was placed on the vehicle's centerline and moved rearward to a location where the driver could first see the red target using the center mirror. The centerline visibility distance was measured from the rear bumper. A second measurement was taken with the target placed at ground level. The measured visibility distance is summarized below:

- Sight distance to 71 cm (28 in) target: 5.8 m (19.0 ft)
- Sight distance to ground level target: 16.3 m (53.5 ft)

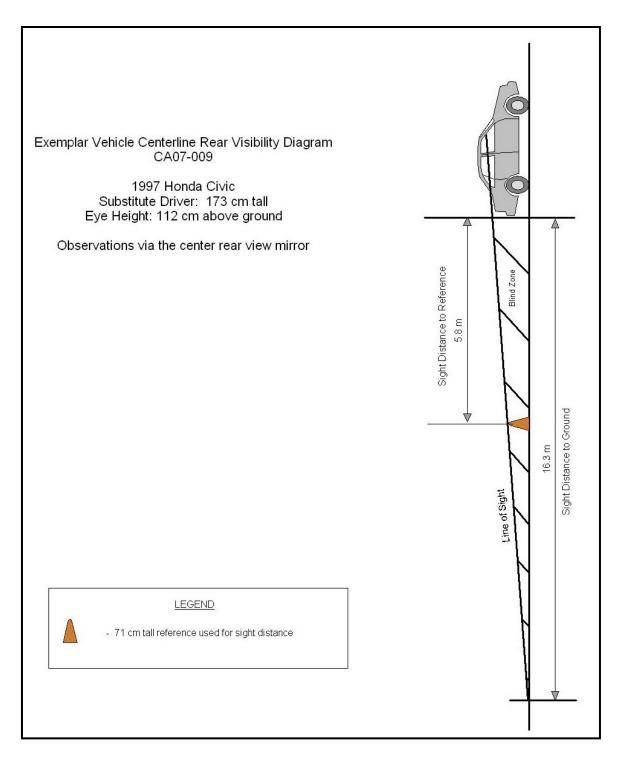


Figure 5: Rear Visibility Diagram.

## ATTACHMENT A

Not-In-Traffic Surveillance Forms

Not Not	Applicable		
	ment of Transportation hway Traffic Safety Administration	SCENE FOR	M Special Crash Investigations Not In Traffic Surveillance
1 Case	Number		SCENE INFORMATION
_	IDENTIFICATION           of Crash	7. 1 /	<ul> <li>Type of area in which crash occurred (Select all that apply)</li> <li>O Single family residential</li> <li>O Row houses/townhouses</li> <li>O Multi family housing</li> <li>O Commercial</li> <li>O Industrial</li> <li>O Rural</li> <li>O Unknown</li> </ul>
	of Crash	8.	Driver exterior sightline obstructions (Select all that apply)
	OTE: Midnight = 2400 nknown = 9999		ONoneOUtility polesOOther vehiclesOSignsOBuildingOGlareOTreesOUnknown
	AMBIENT CONDITIONS		O Shrubbery O No driver present O Other (specify)
4. Light (	Conditions		
0 C 0 C 0 C	ark but lighted awn	9.	Crash location O Driveway O Road / street O Parking Lot O Roadside / shoulder O Sidewalk O Other (specify) O Alley O Unknown O Intersection of driveway and sidewalk
	spheric Conditions Select all that apply)	10.	Non motorist sightline obstructions (Select all that apply)
0 0 F S 0 0 F S 0 0 0 E S 0 0 0 E S 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			<ul> <li>O None</li> <li>O Other vehicles</li> <li>O Building</li> <li>O Trees</li> <li>O Shrubbery</li> <li>O Utility poles</li> <li>O Signs</li> <li>O Glare</li> <li>O Other (specify)</li></ul>
	erature	11.	Grade at parked position %
0 E 0 1 0 > 0 0	elow 0 degrees Celsius (Below 32 F) -10 degrees Celsius (33-50 F) 10-24 degrees Celsius (51-75 F) over 24 degrees Celsius (Over 75 F) nknown	13. 14.	Estimated distance from parked position to impact m Estimated speed at impact m Grade at impact % Estimated distance from impact to vehicle final rest m
	D. 1.1. (2027		Unknown. = 999 Reference Items 11,12, 13, 14, 1
	Rev July/2007		

Not Applicable

# U.S. Department of Transportation National Highway Traffic Safety Administration

\_ \_

\_ \_

1. Case Number \_\_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_

# VEHICLE IDENTIFICATION

\_ \_

- 3. Model Year \_\_\_\_ \_\_\_ \_\_\_
- 4. Vehicle Make (specify):
- 5. Vehicle Model (specify): \_\_\_\_\_

	GLAZING						
Location	Presence (check)	Status (select)	Clarity (select)	Tint (check)	Glazing Obstructions (specify if present)		
Windshield		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
LF		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
RF		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
2 <sup>nd</sup> Left		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
2 <sup>nd</sup> Right		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
3 <sup>rd</sup> Left		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
3 <sup>rd</sup> Right		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
Backlight		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
Left Backlight		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
Right Backlight		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
Roof		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
Other (specify)		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown				
		TIRE D	АТА				
6. Vehicle Manufacturer Recommended Tire Size							
7. LF Tire	7. LF Tire Size 9. RF Tire Size						
8. LR Tire	8. LR Tire Size 10. RR Tire Size						

## Special Crash Investigations – Not In Traffic Surveillance: Vehicle Form

Seats / Head Restraint Data						
Seat Position	Seat Type (Select from below )	Head Restraint (Check if available)	Head Restraint Adjustment (select)	NOTES:		
Front Left			Full Down / Mid / Full Up			
Front Middle			Full Down / Mid / Full Up			
Front Right			Full Down / Mid / Full Up			
2 <sup>nd</sup> Left			Full Down / Mid / Full Up			
2 <sup>nd</sup> Middle			Full Down / Mid / Full Up			
2 <sup>nd</sup> Right			Full Down / Mid / Full Up			
3 <sup>rd</sup> Left			Full Down / Mid / Full Up			
3 <sup>rd</sup> Middle			Full Down / Mid / Full Up			
3 <sup>rd</sup> Right			Full Down / Mid / Full Up			

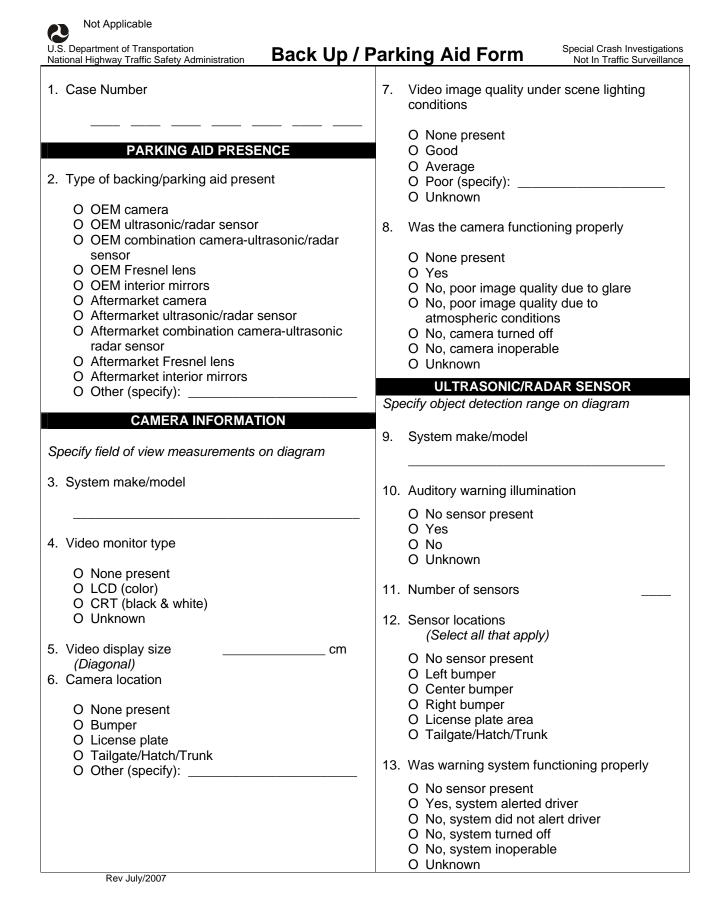
### Seat Type codes:

- 0 = No seat or seat folded down
- 1 = Bucket
- 2 = Bucket w/ folding back
- 3 = Bench
- 4 = Bench w/ separate back cushions
- 5 = Bench w/ folding back
- 6 = Split bench w/ separate back cushions
- 7 = Split bench w/ folding back

- 8 = Pedestal (i.e. column supported)
- 9 = Box mounted (i.e. van type)
- 10= Other seat type (specify)
- 99= Unknown seat type

Clearance Heights	Measurements (all from ground, and in centimeters	NO
Beltline		
Top of trunk/tailgate		
Bottom of bumper		
Trailer hitch (if applicable)		
Undercarriage		
Sway bar		
Axle		
Differential		
Other (specify):	_	
Sensor Height (if equipped)		
Camera Height (if equipped)		
Rev July/2007		

VEHICLE MEASUREMENTS



14. Did driver react to warning	
O No sensor present O Yes O No O Unknown	
15. Did driver report common false warnings	
O No sensor present O Yes O No O Unknown	

U.S. Department of Transportation National Highway Traffic Safety Administration	DRIVER	FORM	Λ	Special Crash Investigations Not In Traffic Surveillance
1. Case Number		10. Dri	iver entry interruption (Select all that apply)	
O F	lale emale inknown		Direct trip from buildir Loaded items into veh Spoke with family Spoke with neighbors Spoke with contacted Return trip (backing ir Other (specify): N/A	nicle nonmotorist nto driveway/lot)
4. Driver's Height 999 = Unknown	cm	11. F	Unknown Purpose of backing	
<ul> <li>5. Driver's Weight</li></ul>	kg	0 0 0 0 0	Leaving parking spac Backing onto roadway Entering parking spac Backing into driveway Other (specify): N/A Unknown here was driver going escription:	y from driveway ce in parking lot / from roadway
<ul> <li>7. Driver vision deficiency condition (Select all that apply)</li> <li>O None</li> <li>O Near sighted</li> <li>O Far sighted</li> <li>O Astigmatism</li> <li>O Other (specify)</li> </ul>		0	river in a hurry Yes No	N/A Unknown
O Unknown 8. Non motorist's relationship to driver O No relationship O Child O Grandchild O Sibling O Neighbor O Friend O Other (specify):		after ve O O O	bw did driver check bef chicle entry <i>(Select all that apply)</i> Did not look Checked mirrors Turned right and look Turned left and looke Viewed Camera	ed back
O Unknown DRIVER ACTIONS 9. Driver approach to vehicle for entry From left front O From left O From left rear O From right rear O From right front		15. Es	Listened for auditory/ system Other (specify): N/A stimated time between backing	visual warning from Unknown vehicle entry and start
O Circled vehicle O Return trip (backing into driveway/ O Other (specify): O N/A O Unknown Rev July/2007		0	0-10 Seconds 11-30 Seconds 31-60 Seconds	O Over 60 Seconds O N/A Unknown

## Special Crash Investigations – Not In Traffic Surveillance: Driver Form

16.	What direction was the driver looking during backing maneuver	19.	Did driver see struck non motorist prior to impact (Select all that apply)
	(Select all that apply) O Straight ahead O Right O Left O Rearward		<ul> <li>O No, never saw non motorist</li> <li>O Saw non motorist prior to entering vehicle</li> <li>O Saw non motorist after entering vehicle</li> <li>O Other (specify):</li></ul>
	O At object inside the car O At mirrors	20.	Est time between start of backing and impact
17.	O Other (specify): O N/A Unknown Was the driver distracted during back up maneuver (Select all that apply)		O <2 or = 1 second O 2-5 seconds O 6-10 seconds O > 10 seconds O N/A Unknown
	O No non-driving activities External	21.	Driver interior sightline obstructions (Select all that apply)
	<ul> <li>O Looking at other vehicles</li> <li>O Looking at other non motorist</li> <li>O Looking at intended turn destination</li> <li>O External focus, not specified</li> <li>O Other external focus (specify):</li> </ul>	22	O Pillar O Other occupant O Headrest O Other (specify) O Cargo O Unknown None Recent experience driving this vehicle
	Internal O Looking at other occupant O Talking to passenger O Dialing phone O Talking on phone O Listening to radio/cd/portable playback device O Adjusting radio/cd player O Adjusting climate controls O Using a device/controls integral to vehicle (specify): O Reading/adjusting navigation system O Eating or drinking O Smoking related		<ul> <li>O More than 10 times the last three months</li> <li>O 6-10 times the last three months</li> <li>O 2-5 times the last three months</li> <li>O Less than 2 times the last three months</li> <li>O First time driving this vehicle</li> <li>O N/A <ul> <li>Unknown</li> </ul> </li> <li>Frequency of driving in this parking lot/driveway</li> <li>O Daily</li> <li>O Weekly</li> <li>O Several times a month</li> </ul>
	<ul> <li>O Retrieving fallen object (specify):</li> <li>O Internal focus, not specified</li> <li>O Focused on other internal object</li> </ul>		O Monthly O Rarely O First time in lot/driveway O N/A Unknown
	(specify): O N/A	24.	Driver Impairment (Select all that apply)
18.	Unknown Driver avoidance actions prior to impact (Select all that apply)		O No drugs or alcohol present O Alcohol present (specify BAC):
	O None O Braking		O Drugs present (specify): O Unknown
	O Steering left O Steering right	25.	Source of alcohol/drug results
	O Accelerating O Other (specify): O N/A Unknown		<ul> <li>O Police reported</li> <li>O Medical record</li> <li>O Other (specify)</li> <li>O Not Tested</li> </ul>
			Unknown if tested

Not Applicable

U.S. Department of Transportation National Highway Traffic Safety Administration

**Non Motorist** Form

1. Case Number \_\_\_\_\_

#### NON-MOTORIST PROFILE

	lonths ′ears
3. Non-motorist's Sex O Male O Female O Unknown	
4. Non-motorist's Height cm 999 = Unknown	ı
5. Non-motorist's Weight kg 999 = Unknown	
6. Medical outcome	
<ul> <li>O Not injured</li> <li>O ER only</li> <li>O Hospitalized 1-4 days</li> <li>O Hospitalized 5 days or more</li> <li>O Treatment later</li> <li>O Fatal</li> <li>O Unknown</li> </ul>	
7. Source of most severe injury Bumper O Tire O Undercarriage O Other Specify: O Ground O N/A	
Unknown 8. Non-motorist impairment <i>(Select all that apply</i> ) O No drugs or alcohol present O Positive for alcohol (specify BAC): O Positive for drugs (specify): O Unknown	-
<ul> <li>9. Source of alcohol/drug results <ul> <li>Police reported</li> <li>Medical Report</li> </ul> </li> <li>O Other (specify) <ul> <li>O Not Tested</li> <li>O Unknown if tested</li> </ul> </li> </ul>	
NON-MOTORIST ACTIONS	
10. Non-motorist attitude	
O Standing O On skates/skateboard O Bending at waist O On bike/scooter O Sitting O Other (specify) O Crouching O Unknown O Kneeling	

า	Special Crash Investigations Not In Traffic Surveillance	
11.	Non-motorist motion	
	<ul> <li>Not moving</li> <li>Walking slowly</li> <li>Walking rapidly</li> <li>Running or jogging</li> <li>Skipping/Hopping/Jumping</li> <li>Falling/Stumbling/Rising</li> <li>On skates/skateboard</li> <li>On sike/scooter</li> <li>Other (specify):</li></ul>	
12.	Non-motorist approach relative to rear of vehicle	
	<ul> <li>O Stationary</li> <li>O From left</li> <li>O From right</li> <li>O From behind</li> <li>O Other (specify):</li></ul>	
13.	Non-motorist first avoidance action	
	<ul> <li>No avoidance actions</li> <li>Stopped</li> <li>Accelerated pace</li> <li>Ran away (along vehicle path)</li> <li>Jumped</li> <li>Turned away from vehicle</li> <li>Turned toward vehicle and braced</li> <li>Dove or fell away from vehicle</li> <li>Other (specify):</li></ul>	
14.	Non-motorist primary focus of attention	
	<ul> <li>O Striking vehicle</li> <li>O Play object</li> <li>O Person</li> <li>O Surrounding traffic</li> <li>O Animal</li> <li>O Handheld electronic (phone, MP3 player, etc.)</li> <li>O Other Object (specify)</li></ul>	
15.	Were any other Non-motorists present? (Select all that apply)	
	<ul> <li>O Alone</li> <li>O One adult present</li> <li>O One other child present</li> <li>O Multiple adults present</li> <li>O Multiple children present</li> </ul>	

O Unknown

Sp	ecial Crash Inve		ffic Surveillance: Non		Page 2
		NON	I MOTORIST CLOTHIN	G	
NC	DTES:			h.	
		NE' if applicable	eight for outermost laye	roniy	
	<u>Color</u> Black Lt gray/silver	<u>'s</u> Charcoal gray Brown	<u>Fabrics</u> Natural Synthetic	<u>Textures</u> Soft Slick	<u>Weights</u> Heavy Medium
	Gold/tan Dark blue Dark green Maroon Orange White	Purple Light blue Light green Red Yellow Other (specify)	Blend	Coarse	Light
	Clothing	Color	Fabric	Texture	Weight
	Hat				
H E A	Helmet				
D W	Hood				
E A R	Other (specify):				
U	Short Sleeve				
P P	Long Sleeve				
E R	Light Jacket				
в	Heavy Jacket				
O D Y	Other (Specify):				
L O	Shorts				
W E R	Pants				
	Shoes				
B O	Other (specify):				
D Y					