Vehicle Data Sources for Accident Reconstruction

Randall L. Hargens and Terry D. Day
Engineering Dynamics Corp.

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Engineering Dynamics Corp.

ABSTRACT

A major component in reconstructing motor vehicle accidents is the use of accurate data about the vehicles involved in the accident. Whether the reconstruction is done manually or with the aid of computers, the accuracy of the reconstruction is directly proportional to the accuracy of the vehicle data. Unfortunately, the vehicle data is not always available from the actual vehicles involved in the accident. In these instances, the reconstructionist must obtain data that best approximates the original vehicles. In lieu of finding, measuring, and weighing identical vehicles, the data is available through publications, trade associations, and other common sources. This paper describes these sources and how the information can be obtained.

Crashes are reconstructed by several groups, ranging from the Government (National Accident Sampling System, National Transportation Safety Board) to local and statewide law enforcement agencies, insurance companies, or private consultants. Information from the reconstruction is ultimately for improving vehicle standards or litigation which frequently results from serious crashes.

Any individual, company or agency that reconstructs motor vehicle crashes requires detailed information about the vehicles involved in the crashes. The source of this vehicle data is thus of major importance to accident investigators.

TYPES OF VEHICLE DATA

Accident investigators are interested in three types of vehicle data: dimensional properties, inertial properties, and exterior structural properties (stiffness coefficients). These data are shown in Figure 1. Other information re-

1. Dimensions
   a. overall length
   b. overall width
   c. wheelbase
   d. track width
   e. front overhang
   f. rear overhang

2. Inertias
   a. vehicle weight
   b. moment of inertia

3. Crush resistance
   a. structural stiffness

Figure 1 - Types of Vehicle Data

*Numbers in brackets designate references at the end of the paper.
quired for specific types of parametric studies may also be necessary. This information includes tire cornering stiffness, suspension properties, aerodynamic drag, rolling resistance, and drive-train properties.

The purpose of this paper is to identify several sources of vehicle data useful to accident investigators. Additionally, the paper describes the contents of these documents and how to obtain them. The scope is primarily limited to the types of data previously shown in Figure 1.

PROCEDURE

Several sources of data known to the authors were identified. The following procedure was then used to evaluate the data:

1. All identified data sources were evaluated on the following:
   a) frequency of updates
   b) price
   c) listed data
   d) source of original data
   e) vehicle years available
   f) ordering information

Additional comments about ordering or distribution were also documented.

2. Sources of additional information were also summarized. This typically was data used in parametric studies.

3. As an independent means of checking the data, a random vehicle was obtained from the population of vehicles in use. The vehicle was measured using a plumb-bob approach. All measurements were recorded to the nearest quarter of an inch. The vehicle was weighed on a certified truck scale accurate to the nearest 10 pounds.

RESULTS

Two types of data sources for vehicle specifications used in accident reconstruction were identified. The more common vehicle measurements, such as wheelbase and curb weight, are readily available from a list of primary sources. Less frequently referenced material, such as parametric data or tractor-trailer information, was classified as additional sources. Both of these sources are described in the following sections.

PRIMARY SOURCES

The primary sources documented in this paper are listed in Table 1. The documentation for each source includes the frequency of update, costs, contents, ordering information, and additional comments.

<table>
<thead>
<tr>
<th>Automotive News</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bailey &amp; Associates</td>
</tr>
<tr>
<td>Car &amp; Driver</td>
</tr>
<tr>
<td>Consumer Reports</td>
</tr>
<tr>
<td>Detroit Public Library</td>
</tr>
<tr>
<td>Engineering Dynamics Corp.</td>
</tr>
<tr>
<td>- EDVAP Appendix</td>
</tr>
<tr>
<td>- Vehicle Crash Coefficients</td>
</tr>
<tr>
<td>Kelly Blue Book</td>
</tr>
<tr>
<td>MVMA Parking Dimensions</td>
</tr>
<tr>
<td>Owner's Manual</td>
</tr>
<tr>
<td>Road &amp; Track</td>
</tr>
<tr>
<td>Transport Canada</td>
</tr>
<tr>
<td>Ward's Automotive Yearbook</td>
</tr>
<tr>
<td>U.S. and Foreign Passenger Car Specifications</td>
</tr>
</tbody>
</table>

The following is a detailed description of the data sources identified in Table 1:

**Automotive News**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Cost</th>
<th>Data Source</th>
<th>Listed Data</th>
<th>Vehicle Years</th>
<th>Ordering Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
<td>$25 - &quot;Market Data Book&quot;</td>
<td>Manufacturers</td>
<td>See Table 2 and Figure 2</td>
<td>1982 - present</td>
<td>Automotive News</td>
</tr>
<tr>
<td>April - &quot;Market Data Book&quot; (all vehicles)</td>
<td>$50 - annual subscription (includes &quot;Market Data Book&quot;)</td>
<td></td>
<td></td>
<td></td>
<td>Circulation Department</td>
</tr>
<tr>
<td>March - imports only</td>
<td>$1.25 - weekly issue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October - domestic only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Phone

Phone Comments: The *Automotive News* is a weekly publication. However, the data for all vehicles is only published in the special April edition, called the "Market Data Book".
**TABLE 2 - Reconstruction Data Available by Source.**

<table>
<thead>
<tr>
<th>Source</th>
<th>Overall Length</th>
<th>Width</th>
<th>WB</th>
<th>Track Width</th>
<th>Overhang Front</th>
<th>Rear Weight</th>
<th>Inertia Stiff.</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Automotive News</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>1</td>
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<tr>
<td>Bailey &amp; Assoc.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Car &amp; Driver</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><em>Consumer Reports</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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<tr>
<td>Detroit Library</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X L</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>EDVAP</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X L</td>
<td></td>
<td>X</td>
<td></td>
<td>1,3,4</td>
</tr>
<tr>
<td><em>Vehicle Crash Coef.</em></td>
<td></td>
<td></td>
<td></td>
<td>X L</td>
<td></td>
<td>X</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td><strong>Kelly Blue Book</strong></td>
<td></td>
<td></td>
<td></td>
<td>X L</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVMA Park. Dimens.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X L</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>1,2,6</td>
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<tr>
<td>Owners Manual</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><em>Road &amp; Track</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X L</td>
<td></td>
<td>X</td>
<td></td>
<td>1,9</td>
</tr>
<tr>
<td>Transport Canada</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X L</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>1,7</td>
</tr>
<tr>
<td>Ward's <em>Yearbook</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X L</td>
<td></td>
<td>X</td>
<td></td>
<td>1,9</td>
</tr>
<tr>
<td><em>U.S. and Foreign</em></td>
<td></td>
<td></td>
<td></td>
<td>X L</td>
<td></td>
<td>X</td>
<td></td>
<td>1,8,9</td>
</tr>
<tr>
<td><em>Passenger Car Spec.</em></td>
<td></td>
<td></td>
<td></td>
<td>X L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
1. Track width is given for both front and rear axles.
2. Some values are entered as ranges (i.e. overall length and weight).
3. Front and rear weight is also given.
4. Data is given in the form of empirical formulas; actual values are not given.
5. Weight for vehicle includes test equipment.
6. Does not always include weight.
7. Data is metric; lengths are in centimeters and weights are in kilograms.
9. Track width is not available on earlier vehicles (usually prior to 1972).
Bailey & Associates

**Frequency**  Annual
**Cost**  $450 for program
          $30 per year for updates
**Data Source**  Manufacturers and periodicals
**Listed Data**  See Table 2 and Figure 3
**Vehicle Years**  1963 - present (cars)
                   1973 - present (light trucks)
**Ordering Info**  Bailey & Associates
                   324 Wildwood Lane
                   Dallas, Georgia 30132
**Phone**  (404) 445-9972
**Comments**  The data is in the form of a program that operates on an IBM PC with 256K memory. The program also performs some accident reconstruction calculations.

Car & Driver ("Buyers Guide")

**Frequency**  Annual
"Buyers Guide" - December or January
**Cost**  $3.95 per issue
          $16.98 per year subscription
**Data Source**  Manufacturers
**Listed Data**  See Table 2 and Figure 4
**Vehicle Years**  1982 - present
**Ordering Info**  Local news stand or
                   Car and Driver
                   Attn: Customer Service
                   P.O. Box 2886
                   Boulder, Colorado 80302-2886
**Phone**  (800) 525-0643
**Comments**  The Car & Driver magazine is published monthly; the Car & Driver "Buyers Guide" is a special issue that contains data for vehicles in the coming year.

Consumer Reports

**Frequency**  Annual
"Annual Auto Buying Guide" - April
**Cost**  $2 per issue
          $5 per issue (back issues)
          $18 per year subscription
**Data Source**  Manufacturers and direct measurements by Consumer Reports
**Listed Data**  See Table 2 and Figure 5
**Vehicle Years**  1936 to present
**Ordering Info**  Back Issue Department
                   Consumer Reports
                   P.O. Box 53016
                   Boulder, Colorado 80322-3029
**Phone**  (914) 667-9400
**Comments**  Only the past 11 months are available from Consumer Reports; prior issues can usually be obtained at your local library. Major cars introduced in the year are summarized in the April issue; other monthly issues review a specific vehicle or group of new car types (i.e. vans).

Detroit Public Library

**Frequency**  n/a
**Cost**  $7 (average per vehicle for photocopy)
**Data Source**  Either manufacturers or:
                   Automotive News
                   MVMA
                   Wards
**Listed Data**  See Table 2
**Vehicle Years**  All
**Ordering Info**  Attn: Ronald Grantz
                   National Automotive Historical
                   Collection
                   Detroit Public Library
                   5201 Woodward
                   Detroit, Michigan 48202
**Phone**  (313) 833-1456
**Comments**  Hours: 1-5 pm. Tuesday - Saturday except
                  5-9 pm. Wednesday
                  Closed Sunday and Monday
                  Requests for data can be made in writing or
                  over the phone. This is an historical library
                  and has actual blue-prints of some older
                  vehicles.

Engineering Dynamics Corp. (EDVAP Appendix)

**Frequency**  n/a
**Cost**  n/a
**Data Source**  Calspan Corporation [3]
**Listed Data**  See Table 2 and Figure 6
**Vehicle Years**  n/a
**Ordering Info**  Engineering Dynamics Corporation
                   1026 Lund
                   Lake Oswego, Oregon 97034
**Phone**  (503) 636-0427
**Comments**  The EDVAP program manual is included with the purchase of any of the EDVAP accident reconstruction programs, but can be purchased separately. Specific data by vehicle is not quoted, rather formulas developed by Calspan on pre-1975 vehicles are shown.
**Engineering Dynamics Corp. - Vehicle Crush Stiffness Coefficients**

**Frequency** Variable

**Cost** $225 - detail (Pub. #1042)  
$95 - summary (Pub. #1043)

**Data Source** Engineering Dynamics Corp. and U.S. Department of Transportation

**Listed Data** See Table 2 and Figure 7

**Vehicle Years** 1870 - 1984

**Ordering Info** Engineering Dynamics Corporation  
1026 Lund  
Lake Oswego, Oregon 97034  
(503) 636-0427

**Phone**

**Comments** The detail version (Publication #1042) includes an IBM PC-formatted diskette containing the published data. A computer program was developed by Engineering Dynamics to compute the stiffness coefficients from barrier crush data provided by the U.S. Department of Transportation. The formulas are found in the publication.

Vehicle crush stiffness coefficients are empirical factors used in the calculation of total dissipated energy and ultimately the velocity change for vehicular collisions. These factors define the force-deflection relationship or crush resistance of the vehicle’s exterior. The values can be used in some accident reconstruction programs, such as EDCRASH.[4]

**Motor Vehicle Manufacturers Association - Parking Dimensions**

**Frequency** Annual (January or February)

**Cost** Free

**Data Source** Manufacturers

**Listed Data** See Table 2 and Figure 9

**Vehicle Years** 1983 - present

**Ordering Info** Attn: Mr. Jim Steiger  
Technical Affairs Division  
Motor Vehicle Manufacturers Association  
300 New Center Building  
Detroit, Michigan 48202  
(313) 872-4311

**Phone**

**Comments** Only data for certain years are still available. Requests should be in writing and once requested, MVMA will mail the annual Parking Dimensions at no cost.

**Owner’s Manual**

**Frequency** n/a

**Cost** Varies, usually $2.50 - $5.00 per manual

**Data Source** Manufacturers

**Listed Data** See Table 2 and Figure 10

**Vehicle Years** All

**Ordering Info** Varies by vehicle make. Contact your local dealer for information on obtaining copies of the particular Owner’s Manual.

**Comments** The contents of individual owner manuals varies in complexity by manufacturer and vehicle model.

**Kelly Blue Book**

**Frequency** Bi-monthly beginning January First

**Cost** $41 per year subscription  
$9 per issue (1981-1987 vehicles)  
$14 per issue (1874-1980 vehicles)

**Data Source** Manufacturers

**Listed Data** See Table 2 and Figure 8

**Vehicle Years** 1974 - present

**Ordering Info** Kelley Blue Book  
P.O. Box 19691  
Irvine, California 92713

(800) 826-4424 (U.S. outside Calif.)  
(800) 231-1743 (N. Calif.)  
(714) 770-7704 (S. Calif. & foreign)

**Phone**

**Comments** Vehicle data is included for domestic and foreign cars, trucks, and vans. The Blue Book can usually be found at a local car dealer or financial institution. Although this book is not sold directly to the public, vehicle data can be obtained by asking.

**Road & Track**

**Frequency** Annual  
"Index" issue - March (contains summary of specifications on all imports and mid-size to large domestic cars.)

**Cost** $2.50 per issue  
$19.94 per year subscription

**Data Source** Manufacturers and measured by Road & Track

**Listed Data** See Table 2 and Figure 11

**Vehicle Years** 1984 - present

**Ordering Info** Road & Track  
P.O. Box 1126  
Redlands, California 92373

(800) 345-8112 (Non-Calif. residents)  
(800) 331-6363 (California residents)

**Phone**

**Comments** Although Road & Track is noted for extensive reviews on exotic cars, the March Summary also contains specifications on most other vehicles.
Transport Canada

Frequency n/a
Cost Free
Data Source Measured on test vehicles and compared to other sources
Listed Data See Table 2 and Figure 12
Vehicle Years 1970 - present
Ordering Info Transport Canada
Vehicle Investigation
Box 8880
Ottawa, Ontario, Canada
K1G 3J2
Phone (613) 993-9851
Comments No regular publication is available. Statistics are kept for internal use by Transport Canada. However, information is printed if requested for a specific make and model and if they have the information.

Ward's Automotive Yearbook

Frequency Annual (June 1)
Cost $95
Data Source Manufacturers
Listed Data See Table 2 and Figure 13
Vehicle Years 1950 to present
Ordering Info Wards Communications, Inc.
28 West Adams Street
Detroit, Michigan 48226
(313) 962-4433
Phone Comments The Yearbook is very comprehensive including numerous statistics on Canadian, import, and domestic cars and trucks. The book also includes information on all sizes of trucks, buses, recreation vehicles, farm and construction vehicles.

U.S. and Foreign Passenger Car Specifications

Frequency Not updated since 1982
Cost $15.00
Data Source Reproduced by permission from Motor Vehicles Manufacturers Assoc and Automotive News. Data was originally obtained from manufacturers.
Listed Data See Table 2 and Figure 14
Vehicle Years 1966 - 1982
Ordering Info Engineering Dynamics Corp.
1026 Lund
Lake Oswego, Oregon 97034
(503) 636-0427
Phone Comments This is a reprint of the last issue printed by MVMA. The publication contains vehicle dimensions and engine specifications.

ADDITIONAL SOURCES

Several other sources of vehicle specifications used in analyzing accidents were found. The description of these sources is described below:

Chilton Company (Automotive Industries)

Ordering Info Reprints
Automotive Industries
2600 Fisher Building
Detroit, Michigan 48202
Phone (312) 649-5303
Comments Automotive Industries April issue contains the vehicle specifications for all major domestic and import vehicles (trucks, tractors, and vans included) to be released that year. Most libraries have Automotive Industries and back issues are available. If not, small volume reprints or information on specific vehicles can be obtained by calling or writing Automotive Industries.

Chilton Company (Commercial Car Journal)

Ordering Info Reprint Editor
Commercial Car Journal
Chilton Company
Chilton Way
Radnor, Pennsylvania 19089
Phone (215) 964-4000
Comments Commercial Car Journal's October issue contains truck and tractor specifications for all major manufacturers introduced in the coming year. Included are wheelbases, GVW, GCW, and specifics for major components. Reprints of the 32 page section are available at $0.35.

Machine Design

Ordering Info "Mechanics of Vehicles"
by J.J. Tabor, 1957
Reprints obtained from:
University of Microfilm (UMI)
Article Clearing House
300 N. Zeeb Road
Ann Arbor, Michigan 48106
Phone (800) 732-0616 or
(800) 521-0600 or
(313) 761-4700
Comments This was a series of articles published in Machine Design describing the rolling resistance and aerodynamic drag on various surfaces for passenger and truck tires. UMI has permission to reprint this series from The Penton Publishing Company.
Fleet Owner

Ordering Info  Fleet Owner
              P.O. Box 530
              Highstown, New Jersey 08520-9990
Phone        (609) 883-3500
Comments    The October issue lists truck and tractor
dimensions and specifications.

Popular Science Track Tests

Ordering Info  For annual indexes:
              Popular Science Indexes
              P.O. Box 2027
              Latham, NY 12111
Phone        (518) 445-0573
For microfilm copies:
UMI
Microfilm Serial Bid Coordinator
300 N. Zeeb Road
Ann Arbor, Michigan 48106
Phone        (800) 732-0616 or
              (800) 521-0600 or
              (313) 761-4700
Comments    Annual indexes to the magazine list the
vehicles reviewed in prior issues. Each
monthly issue of the magazine lists vehicle
dimensions and specifications on selected
vehicles. Indexes are available for $5.00 per
5 year index.

Truck Index

Ordering Info  Truck Index, Inc.
              P.O. Box 10291
              Santa Ana, California 92711
Phone        (714) 835-3061
Comments    Truck Index is updated annually and comes
in two volumes: one for gasoline trucks and
one for diesel trucks. Besides truck dimen-
sions and specifications, the set includes
weight and load ratings, chassis diagrams,
and wheel and tire sizes. Pickups are in-
cluded. The cost is $20 per year for the two
volumes, including updates.

DATA SOURCE EXAMPLES

A 1984 Chevrolet Celebrity 4 door station wagon was used
as a base vehicle when obtaining information from the
primary sources. Some sources had no information on this
vehicle and a similar vehicle was used to illustrate data
from the source. The following pages contain examples of
the types of data found in each of the primary sources.

1988 SPECS

1988-model U.S. passenger car specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>186.3</td>
<td>190.7</td>
<td>204.6</td>
</tr>
<tr>
<td>Engine</td>
<td>2.8L</td>
<td>2.8L</td>
<td>2.8L</td>
</tr>
<tr>
<td>Capacity</td>
<td>6.5L</td>
<td>6.5L</td>
<td>6.5L</td>
</tr>
<tr>
<td>Mileage</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
</tr>
</tbody>
</table>

Figure 2 - Automotive News
CHEVROLET CELEBRITY

Few cars have had as hard a time living up to their names as this one. A few years ago, the Celebrity would have been an overnight sensation, given its specifications. But today it's one of many front-drive sedans smack in the middle of the family-car segment.

Slowly but surely, though, the Celebrity is gaining the recognition it deserves. This is undoubtedly one of the best GM cars to come along in some time, a car with a special harmony. The Celebrity is the successor to the mid-sized Malibu line, which was retired a few years back, and it provides the same brand of room and comfort in a decidedly more compact and fuel-efficient front-wheel-drive package.

The Celebrity line is carefully planned to appeal to a variety of domestic-car buyers, and a few considering imports. The motivation menu ranges up to a fuel-injected 2.8-liter V-6. Two sedans and a wagon are available. And you can dress the Celebrity in plain, fancy, or Eurosport trim. All this has made the Celebrity one of the most popular cars in the land, if not exactly a cause célèbre.

Figure 3 - Bailey & Associates

Manufacturer: Chevrolet Motor Division
30007 Van Dyke Avenue
Warren, Michigan 48090

Base price: $9995–10,672
Vehicle type: front-engine, front-drive
Body styles: 2-door sedan, 4-door sedan, 5-door wagon

DIMENSIONS
Wheelbase ....................... 104.9 in
Track, F/R ....................... 58.7/57.0 in
Length ......................... 188.3–190.8 in
Width ...................... 69.3 in
Height ......................... 53.9–54.3 in
Curb weight ..................... 2800–3100 lb
Fuel-tank capacity ................ 15.7–16.6 gal

ENGINES
2.5-liter 4-in-line, 2.8-liter V-6

TRANSMISSIONS
5-spd man, 3-spd auto, 4-spd auto

SUSPENSION
F. .................... ind, strut, coil springs
R. .................... rigid axle, coil springs

BRAKES
F. ...................... vented disc
R. ...................... drum

EPA ESTIMATED FUEL ECONOMY
City ......................... 19–22 mpg

Figure 4 - Car & Driver
Figure 5 - Consumer Reports

Given a wheelbase, L (in):

1. Total Weight

\[ W_t = 2.451 \times 10^{-3} L^3 \] (lb)

2. Total Unsprung Weight

\[ W_{ut} = 126.6 + 0.111W_t \] (lb)

3. Front Unsprung Weight

\[ W_{uf} = 0.385W_{ut} \] (lb)

4. Rear Unsprung Weight

\[ W_{ur} = W_{ut} - W_{uf} \] (lb)

5. Sprung Weight

\[ W_s = W_t - W_{ut} \] (lb)

6. Total Weight on Front Wheels

\[ W_{ft} = \left\{\frac{62.727 - 0.0629L}{100}\right\}W_t \] (lb)

7. Total Weight on Rear Wheels

\[ W_{rt} = W_t - W_{ft} \] (lb)

8. Percent Weight on Front Wheels

\[ P_f = 100\left(\frac{W_{ft}}{W_t}\right) \]

Figure 6 - Engineering Dynamics Corp. - EDVAP Appendix (example of 54 formulas)
Figure 7 - Engineering Dynamics Corp. - Vehicle Crush Coefficients

1984 CHEVROLET

<table>
<thead>
<tr>
<th>Body Type</th>
<th>VIN</th>
<th>Wt</th>
<th>List Wholesale Retail</th>
</tr>
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<tbody>
<tr>
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<td></td>
<td></td>
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<tr>
<td>Sedan 4D</td>
<td>W166 3623 3606</td>
<td>4200</td>
<td>5910</td>
</tr>
<tr>
<td>4-Door Sedan</td>
<td>W166 3623 3606</td>
<td>4200</td>
<td>5910</td>
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<tr>
<td>Wagon 4D</td>
<td>W357 2771 3606</td>
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DIMENSIONS

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<tr>
<th>Models</th>
<th>Metric Measure</th>
<th>U.S. Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length - Coupe &amp; Sedan</td>
<td>4783mm</td>
<td>188.3&quot;</td>
</tr>
<tr>
<td>- Station Wagon</td>
<td>4847mm</td>
<td>190.8&quot;</td>
</tr>
<tr>
<td>Width - All Models</td>
<td>1760mm</td>
<td>69.3&quot;</td>
</tr>
<tr>
<td>Height - Sedans</td>
<td>1365mm</td>
<td>53.7&quot;</td>
</tr>
<tr>
<td>- Coupe and Station Wagon</td>
<td>1379mm</td>
<td>54.3&quot;</td>
</tr>
<tr>
<td>Wheelbase - All Models</td>
<td>2664mm</td>
<td>104.9&quot;</td>
</tr>
</tbody>
</table>

OVERALL DIMENSIONS - 1984 (Figures in Inches)

<table>
<thead>
<tr>
<th>Models</th>
<th>Wheelbase L101</th>
<th>Overall Length L103</th>
<th>Overall Width W103</th>
<th>Overall Width Doors Open W103</th>
<th>Overall Height H101</th>
<th>Minimum Running Ground Clearance H1155</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Motors Corporation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliance 95, 96</td>
<td>97.8</td>
<td>163.8</td>
<td>65.0</td>
<td>126.0-142.0</td>
<td>51.3</td>
<td>4.72</td>
</tr>
<tr>
<td>Encore 95, 96</td>
<td>97.8</td>
<td>160.6</td>
<td>65.0</td>
<td>142.0</td>
<td>51.3</td>
<td>4.72</td>
</tr>
<tr>
<td>Eagle MPV 35, 38</td>
<td>109.3</td>
<td>180.94</td>
<td>72.34</td>
<td>139.22</td>
<td>54.35</td>
<td>6.65&quot;</td>
</tr>
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</table>

FRONT OF CAR DIMENSIONS - 1984 (Figures in Inches)

<table>
<thead>
<tr>
<th>Models</th>
<th>Bottom of Front Bumper to Ground H102</th>
<th>Bottom of Front Door to Ground H113</th>
<th>Cowl At Rear to Ground H114</th>
<th>Length</th>
<th>Upper Structure L123</th>
<th>Overhang, Front L104</th>
<th>Width Travel W101</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Motors Corporation</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliance 95, 96</td>
<td>13.4-15.4</td>
<td>10.39</td>
<td>34.56</td>
<td>93.35</td>
<td>30.98</td>
<td>55.19</td>
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<tr>
<td>Encore 95, 96</td>
<td>13.4-15.4</td>
<td>10.39</td>
<td>34.56</td>
<td>93.35</td>
<td>30.98</td>
<td>55.19</td>
<td></td>
</tr>
<tr>
<td>Eagle MPV 35, 38</td>
<td>16.63*</td>
<td>12.66-12.97</td>
<td>39.52-39.82</td>
<td>96.29</td>
<td>33.50</td>
<td>59.60</td>
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</tr>
</tbody>
</table>

Figure 8 - Kelly Blue Book

Figure 9 - Motor Vehicle Manufacturers Association (Parking Dimensions)

Figure 10 - Owner's Manual
### Figure 11 - Road & Track

<table>
<thead>
<tr>
<th>Country</th>
<th>Manufacturer</th>
<th>Model(s)</th>
<th>Body Type(s)</th>
<th>Seats</th>
<th>Change</th>
<th>Engine Type</th>
<th>Horsepower @ RPM</th>
<th>Torque @ RPM</th>
<th>Length Width Height</th>
<th>Wheelbase</th>
<th>Curb Weight</th>
<th>Transmission(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>ACURA</td>
<td>Integra LS</td>
<td>4DR, SD, S</td>
<td>YES</td>
<td>YES</td>
<td>2.0L SOHC</td>
<td>100</td>
<td>60</td>
<td>213</td>
<td>111</td>
<td>91</td>
<td>267</td>
</tr>
<tr>
<td>UA</td>
<td>ALFA ROMEO</td>
<td>Spider, 24V, Quadrifoglio</td>
<td>4DR</td>
<td>S</td>
<td>YES</td>
<td>2.0L SOHC</td>
<td>165</td>
<td>60</td>
<td>210</td>
<td>110</td>
<td>90</td>
<td>267</td>
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</table>

### Figure 12 - Transport Canada

<table>
<thead>
<tr>
<th>MODEL</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>S</th>
<th>WB</th>
<th>OL</th>
<th>OW</th>
<th>OH</th>
<th>CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAVALIER TYPE 10 2 DR HB &amp; TBI HB</td>
<td>134</td>
<td>116</td>
<td>37</td>
<td>94</td>
<td>114</td>
<td>91</td>
<td>91</td>
<td>257</td>
<td>478</td>
<td>138</td>
<td>131</td>
<td>1097</td>
</tr>
<tr>
<td>CAVALIER TYPE 10 CF</td>
<td>134</td>
<td>70</td>
<td>37</td>
<td>94</td>
<td>114</td>
<td>91</td>
<td>91</td>
<td>257</td>
<td>478</td>
<td>138</td>
<td>131</td>
<td>1097</td>
</tr>
<tr>
<td>CELEBRITY 2 4U (P)</td>
<td>142</td>
<td>92</td>
<td>38</td>
<td>68</td>
<td>120</td>
<td>107</td>
<td>108</td>
<td>268</td>
<td>478</td>
<td>176</td>
<td>177</td>
<td>1204</td>
</tr>
<tr>
<td>CELEBRITY 4 DR 5D</td>
<td>142</td>
<td>92</td>
<td>38</td>
<td>68</td>
<td>120</td>
<td>107</td>
<td>108</td>
<td>268</td>
<td>478</td>
<td>176</td>
<td>177</td>
<td>1204</td>
</tr>
</tbody>
</table>

### Figure 13 - Ward's Automotive Yearbook

### Fall 1981 U.S. Passenger Car Specifications

<table>
<thead>
<tr>
<th>Model and Make</th>
<th>Dimensions</th>
<th>Engine</th>
<th>Capacities</th>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMERICAN MOTORS-</td>
<td>Width (in.)</td>
<td>Length (in.)</td>
<td>Curb Weight (lvs.)</td>
<td>Horsepower @ RPM</td>
</tr>
<tr>
<td>Pacer Sedan 4</td>
<td>168</td>
<td>74</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>Eagle Sedan 4</td>
<td>168</td>
<td>74</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>Eagle Sedan 4</td>
<td>168</td>
<td>74</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>Eagle Sedan 4</td>
<td>168</td>
<td>74</td>
<td>34</td>
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</tr>
<tr>
<td>Eagle Sedan 4</td>
<td>168</td>
<td>74</td>
<td>34</td>
<td>60</td>
</tr>
</tbody>
</table>

### Figure 14 - U.S. and Foreign Passenger Car Specifications
VALIDATION

To verify the primary sources of data, a 1984 Chevrolet Celebrity V6 automatic station wagon was measured and weighed with an empty gas tank. A comparison of these measurements with those obtained from each of the primary above sources is compared in Table 3 - Comparison of Specifications by Source.

In reviewing the data obtained from the various sources, a large disparity in the curb weight was noted. The curb weight varied from as low as 2701 to as high as 3590 pounds. This can be attributed to the options added or removed from the base vehicle or the weight of the test equipment on the vehicle. A more specific weight can sometimes be obtained by referring to the manufacturer's weight for the appropriate options.

---

**TABLE 3 - Comparison of Specifications by Source.** All measurements are in pounds and inches.

<table>
<thead>
<tr>
<th>Source</th>
<th>Wheel Base</th>
<th>Overall Length</th>
<th>Over-hang</th>
<th>Track-width</th>
<th>Weight</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Track-front</td>
<td>Rear</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Front</td>
<td>Rear</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>105</td>
<td>68.5</td>
<td>191.75</td>
<td>41.25</td>
<td>45.5</td>
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<tr>
<td><em>Auto. News</em></td>
<td>104.9</td>
<td>69.3</td>
<td>190.8</td>
<td>58.7</td>
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<td>2903</td>
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<tr>
<td>Bailey</td>
<td>104.9</td>
<td>69.3</td>
<td>190.8</td>
<td></td>
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<td>2856</td>
</tr>
<tr>
<td><em>Car &amp; Driver</em></td>
<td>104.9</td>
<td>69.3</td>
<td>188.3</td>
<td>190.8</td>
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<tr>
<td><em>Consumer Reports</em></td>
<td>105</td>
<td>69</td>
<td>191</td>
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<td>EDVAP</td>
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<td>Vehicle Coefficients</td>
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<tr>
<td>MVMA</td>
<td>104.9</td>
<td>67.8</td>
<td>188.3 - 40.7 - 41.9 - 41.9 - 41.7 - 47.1</td>
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<td>57.0</td>
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<td>Owners Manual</td>
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<td></td>
<td></td>
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<tr>
<td>Road &amp; Track Transport</td>
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<td>69.3</td>
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<tr>
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<td>105</td>
<td>69</td>
<td>188</td>
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<td>190.8</td>
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<td>2851</td>
</tr>
</tbody>
</table>

* Vehicle weight includes test instrumentation.
CONCLUSION

A variety of sources are available to the accident reconstructionist for identifying vehicle dimensions and specifications. The accuracy and contents of each source may vary, but knowing the publisher's source and degree of accuracy can impact the ultimate accuracy of the reconstructionists' results.

ACKNOWLEDGMENTS

The authors would like to thank Mr. Brian Hendrick of Transport Canada, Dr. R.M. Brach of the University of Notre Dame, and Mr. Harold Sherman of the University of Michigan for their assistance in identifying commonly referenced sources of vehicle specifications. Reprints of all examples were obtained from the appropriate publisher and reprinted with their permission.

REFERENCES


