Collision Sciences ***CLAIMS REPORT***

EXPOSURE, RISK & DECISION SUPPORT

Vehicle: 2015 Jeep Compass

VIN: 1C4NJDAB1FD******

Report Number: CS-00389

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REPORT SUMMARY

This section provides an overview of the predictive analytics used for the estimation of claim severity, exposure, and fraud risk for the most recent crash or event sequence.

Repair / Loss Exposure	The market value range for the vehicle is CAD $15,102.28 - CAD $20,518.56. The vehicle is predicted to be a **TOTAL LOSS**.
Occupant Injury Risk	A moderate right side crash was detected by the Event Data Recorder with a recency of 19 ignition cycles ago. If the detected event is related to the claim in question, the mean acceleration in the impact was 1.09 g. Studies have found that the g-forces in daily activities are as follows: 0.75 g - Automobile braking; 0.88 g - Flopping into a chair; 1.48 g - Driving up a curb; 1.80 g - Steep Climb in Airbus A300; 3.00 g - Sneeze; 3.50 g - Cough; 4.00 g - Slap on the back; 4.50 g - Titan Roller Coaster (Six Flags Theme Park).
Pre-Crash Data	The following reconstruction data analysis relates to the moderate right side crash that was detected by the Event Data Recorder (having a recency of 19 ignition cycles ago): Within the 5.0 seconds of recorded pre-impact data for the most recent crash, the recorded speed range on this vehicle was **22 km/h** to **94 km/h**. The vehicle speed was **22 km/h** at the moment of impact. Driver/Vehicle Maneuver: Driving and got rear-ended
Flags / Loss Indicators	Medium Risk (2 Alerts): Emissions Test Failure, Low Velocity Impact
Diagnostic Scan Results	Event Data Recorder: Scan Completed Successfully Emissions Test Failed. 1 DTC Found. 22 Enhanced DTCs Found.
Safety Issues / Ratings	2 Potential Recalls Found. No Safety Ratings Alerts Found.
Recommended Action	Check reported circumstances. Otherwise, the crash severity may have been below the recording threshold.

CRASH DATA RECORDS

This section lists crash data records stored on the vehicle's event data recorder. The date of crash data collection was 2019-05-17.

Recency / Sequence	Crash Severity	Type / Damage Area	Sudden Speed Change (Delta-V)	Force of Impact (Mean g-Force)	Direction of Force	Ignition Cycles since Event
Most Recent (1st Impact)	Minor, Low-speed Impact	Right. Roll Motion.	-4.00 km/h (Increasing)	0.76 g	104 degrees (3 o'Clock)	19
Most Recent (2nd Impact)	Moderate, Low-speed Impact	Right Front. Roll Motion.	-8.00 km/h (Increasing)	1.09 g	63 degrees (2 o'Clock)	19

How To Interpret This Information

The crash severity (acceleration / g-force) measured by the airbag module accelerometer reached a maximum value of 8.00 km/h within 56 milliseconds, which is considered "moderate" in terms of severity. The vehicle's ignition was turned on 19 times between the incident and crash data download; this number can be used as an indication of event recency. For example, if the vehicle were used an average of 2 times per day, the recorded collision event would have occurred approximately 9 days prior to the date of retrieval on 2019-05-17.

Crash events are sorted and displayed in order of recency. It is possible for an airbag module to contain multiple records for a single event. In that case, event recency will be further marked by "1st Impact", "2nd Impact"...etc., with "1st Impact" being the initial record in sequence.

PRE-CRASH DATA / Most Recent (1st Impact)

This section lists pre-crash data records stored on the vehicle's event data recorder.

Time Before Impact (sec)	Distance to Impact (m)	Vehicle Speed (km/h)	Engine Speed (RPM)	Accelerator Pedal (%)	Brake Status	Deceleration (g)
-5.0	N/A	94	1908	23.0	Off	N/A
-4.5	89.8	94	1890	17.0	Off	0.0 (Light)
-4.0	76.9	92	1867	0.0	Off	-0.1 (Light)
-3.5	64.2	90	1822	0.0	Off	-0.1 (Light)
-3.0	52.1	85	1712	0.0	On	-0.3 (Light)
-2.5	40.9	76	1434	0.0	On	-0.5 (Moderate)
-2.0	29.9	83	1524	0.0	On	N/A
-1.5	19.0	74	1259	0.0	On	-0.5 (Moderate)
-1.0	9.6	61	1166	0.0	On	-0.7 (Hard)
-0.5	3.1	33	933	0.0	Off	-1.6 (Emergency)
-0.1	0.0	22	982	0.0	Off	-0.8 (Hard)

PRE-CRASH DATA / Most Recent (2nd Impact)

This section lists pre-crash data records stored on the vehicle's event data recorder.

Time Before Impact (sec)	Distance to Impact (m)	Vehicle Speed (km/h)	Engine Speed (RPM)	Accelerator Pedal (%)	Brake Status	Deceleration (g)
-5.0	N/A	94	1890	17.0	Off	N/A
-4.5	79.9	92	1867	0.0	Off	-0.1 (Light)
-4.0	67.3	90	1822	0.0	Off	-0.1 (Light)
-3.5	55.1	85	1712	0.0	On	-0.3 (Light)
-3.0	44.0	76	1434	0.0	On	-0.5 (Moderate)
-2.5	32.9	83	1524	0.0	On	N/A
-2.0	22.0	74	1259	0.0	On	-0.5 (Moderate)
-1.5	12.6	61	1166	0.0	On	-0.7 (Hard)
-1.0	6.1	33	933	0.0	Off	-1.6 (Emergency)
-0.5	2.2	23	938	0.0	Off	-0.6 (Moderate)
-0.1	0.0	17	932	0.0	Off	-0.4 (Moderate)

How To Interpret This Information

Each pre-crash data set contains recorded vehicle operating status 5.0 seconds prior to impact. Accelerator Pedal, Brake Switch Status, and Steering Angle can be used to reconstruct the driver's maneuver leading up to the impact.

Deceleration (in g) is calculated using speed differences between data points. Note that deceleration depends heavily on road conditions. For example, in winter driving conditions, it may only be possible to reach a peak deceleration of 0.2g.

SEAT BELT & AIRBAG STATUS (Most Recent Crash)

This section lists the restraint system status at the time of the event recording, including airbag deployment status and the seatbelt buckle insertion status for supported seating positions.

Seating Position	Driver	Front Passenger
Occupant Classification	Occupied	Unavailable
Safety Belt Status	Buckled	Unbuckled
Frontal Airbag	Not Deployed	Not Deployed
Side Seat Airbag	**Deployed**	**Deployed**

Side Curtain Airbag	**Deployed**	**Deployed**
Knee Airbag	Unavailable	Unavailable

FLAGS / LOSS INDICATORS

This section lists flags for further investigation based on known anti-fraud indicators and/or inconsistencies with reported circumstances.

Indicator	Description	Risk Alert
Drive Down	Frontal collision where the driver accelerates up to impact, with no pre-impact brake application.	No
No Avoidance Maneuver	No driver input for either brake or steering maneuver within the 2 seconds prior to impact.	No
Possible Distracted Driver	In a frontal collision, driver did not either brake or steer 2 seconds prior to impact.	No
No Pre-Impact Speed Reduction	Brake is only applied lightly with no meaningful reduction in speed.	No
Steered-To Sideswipe	Driver steers either left or right, causing an impact on the steered-to side.	N/A
Swoop & Squat	Driver steers to make a lane change and quickly applies brakes.	N/A
Panic Stop	Rear-end collision where driver brakes just prior to impact.	No
Possible Non-Recent Event	Accident recording may not be recent. Event data recorded 50 or more engine starts prior to data retrieval. Possible issues include: unrelated damage, past posting (no insurance at time of collision)	No
Possible Intentional Damage	Event data recorded on successive engine starts (sequential ignition cycles), or multiple events recorded on the same ignition cycle, where pre-crash data does not overlap.	No
Pre-Damaged Vehicle	Evidence of prior accident damage, where data of multiple events was recorded at different engine starts. Possible issues include: Unrelated Damage to Incident, staged Hit & Run, Phantom Accident, or Paper Accident.	No
Unbuckled Driver	Driver not wearing seat belt at the time of crash data recording.	No
Unbuckled Passenger	Front passenger not wearing seat belt at the time of crash data recording.	No
Emissions Test Failure	Vehicle failed emissions inspection due to insufficient sensor data or diagnostic trouble codes (DTCs).	**Yes**
Low Velocity Impact	An impact in which the mean acceleration is below 3.0 g	**Yes**
Odometer Rollback	Flags tampering through a discrepancy with mileage (odometer reading) for successive crash events. Example: for EDRs that store mileage at the crash event, if the most recent crash event has a lower mileage, this is evidence of odometer tampering.	No

Reported Circumstances

The flags in this section are generated through cross-referencing provided information (if any).

Indicator	Description	Diagnostic and Predictive Data	Reported Info
Reported Number of Occupants	Compares the reported number of occupants to the available seat sensor data.	1	N/A
Reported Maximum Pre-Impact Speed	Compares the reported travel speed with the pre-crash data and flags a variance of 10 km/h.	94	N/A
Reported Impact Speed	Compares the reported impact speed with the pre-crash data and flags a variance of 10 km/h.	22	N/A
Reported Pre-Impact Maneuver Variance	Compares the reported pre-impact motion with pre-crash data and impact angle for consistency.	Driving and got rear-ended	N/A
Reported Appraisal Variance	Compares a provided appraisal estimate with the AI estimate and flags an appraisal variance of +15%.	14723	N/A
Reported Airbag Deployment Variance	Determines whether airbags were manually removed to exaggerate damage by comparing recorded airbag deployment status.	Deployed	N/A
VIN Mismatch	Compares the VIN diagnostically retrieved from the vehicle to the the VIN sticker or provided VIN. Requires claim reference number.	1C4NJDAB1FD******	N/A
Image Integrity	Utilizes algorithms to identify digitally edited or altered parts in provided photographs.	N/A	N/A
Pre-Accident Vehicle Sale Attempt	VIN identified in online classifieds within the last 6 months.	N/A	N/A

1ST PARTY / INJURY SEVERITY & DURATION

This section predicts occupant injury risk ranging from minor to moderate/serious injury for frontal/side/rear collisions. The injury risk is the statistical incidence, likelihood, and probability of injury as tracked in real-world crash studies using event data recorders. The model uses a regression model of crash severity versus reported injuries as published in scientific studies.

Assumed delta-V: 8.00 km/h

Occupant Detail	Statistical Likelihood of Minor Injury Symptoms	Statistical Likelihood of Moderate Injury	Risk of Serious Injury
Occupants in Side Impact	34% (Possible)	7% (Unlikely)	0% (Improbable)

How To Interpret This Information

On a balance of probabilities, if the likelihood of injury occurrence is below 50%, it is suggested that an injury is more likely not to have occurred. With a high risk of whiplash or other injury, the claim can be expedited. Early treatment is often effective in providing the best probable outcome for patient recovery.

The injury prediction is based on the actual incidence rate or proportion of injury in tracked studies using data from real-world outcomes. The most important factor in predicting the risk of injury or death in a vehicle crash is the crash severity, which is expressed as the velocity change, or Delta-V, experienced by the vehicle during the crash. The Crash Investigation Sampling System (CISS) is the largest database in the world with over 100,000 cases linking injury outcomes with Delta-Vs, which are obtained from field reconstructions. The effects of

occupant age, gender, and belt use on injury and fatality risk have been found substantial.

Low Velocity Impact Studies

Delta-V (Change in Velocity) has traditionally been used to correlate crash severity with the risk of occupant injury (Augenstein et al., 2003; Bahouth et al., 2004; Sunnevång et al., 2009; Kononen et al., 2011). Injury tolerance and risk for various injury types based on real-world crashes with recorded crash data have been established (Gabauer and Gabler, 2006; Gabauer and Gabler, 2008; Kullgren and Krafft, 2008; Ydenius, 2010).

Large-scale retrospective studies have also examined the relationship between minor severity crashes and the risk of occupant whiplash complaints, including studies in the U.S. (Tencer et al., 2001), Germany (Eis et al., 2005; Hell et al., 2002) and Sweden (Krafft et al., 2005). In the minor severity studies it was found that occupant's reporting symptoms for greater than one month corresponded to an average delta-V of 12.4 +/-2.9 mph and a mean acceleration of 5.3 +/-0.6 g. Occupants that sustain soft tissue symptoms for less than one month, on average, corresponded to a delta-V of 6.4 +/-1.3 mph and a mean acceleration of 3.9 +/-0.5 g. The mean acceleration was found to be the best predictor for duration of symptoms.

The following studies describe the impact severity when no injury or only short-term consequences occur: Hell and Langwieder (1998) found that most occupants sustained short-term symptoms in impacts where the change of velocity was 10-15 km/h (6.2-9.3 mph). McConnell et al (1995) performed low-speed rear impacts with seven male volunteers, with velocity changes of up to 10.9 km/h (6.77 mph). None of the volunteers reported whiplash symptoms after a few days. Ono and Kaneoka (1997) and Siegmund et al (1997) found similar results from volunteer tests. In another study with volunteers (Eichberger et al 1996), where the sled impact velocities were 8-11 km/h (4.9-6.8 mph) and the mean deceleration 2.5 g, the volunteers suffered whiplash symptoms for approximately 24 hours.

Typical G-forces (Tolerance)

A hard acceleration or deceleration in a vehicle produces a sustained g-force in the range of 0.6 to 0.8 g. In everyday life, humans experience g-forces stronger than 1 g. The steep ascent of an Airbus A-300 would produce 1.8 g. A sneeze results in about 3 g of acceleration and typical cough produces a momentary force of 3.5 g. A luge athlete may experience forces of 5.2 g. Roller coasters are usually designed not to exceed 3 g but are known to reach 6.3 g. A slap on the back may produce a force of 4 g. Humans typically black out at 6 g, where fighter pilots where special "g-suits" to withstand forces up to 9 g. A car crash with forces of 10 g can break human bones. A belted occupant in a car crash at 30 g could sustain broken ribs when held by the seat belt. Humans can tolerate localized g-forces in the 100s of g's for a split second, such as a slap to the face. Sustained forces above about 10 g can be deadly or lead to permanent injury.

For context, consider the following g-forces:
0.75 g - Automobile braking
0.88 g - Flopping into a chair
1.48 g - Driving up a curb
1.80 g - Steep Climb in Airbus A300
3.00 g - Sneeze
3.50 g - Cough
4.00 g - Slap on the back
4.50 g - Titan Roller Coaster (Six Flags Theme Park)
5.00 g - NASCAR vehicle on turn
10.0 g - Car crash that can break human bones
30.0 g - Ribs can be broken by seat belt
50.0 g - Death or serious injury

For safety, police demonstrate the beneficial use of a seatbelt. The videos below show the occupant kinematics experienced in a casual 5.0-7.0 mph collision: Video 1, Video 2.

RELATIVE INJURY RISK / 3RD PARTY EXPOSURE

This section provides a lead indicator for relative 3rd party injury risk based on accident reconstruction principles including conservation of momentum and relative vehicle mass (Delta V2 (Change in velocity) = Delta V1 * M1 / M2). The calculation does not require the vehicles reach a common post-impact velocity. Calculated injury risk applies only to the occupants in another passenger vehicle or light truck as shown and not to any struck pedestrian or cyclist (bicycle or motorcycle).

Assumed 3rd Party Vehicle	3rd Party Vehicle Delta-V / Severity	Statistical Likelihood of Minor Injury Symptoms	Statistical Likelihood of Moderate Injury	Risk of Serious Injury
Compact Car (1815 kg)	-6.53 km/h	13% (Unlikely)	2% (Improbable)	0% (Improbable)
Midsize Car (2260 kg)	-5.25 km/h	11% (Unlikely)	2% (Improbable)	0% (Improbable)
Van/SUV/Light Truck (2720 kg)	-4.36 km/h	10% (Unlikely)	0% (Not Present)	0% (Improbable)
Full Size Truck/SUV (3630 kg)	-3.27 km/h	5% (Improbable)	0% (Not Present)	0% (Improbable)

POTENTIAL RECALLS / SAFETY / DIAGNOSTIC SCAN DATA

This section lists any potential outstanding recalls, known safety ratings & issues, retrieved DTCs (Diagnostic Trouble Codes), and respective Freeze Frame impact data, if any.

Potential Safety Recalls

Vehicle safety recall information is received from Transport Canada and includes all known recalls associated with this particular vehicle model. Any listed recalls are potential recalls which can be verified as outstanding or not by providing the VIN to a local dealer's service department.

Recal Date: 2015-12-22
Recall Number: 2015614
Affected System: Steering
Description: On certain vehicles, the power steering hose retention clamp may have been incorrectly positioned during assembly. This could result in a detachment of the low pressure return hose, resulting in a large volume leak of power steering fluid, which would require greater driver effort to steer the vehicle. In some circumstances, the leaking fluid in the presence of an ignition source, could result in a fire causing injury and/or damage to property.
Correction: Dealers will inspect the return power steering hose for proper placement of the hose clamp, and reposition the hose clamp as needed.

Recal Date: 2017-11-28
Recall Number: 2017585
Affected System: Label
Description: Certain vehicles fail to comply with the requirements of Canada Motor Vehicle Safety Standard (CMVSS) 205 - Glazing Materials. The rear lift gate glass panel is labeled with the luminous transmittance number “AS2” instead of the correct number “AS3”. Correction:. No corrective recall action is required as the technical non-compliance condition is deemed to be non-safety related.

IIHS Crashworthiness / Safety Ratings

Insurance Institute for Highway Safety (IIHS) in the US publishes vehicle safety ratings based on actual crash tests. In each category, the possible ratings are: Good, Acceptable, Marginal, and Poor. Further vehicle research on safety ratings and features, reviews, tips and more can be found here: www.iihs.org/iihs/ratings.

Frontal Small Overlap	Unavailable	**Side**	Good
Frontal Moderate Overlap	Unavailable	**Rollover**	Unavailable

Diagnostic Trouble Codes (DTCs)

Diagnostic Trouble Codes (DTCs) are set by a control module when it detects faults in its system through self-diagnostics. The following section lists DTCs retrieved from various control modules of the vehicle.

Engine Control Module (ECM) — No Issues Found

Transmission Control Module (TCM) — **1 Code Found: P0073**

Error Code: P0073
Definition: Ambient Air Temperature Sensor Circuit High Input
Recommended Repair: Replace Ambient Temperature Sensor
Total Cost: CAD $102.44

Enhanced DTCs (Beta) — **22 Codes Found: C0077E0, B210D20, B163C30, P007360, B233870, B230520, B236F30, B230420, U0164F0, U016460, B1C2DE0, B1C29E0, B1C49E0, B1C3AE0, B1B1AE0, B1B22E0, U0170E0, U11F020, B1C2B20, B210D20, B1C2720, P0073F0**

Freeze Frame Data

Freeze Frame Data refers to a snapshot taken by a control module when it detects a fault in its system. The snapshot consists of measured values from various sensors and can be useful in determining the root cause of the fault. Note that not all vehicles support the items listed below and thus some values may be inaccurate.

DTC	Engine RPM	Vehicle Speed	Throttle Position	Distance Travelled
P0073	N/A	N/A	N/A	N/A

MARKET VALUE

This section provides an estimated market value for 2015 Jeep Compass (Sport 4WD). Estimate based on 4 similar vehicles sold between 2019-10-05 and 2019-10-15 within the range of CAD $15,102.28 - CAD $20,518.56.

Assumed Mileage	Market Value	Time Period	Value Certainty

108,264 km	CAD $17,810.42	6 Months	65%

EXPOSURE / AUTO PHYSICAL DAMAGES

This section provides predictive loss and repair estimate/cost information. AI inputs: Trusted Repair Estimates, Max Delta-V, Impact Angle, Vehicle Model/Specs (weight, stiffness), Airbag Deployment status, DTCs, Damage Area/Level/Photographs (if any).

Repair Estimate (AI Prediction)	Salvage Value (80% of Market Value)	Prediction: Total Loss / Repairable	Value Certainty
CAD $19,478.79	CAD $14,248.34	Likely Total Loss	62%

How To Interpret This Information

The vehicle is predicted to be a Total Loss. The algorithmic repair estimate exceeds the estimated salvage (as damaged) value of the vehicle. The algorithmic repair estimate for this prediction considered "total repair estimates" from similar vehicles, with similar recorded impact configuration and severity, also requiring airbag replacement. Photographs of the damaged vehicle were not used to generate the prediction.

The repair estimate does not replace a physical damage appraisal. Collision Sciences is working with strategic partners to develop an advanced repair cost prediction algorithm using a combination of photo-based estimating, diagnostically detected impact configuration and severity, and diagnostic issues requiring repair. The repair estimate may currently be used to predict a total loss or repairable condition, identify potentially exaggerated repair estimates and provides a contextual frame of reference for claim severity.

VEHICLE SPECIFICATIONS

This section lists basic vehicle details encoded by the VIN.

VIN	1C4NJDAB1FD******	**Year**	2015
Make	Jeep	**Model**	Compass
Trim	Sport	**Engine**	2.4-L L-4 DOHC 16V
Made In	United States	**Style**	N/A
Steering Type	Rack & Pinion	**Anti-Lock Brakes**	4-Wheel ABS
Fuel Type	Regular Unleaded	**Fuel Capacity**	51 L
Overall Length	4448 mm	**Overall Width**	1814 mm
Overall Height	1651 mm	**Standard Seating**	5
Curb Weight	1482 kg	**Gross Weight**	N/A
Highway Mileage	11 km/L	**City Mileage**	9 km/L
Invoice Price	CAD $27,341	**MSRP**	CAD $27,776

Event Data Disclaimer

It is important to note is that if a vehicle was spinning or rolling surrounding the collision, then the report's speed measurements would not accurately reflect the actual speed of the vehicle during/after it lost control; the speed measurement is typically based on the wheel speed sensor. Signs of this type of anomaly would be rapid changes in speed between the brief timing intervals. The reported speed may be an average of the four wheels; thus could also be skewed by spinning wheels. In combination with scene evidence, an expert could assess vehicle speed by analyzing the data via accident reconstruction and engineering analysis.

Users of the Collision Sciences service and reviewers of the reports and exported data shall ensure that data and information supplied is applicable to the vehicle, vehicle's system(s) and the vehicle ECU. Collision Sciences Inc. and all its directors, officers, employees and members shall not be liable for damages arising out of or related to incorrect, incomplete or misinterpreted software and/or data. Collision Sciences Inc. expressly excludes all liability for incidental, consequential, special or punitive damages arising from or related to the online services, evidence logistics, EDR data, EDR software or use thereof.

Injury Risk / Biomechanical Assessment Disclaimer

The estimated injury risks are calculated based on the recorded crash pulse, relative energy changes, known vehicle characteristics in standardized and real-world crashes, published databases, and recognized studies. The provided information can be used as a guide in settlement decisions but cannot be used to definitively prove the existence or non-presence of an injury. In cases with a very low risk of whiplash or other injury, claims can be identified for further investigation. Conversely, for cases with a high risk of whiplash or other injury, the claim can be expedited, since early treatment is often effective in reducing the long term prognosis.

Delta-V (Change in Velocity) has traditionally been used to correlate crash severity with risk of occupant injury (Augenstein et al., 2003; Bahouth et al., 2004; Sunnevång et al., 2009; Kononen et al., 2011). Injury tolerance and risk for various injury types based on real-world crashes with recorded crash data have been established (Gabauer and Gabler, 2006; Gabauer and Gabler, 2008; Kullgren and Krafft, 2008; Ydenius, 2010). Large-scale retrospective studies have also examined the relationship between minor severity crashes and the risk of occupant whiplash complaints, including studies in the U.S. (Tencer et al., 2001), Germany (Eis et al., 2005; Hell et al., 2002) and Sweden (Krafft et al., 2005). Injury risk studies consider the following risk factors: Crash configuration (front, side, rear, rollover), Delta-V = Change in velocity, Vehicle mass (size, weight), Vehicle stiffness, Vehicle geometry and engagement, Restraint system and its adjustment, Occupant seated position, Occupant profile (age, gender, previous injury), Number of WAD symptoms, and Psychological Distress. Structural damage and known whiplash thresholds overlap, indicating structural damage and repair cost are a poor predictor of minor injury threshold. Damage can also vary widely by vehicle model and impact configuration.