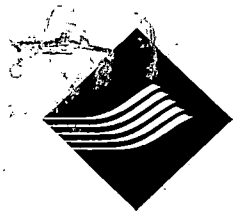

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Oakland Community College
Collision Auto Repair (CAR) Labor Market Analysis

Preliminary Report

Prepared by:
The Office of Institutional Research
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January 2003

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Executive Summary

Purpose of the Study

In order to better understand the many components of the collision auto body repair profession and labor market, the following Labor Market Analysis of Collision Auto Body Repair (CAR) was developed. The primary goals of this analysis are to:

- Explore the collision auto body repair industry in general, including trends and conditions that may affect the field.
- Define the profession of collision auto body repair; including job duties, work environments, education, training, certification recruitment, and career pathways.
- Consider the labor market for collision auto body repair technicians; including wages, future needs and trends.

Figure 1
Collision Auto Repair Labor Market Analysis

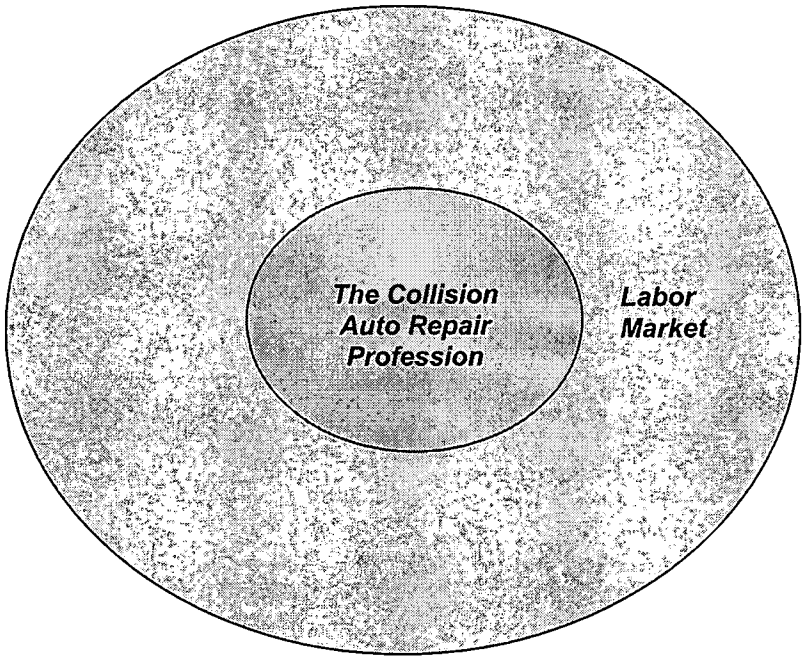

Figure 1 depicts the relationships among each element of this analysis. The auto body repair industry encompasses both the labor market and the profession of collision auto body repair. The labor market, in turn, provides a framework for the

collision auto body repair profession and many other auto repair and maintenance occupations. This report will describe each of these elements, with the Labor Market portion specific to collision auto body repair.

Methods

Several research methods were utilized to attain data for this report, including:

- Literature and Internet Research. The Occupational Outlook Handbook and the Bureau of Labor Statistics (BLS) were primary sources, among others.

- Telephone Interviews. Several individuals with specific knowledge about collision auto repair and the auto repair industry provided valuable insight.

- The Collision Auto Repair (CAR) Employer Survey. Institutional Research developed and administered a comprehensive telephone survey of auto repair employers in Metropolitan Detroit area. The purpose of the survey was to gain knowledge of the collision auto repair profession and related trends. The results of this survey will be referenced frequently throughout the report.

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Key Findings

A total of one hundred eighty-seven surveys were completed via telephone. Responses are broken down by national labor market and state/local labor market.

National

- According to the Occupational Outlook Handbook, there is rising concern among collision auto body repair facility operators about the industry's ability to attract new technicians to the trade.
- Concern about the future of the industry's workforce is evident in the lack of interest in the trade among students, especially female students.
- Most employers prefer to hire individuals who have completed formal training programs in automotive body repair field, but these programs supply only a portion of employer's needs. Therefore, most new recruits receive primarily on the job training.
- As beginners increase their skills, learn new techniques, and complete work more rapidly, their pay will increase accordingly.
- In addition to on the job training, certification is also important. The National Institute for Automotive Service Excellence (ASE), though voluntary, is the recognized standard of achievement for automotive body repairers.
- Most automotive body repairers work a standard 40-hour week, although some, including the self-employed, work more than 40 hours a week.
- There are several other occupations directly related to the collision auto body repair field.
- Automotive body repairers often work closely with individuals including automotive service technicians and mechanics, diesel service technicians and mechanics, auto damage insurance appraisers, and painting and coating workers.

Key Findings continues

State

- The majority (39.6%) of those polled stated that a high school diploma or GED was the minimum level of education required.
- The majority (37.4%) of respondents preferred I-CAR certification classes.
- The local Collision Auto Repair Industry found the State of Michigan Certification most valuable (47.6%).
- Almost ninety percent (89.8%) of employers surveyed claimed that certification was a requirement at their facility
- Over seventy five percent (75.8%) of employers polled claimed a degree does not increase an employee's rate of pay.
- Well over half (66.1%) of employers said that having a degree had no impact on opportunity for advancement.
- Respondents were asked if they thought certification increased an employee's rate of pay. Over half (62.4%) of respondents said certification did not increase rate of pay.

Table 1
Comparison of Auto Body Repair Technicians '
Mean Pay Rates
2000-2001

Region	Mean Pay Rate (hourly)
National[a]	$ 15.62
Michigan[b]	$16.43
Metro Detroit[c]	$15.87

[a] Occupational Outlook Handbook 2000-01, http://www.bls.gov/oco/ocos164, based on annual salary given of $23,000.
[b] www.michlmi.org/web_nav/Wages/frame.htm
[c] www.michlmi.org/web_nav/Wages/frame.htm

Key Findings continues

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Table 2

Employment Estimates and Mean Wage Estimates for Automotive Body and Related Repairers		RSE (3)
Employment (1)	168, 630	2.3%
Mean Hourly Wage	$16.82	0.8%
Mean Annual Wage (2)	$34, 980	0.8%

1. Data for detailed occupations does not sum to the totals because the totals include data for occupations not shown separately.
2. Annual wages have been calculated by multiplying mean wage by a "year round, full-time" hours figure of 2,080 hours.
3. The smaller the standard of error, the more precise the estimate. (http://stats.bls.gov/oes/2001/oes493021.htm

Table 3

Percentiles, Hourly and Annual Wage					
Percentile	10%	25%	50% (Median)	75%	90%
Hourly Wage	$8.76	$11.61	$15. 62	$20.78	$26.79
Annual Wage (2)	$18, 210	$24, 160	$32, 490	$43, 210	$55, 720

2. Annual wages have been calculated by multiplying mean wage by a "year round, full-time" hours figure of 2,080 hours. (http://stats.bls.gov/oes/2001/oes493021.htm

- Fifty-seven percent (57%) of respondents believed that certification did not increase opportunity for advancement.
- Close to half (48.9%) of employers surveyed said their future needs for collision auto body repair technicians would increase.
- According to respondents, the most common (25%) job identified available for advancement are mechanic positions. Other jobs represents forty-one point seven percent (41.7%) of all jobs available for advancement.
- Almost all (88.8%) of those surveyed were from private body shops.

The Collision Auto Repair Industry

National

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There is rising concern among collision auto body repair facility operators about the industry's ability to attract new technicians to the trade. Concern about the future of the industry's workforce is evident in the lack of interest in the trade among students, especially female students. Despite the fact that the number of technicians has grown substantially in recent years and the projected number of job openings between now and 2010 will also be substantial. The problem of finding staff for growing repair facilities will continue in the foreseeable future.[1]

Considerably more attention has been focused on the industry during the past year concerning this long-term problem, which has repair facility owners who are growing their business worried. Hence, for the past several months many efforts have been underway both locally and nationally, designed to improve the situation shops face.

For example, the I-CAR Education Foundation's PACE-ST3 program, designed to help secondary schools with collision repair programs develop qualified entry-level staff, is moving from test markets into a wider roll-out. This is great progress for a program that was only announced last year at NACE in Las Vegas.[2]

For several years, shop operators asking what they could do in their local market to improve the quality and availability of entry-level technicians were, encouraged to become active in their local trade school's advisory board. Participation in a local advisory board remains vital in ensuring that the skills you require of a technician are being taught and that the school has the necessary resources to teach at that level. But, more and more it appears that this level of involvement is not enough. Those actively involved with trade schools point out the need to become active in the recruitment process that generates the interest in the auto body repair field in the first place. This is an area where shop operators can have the most impact.[3]

By working with high school guidance counselors and administration and offering personal time and experience as a resource for students interested in a technical trade, one can serve as an active recruiter for the CAR industry on the local and national level. Passion and pride in the industry can serve as a model for future technicians and leaders. The ability to reach out to students beyond those who may be considering an automotive repair career is also crucial.[4]

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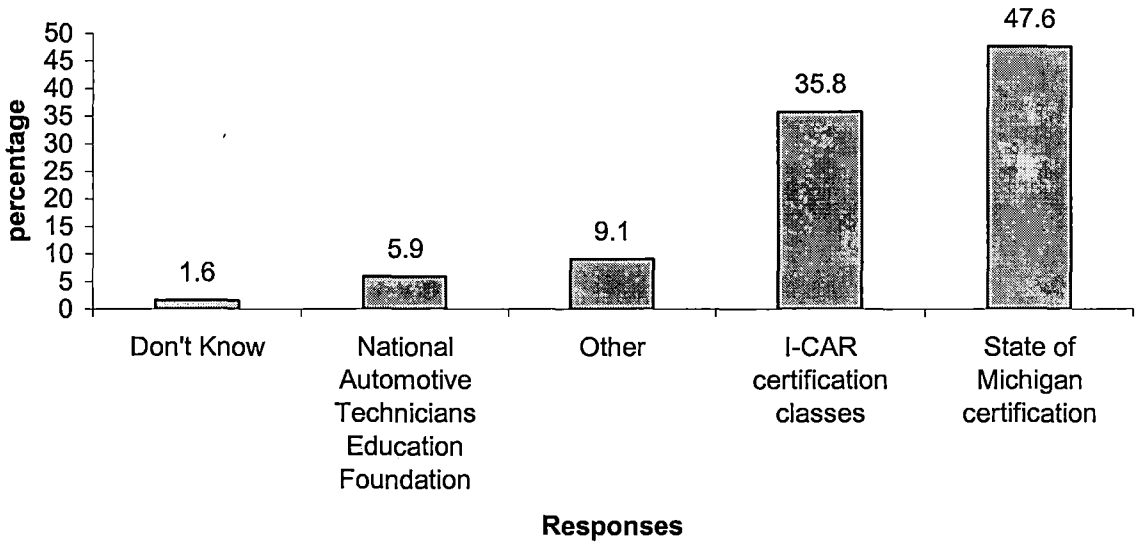
[1] http://www.abrn.com/abrn/article/articleDetail.jsp?id=39776
[2] http://www.bls.gov/oco/ocos180.htm
[3] Ibid
[4] http://www.bls.gov/oco/ocos180.htm

The Collision Auto Repair Industry

Local

Chart 1
Type of Certification Found Most Valuable



The local Collision Auto Repair Industry found State of Michigan Certification most valuable (47.6%). Next in line were I-CAR classes (35.8%). Other forms of certification represented approximately nine percent (9.1%). The National Automotive Technicians Education Foundation certification was found most valuable by nearly six percent (5.9%) and just over one percent (1.6%) did not know which form of certification was most valuable.

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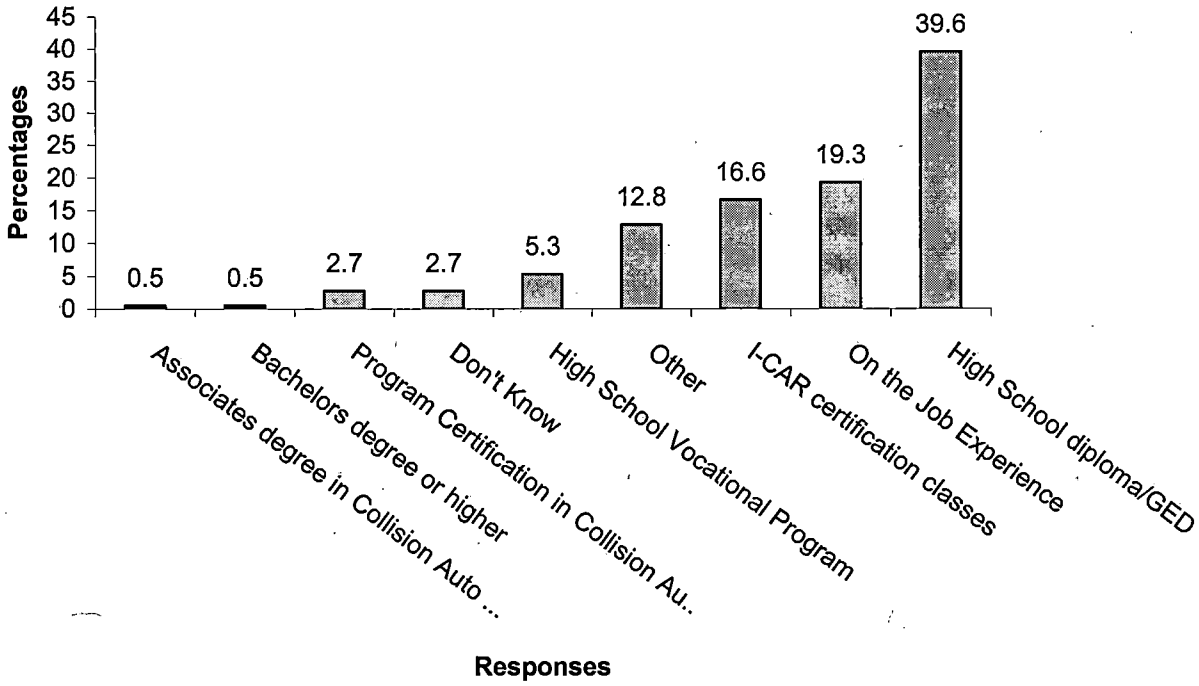
Chart 2
Minimum Educational Requirement at Your Facility



The local Collision Auto Body Repair Industry was asked to indicate the minimum educational requirement at their facilities. The majority (39.6%) stated that a high school diploma or GED was the minimum level of education required. On the job training was the minimum requirement by approximately nineteen percent (19.3%) of employers. I-CAR certification courses were the minimum educational requirement by approximately sixteen percent (16.6%) of employers. Almost thirteen percent (12.9%) listed other levels of education as their minimum requirement. High school vocational programs were the minimum requirement by five percent (5.3%) of employers. Two point seven percent (2.7%) said they did not know or program certification in Collision Auto Body Repair was the minimum educational requirement for their facility. Merely point five percent (0.5%) of employers said the minimum educational requirement was a Bachelors or higher or an Associates degree in Collision Auto Body Repair.

Source: OCC, Office of Institutional Research

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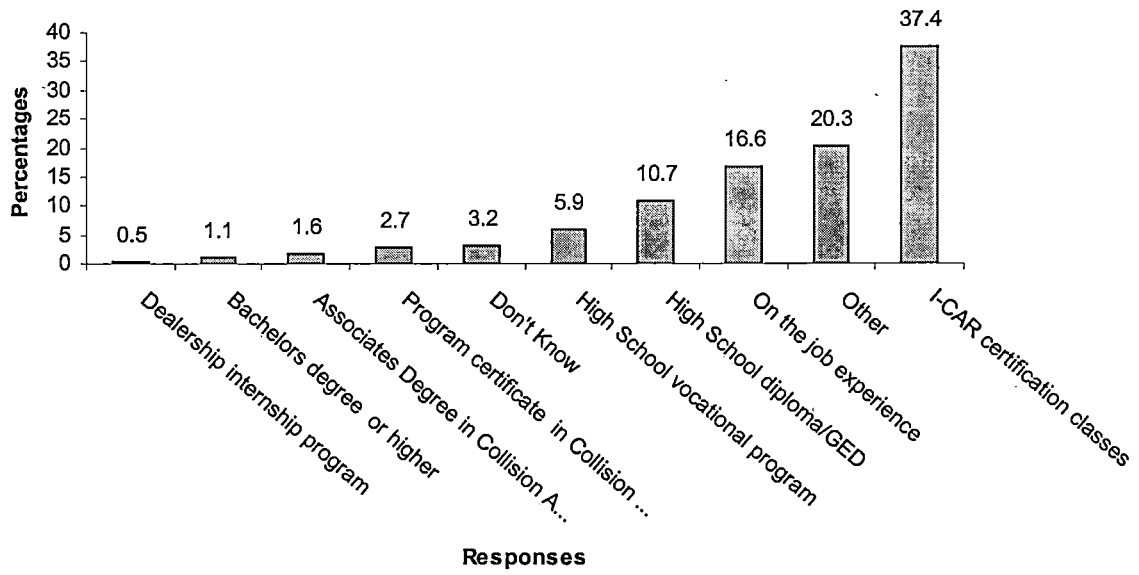
Chart: 3 Preferred Educational Requirement for Collision Auto Body Repair Technicians



Employers were asked to specify preferred educational requirements. The majority (37.4%) preferred I-CAR certification classes. Twenty point three percent (20.3%) preferred some other form of education. Nearly seventeen percent (16.6%) preferred on the job experience. A high school diploma or GED followed next in line as the most preferred with ten point seven percent (10.7%) of respondents polled. Completion of a high school vocational program was preferred by just under six percent (5.9%). Three point two percent (3.2%) of respondents did not know of a preferred educational requirement. Respondents preferring program certification in collision auto body repair represented close to three percent (2.7%). Almost two percent (1.6%) preferred an Associates degree in collision auto body repair. Approximately one percent (1.1%) preferred a bachelor's degree or higher, while only point five percent (0.5%) preferred the competition of a dealership internship program.

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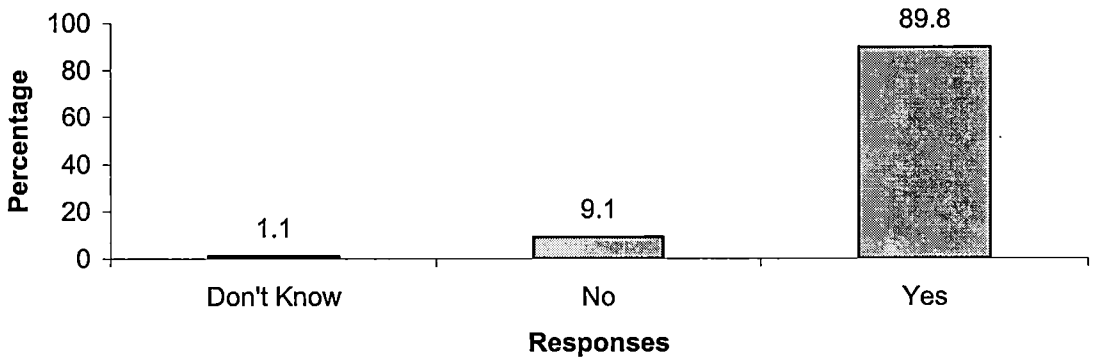
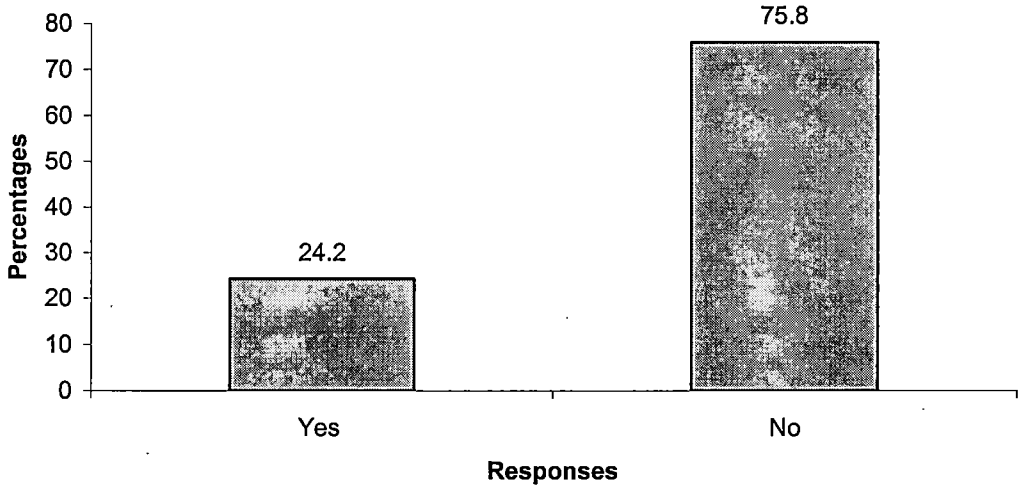
Chart 4: Is State Certification a Requirement for Collision Auto Body Repair Technicians at Your Facility



Local employers were then asked, "Is state certification a requirement for Collision Auto Body Repair Technicians at your facility"? Almost ninety percent (89.8%) of employers said certification was a requirement at their facility. Approximately nine percent of employers polled said certification was not a requirement at their facility. One point one percent (1.1%) did not know if certification was a requirement at their facility.

Chart 5: The Impact of a Degree on Pay Rate



According to the majority (75.8%) of employers polled, claims that having a degree does not increase an employee's rate of pay. However, twenty-four point two percent (24.2%) believes that having a degree does increase the rate of pay.

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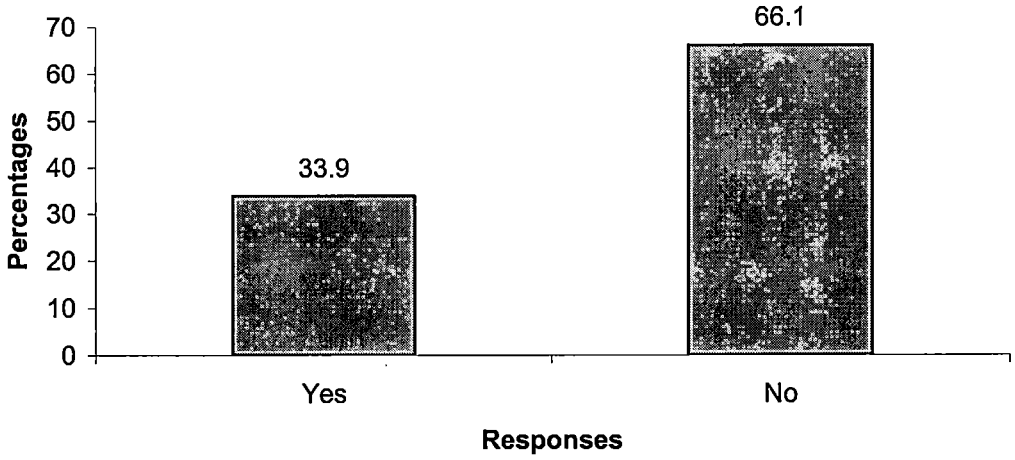
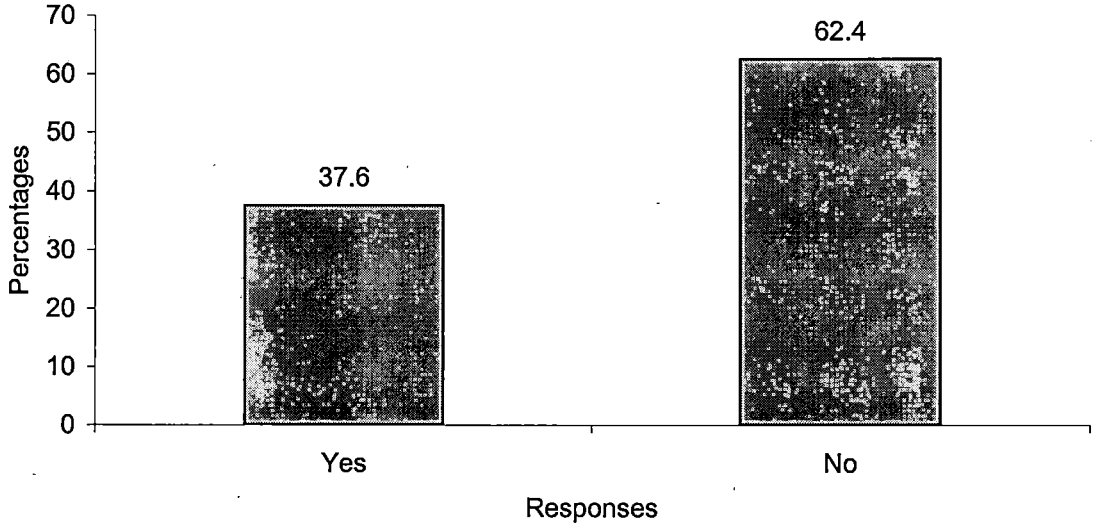
Chart 6: The Impact of a Degree on the Opportunity for Advancement



Respondents were then asked if having a degree had any impact on the opportunity for advancement? Almost all (66.1%) believed that having a degree did not increase the opportunity for advancement. Yet, thirty-three point nine percent (33.9%) believed that having a degree did in fact increase the opportunity for advancement.

Chart 7: The Impact of Certification on Pay Rate



Source: OCC, Office of Institutional Research

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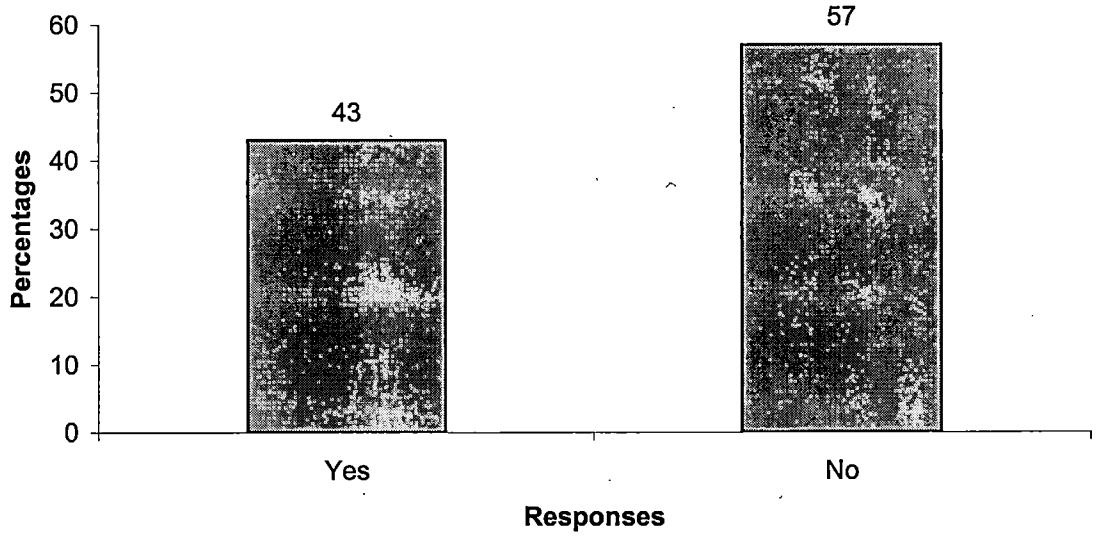
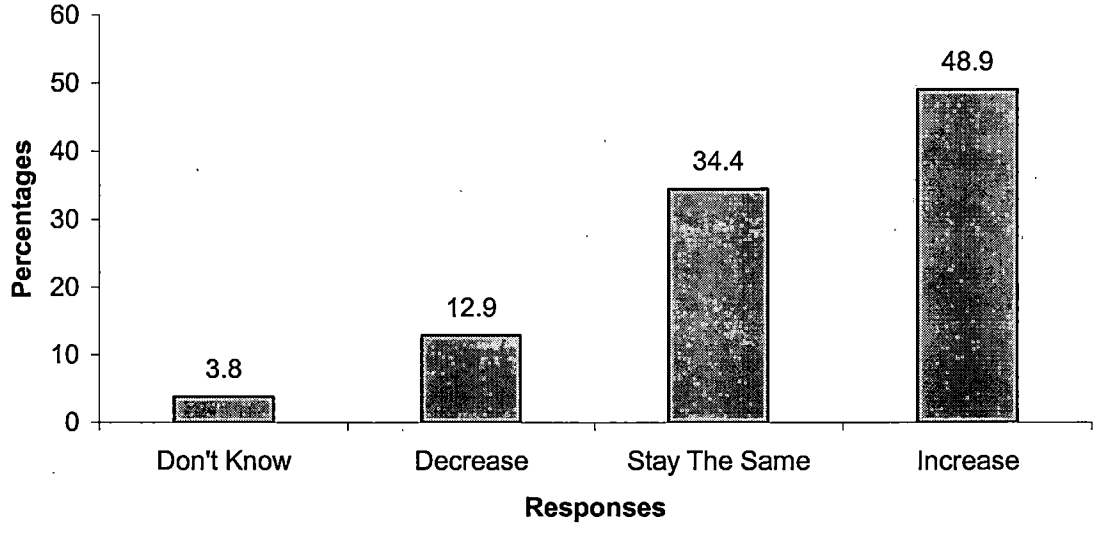
Respondents were also asked if they thought being certified increased the pay rate. Well over half (62.4%) said that it did not. However, close to thirty-eight percent (37.6%) claimed that certification did help increase the pay rate.

Chart 8: The Impact of Certification on Advancement Opportunities



According to those polled, over half (57%) believed that certification did not increase the opportunity for advancement. Yet forty-three percent (43%) believed that certification does increase the opportunity for advancement.

Chart 9: Future Needs of Collision Auto Body Technicians



Source: OCC, Office of Institutional Research

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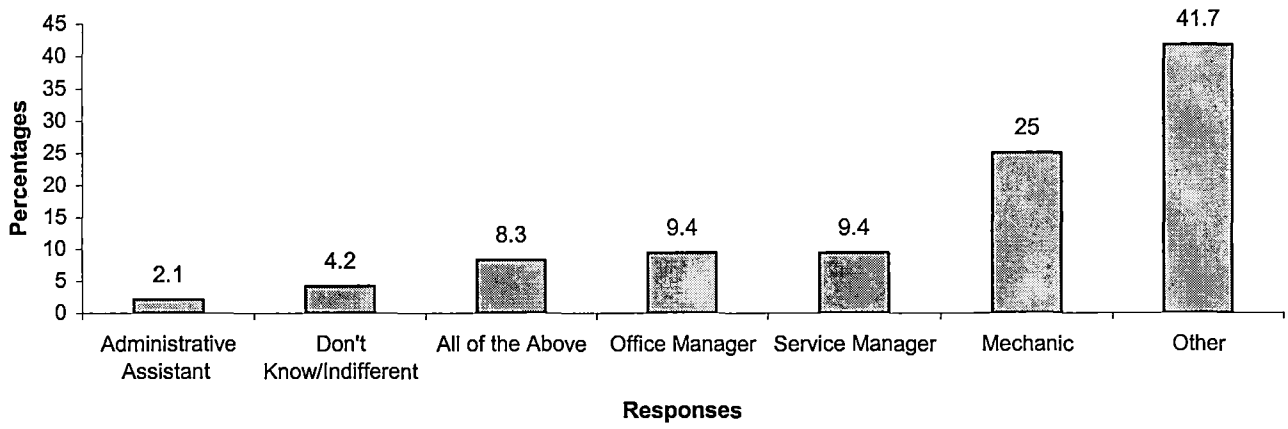
Respondents were asked to identity their future need(s) for collision auto body repair technicians. Close to half (48.9%) claimed their needs would increase. About thirty-four percent (34.4%) said their needs would remain the same. Approximately thirteen percent (12.9%) said their needs for collision auto body technicians would decrease. Three point eight percent (3.8%) of respondents did not know what their future needs would be.

Chart 10: Types of Jobs Available for Advancement



Employers were also asked to identify the types of jobs that are available for advancement. The least number of jobs available were administrative assistants, representing only two percent (2.1%)of jobs available. Four point two percent (4.2%) of those polled didn't know or were indifferent about the types of jobs available for advancement. Service Manager and Office Manager each represented just over nine percent (9.4%) of jobs available for advancement. Mechanic represented a quarter (25%) of jobs available for advancement. Eight point three present (8.3%) of respondents claimed that all jobs mention were available for advancement. Other jobs not specifically mentioned, represented the majority at forty-one point seven percent (41.7%) of jobs available for advancement.

Although there are many jobs available, the turnover rate for this profession appears to be of little concern. Of those polled, the majority (64.7%) said the turnover rate was low. Twenty point three percent (20.3%) said the turnover rate was about average. Just over nine percent (9.2%) of those polled said the turnover rate was high. Almost five percent (4.9%) said the turnover rate was not a concern for them. Less than one percent (.5%) was unaware of the turnover rate or was indifferent about the issue. Some of the reasons given for the turnover rate were low pay, job availability, returning to school, leaving the job market all together, increased family demands, lack of quality employees, lack of skill, and others. Each of the reasons mentioned represented less than one (.5%) of the total population polled.

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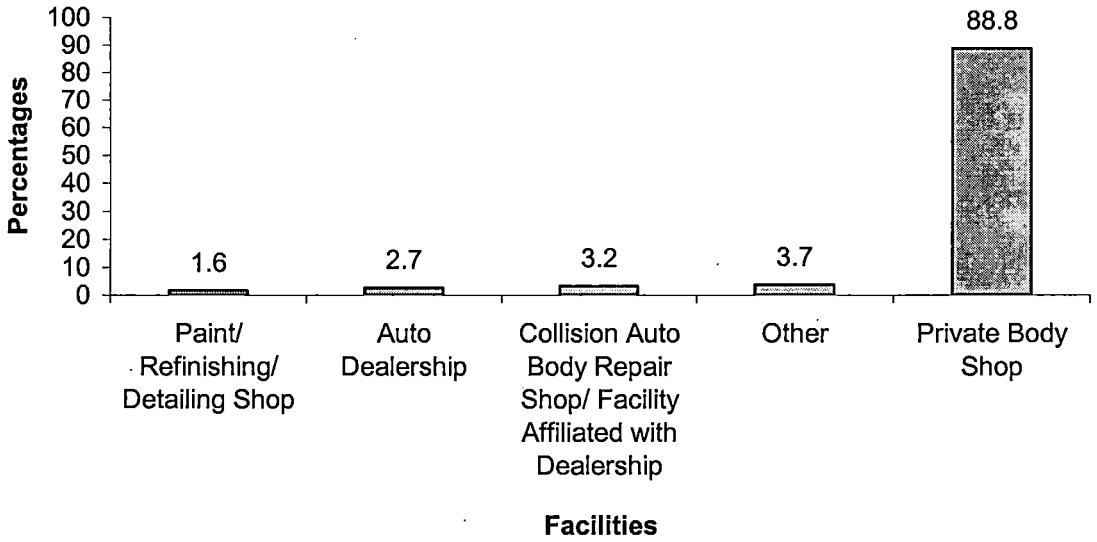
Chart 11: Type of Facility



Respondents were asked to identify the type of facility they represented. The majority (88.8%) of facilities were private body shops. The least (1.6%) number of facilities were paint/ refinishing/ detailing shops. Auto dealerships represented almost three percent (2.7%) of facilities polled. Collision auto body repair shop/ facility affiliated with a dealership represented just over three percent (3.2%) of facilities polled. Other facilities not specifically mentioned, represented almost four percent (3.7%) of facilities polled.

Source: OCC, Office of Institutional Research

The Collision Auto Repair Profession

Description of the Job

To become fully skilled automotive body repair technicians, formal training is desirable in addition to on-the-job training. They must also possess good mathematics, computer, and reading skills to understand the highly technical instruction manuals and diagrams.

Education, Training, and Other Qualifications

National

Most employers prefer to hire individuals who have completed formal training programs in the automotive body repair field, but these programs supply only a portion of employers' needs. For that reason, most new repairers get primarily on-the-job training, enhanced, when available, with short-term training sessions given by vehicle, parts, and equipment manufacturers. Some degree of training is necessary because advances in technology have greatly changed the structure, components, and materials used in automobiles. As a result, these new technologies require proficiency in new repair techniques and skills. For example, bodies of many newer automobiles are a combination of materials—traditional steel, aluminum, and a growing variety of metal alloys and plastics. Each of these materials or composites requires the use of somewhat different techniques to reshape parts and smooth out dents and small pits. Many high schools, vocational schools, private trade schools, and community colleges offer automotive body repair training as part of their automotive service programs.[5]

A fully skilled automotive body repairer must have good reading and basic mathematics and computer skills. Restoring unibody automobiles to their original form requires such precision that body repairers must follow instructions and diagrams in technical manuals to make very precise three-dimensional measurements of the position of one body section relative to another.[6]

A new repairer begins by assisting veteran body repairers in tasks such as removing damaged parts, sanding body panels, and installing repaired parts. They learn to remove small dents and to make other minor repairs. They then progress to more difficult tasks, such as straightening body parts and returning them to their correct alignment. Generally, to become skilled in all aspects of body repair requires approximately 3 to 4 years of on-the-job training.[7]

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[5] http://www.bls.gov/oco/ocos181.htm
[6] http://www.bls.gov/oco/ocos180.htm
[7] Ibid

(Education and Training Continued)

Because automotive parts, body materials, and electronics continue to change and to become more complex and technologically advanced, continuous education and training throughout a career in automotive body repair is required. To keep up with the constant changes and technological advances, repairers must continue to gain new skills, read technical manuals, attend seminars, and attend classes.[8]

The more beginners increase their skills, learn new techniques, and complete work more rapidly, their pay therefore increases. An experienced automotive body repairer with supervisory ability may advance to shop supervisor. Some workers even open their own body repair shops. Others go on become automobile damage appraisers for insurance companies.

In addition to on the job training, certification is also important. The National Institute for Automotive Service Excellence (ASE), though voluntary, is the recognized standard of achievement for automotive body repairers. ASE offers a series of four exams for collision repair professionals twice a year. Repairers may take from one to four ASE Master Collision Repair & Refinish Exams. Repairers who pass at least one exam and have 2 years of hands-on work experience earn ASE certification. Completion of a postsecondary program in automotive body repair may be substituted for 1 year of work experience. Those who pass all four exams become ASE Master Collision Repair and Refinish Technicians. Automotive body repairers must retake the examination at least every 5 years to maintain certification.[9]

Since thousands of vehicles are damaged each year in traffic accidents, job opportunities are definitely plentiful. Although, some vehicles are beyond repair, others can be made to look and drive like new again. Automotive body repairers straighten bent bodies, remove dents, and replace crumpled parts that are beyond repair. They repair all types of vehicle, from cars and small trucks to large trucks, buses, or tractor-trailers.[10]

Automotive body repairers use special equipment to restore damaged metal frames and body sections. Repairers chain or clamp frames and sections to alignment machines that use hydraulic pressure to align damaged components. "Unibody" vehicles, designs built without frames, must be restored to precise factory specifications for the vehicle to operate correctly. To do so, repairers use benchmark systems to make accurate measurements of how much each section is out of alignment and hydraulic machinery to return the vehicle to its original shape.[11]

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[8] http://www.bls.gov/oco/ocos240.htm
[9] http://www.bls.gov/oco/ocos180.htm
[10] Ibid
[11] Ibid

(Education and Training Continued)

Body repairers remove badly damaged sections of body panels with a special metal-cutting gun or by other means, and weld in replacement sections. Repairers pull out less serious dents with a hydraulic jack or hand prying bar or knock them out with hand tools or hammers. They smooth out small dents and creases in the metal by holding a small anvil against one side of the damaged area, while hammering the opposite side. They also remove very small pits and dimples with pick hammers and punches in a process called metal finishing. [12]

Body repairers also repair or replace the plastic body parts increasingly used on new model vehicles. They remove damaged panels and identify the family and properties of the plastic used on the vehicle. With most types of plastic, repairers can apply heat from a hot-air welding gun or by immersion in hot water and press the softened panel back into its original shape by hand. They replace plastic parts that are badly damaged or very difficult to repair.[13]

Body repairers use plastic or solder to fill small dents that cannot be worked out of the plastic or metal panel. On metal panels, they file or grind the hardened filler to the original shape and clean the surface with a media blaster before painting. In many shops, automotive painters do the painting. In small shops, workers often do both body repairing and painting. A few body repairers specialize in repairing fiberglass car bodies.[14]

The advent of assembly-line repairs in large shops moves away from the one-vehicle, one-repairer method to a team approach and allows body repairers to specialize in one type of repair, such as frame straightening or door and fender repair. Some body repairers specialize in installing glass in automobiles and other vehicles. *Automotive glass installers and repairers* remove broken, cracked, or pitted windshields and window glass. Glass installers apply a moisture-proofing compound along the edges of the glass, place it in the vehicle, and install rubber strips around the sides of the windshield or window to make it secure and weatherproof.[15]

Body repair work has variety and challenges—each damaged vehicle presents a different problem. Using their broad knowledge of automotive construction and repair techniques, repairers must develop appropriate methods for each job. They usually work alone, with only general directions from supervisors. In some shops, helpers or apprentices assist experienced repairers.[16]

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[12] http://www.bls.gov/oco/ocos180.htm
[13] Ibid
[14] Ibid
[15] Ibid
[16] Ibid

(Education and Training Continued)

Local Industries

Respondents from the Employer CAR Survey were asked about the educational requirements for their collision auto body repair technicians.

Table 4

CAR Employer Survey – Educational Requirements of Collision Auto Body Repair Technicians		
Education	**Percent of total responses (N=187*)**	**Percent of respondents answering (N=187)**
High School Diploma/GED	39.6%	39.6%
High School Vocational Program	5.3%	44.9%
Program Certification In Collision Auto Body Repair	2.7%	47.6%
I-CAR Certification	16.6%	64.2%
Associates Degree in Collision Auto Body Repair	.5%	64.7%
Bachelors Degree or Higher	.5%	65.2%
On the Job Experience	19.3%	84.5%
Other	12.8%	97.3%
Don't know/ indifferent	2.7%	100%

*Respondents were allowed to give more than one response.

The Collision Auto Repair Employer Survey administered by Institutional Research asked employers specifically about the types of administrative and technical duties performed by their collision auto repair technicians:

Table 5

CAR Employer Survey - Administrative Duties Performed by Collision Auto Body Repair Technicians in Metropolitan Detroit (N=187)	
"Do Collision Auto Body Repair Technicians at your facility . . . "	% responding "yes"
Maintain customer files?	9.7%
Prepare billing invoices?	11.8%
Schedule appointments?	15.6%
Prepare written estimates?	16.1%
Greet customers?	26.2%
Order auto body repair supplies? / inventory control?	31.7%

Working Environment

Most automotive body repairers work a standard 40-hour week, although some, including the self-employed, work more than 40 hours a week. Repairers work indoors in body shops that are noisy, because of hammering against metal and the use of power tools. Most shops are well ventilated to disperse dust and paint fumes. Body repairers often work in awkward or cramped positions, and much of their work is strenuous and dirty. Hazards include cuts from sharp metal edges, burns from torches and heated metal, injuries from power tools, and fumes from paint. However, serious accidents usually are avoided when the shop is kept clean and orderly and safety practices are observed.[17]

Respondents were asked to identify administrative duties performed by collision auto body repair technicians at their facilities. The majority (31.7%) of all respondents claimed their CAR technicians order auto body repair supplies and/or perform inventory control. Greeting customers was an administrative duty performed by technicians of twenty-six point two percent (26.2%) of respondents surveyed. Written estimates were prepared by technicians of only sixteen point one percent (16.1%) of respondents surveyed. Fifteen point six percent (15.6%) claimed their technicians scheduled appointments. Eleven point eight percent

[17] http://www.bls.gov/oco/ocos180.htm

Description of the Job (continued)

(11.8%) stated that their technicians prepared billing invoices. Close to ten percent (9.7%) stated that their technicians maintained customer files. Therefore, the most common administrative duty performed by CAR technicians were ordering auto body supplies and performing inventory control.

Table 6

CAR Employer Survey - Technical Duties Performed by Collision Auto Body Repair Technicians in Metropolitan Detroit (N=187)	
"Do Collision Auto Body Repair Technicians at your facility . . . "	**% responding "yes"**
Computer Diagnostics?	31.2%
Electrical Diagnostics? / Troubleshooting?	37.6%
Glass Removal/ Replacement?	40.5%
Steering and Suspension Alignment?	60.2%
Detailing and Polishing?	71.4%
Refinishing?	78.6%
Rust Removal?	83.4%
Surface Preparation?	94.7%
Structural Repair?	95.7%
Welding?	96.2%
Part Removal/ Replacement/ Alignment?	96.2%
Sheet Metal Damage Repair?	96.8%

Of those surveyed, computer diagnostics was the technical duty least performed by CAR technicians (31.2%). Electrical diagnostics/ troubleshooting followed with thirty-seven point six percent (37.6%). Forty point five percent (40.5%) preformed glass removal/replacement. Steering and suspension was performed by technicians of barley over sixty percent (60.2%) of those surveyed. Detailing and polishing was performed by technicians seventy one point four

percent of employers surveyed. Over three quarters (78.6%) of those polled claimed their technicians performed refinishing tasks. Rust removal followed with eighty-three point four percent (83.4%). Surface preparation, structural repair, welding, part removal/ replacement/alignment and sheet metal damage repair were mentioned as technical duties performed by the majority of employers surveyed. Each task was mentioned by over ninety percent of those polled. Sheet metal damage repair was mentioned most frequently by those polled, yielding close to ninety seven percent (96.8%).

Employers were asked to rank the technical duties performed by their collision auto repair technicians in order of importance. The following tables provide an analysis of their responses.

Table 7

CAR Employer Survey Technical Duties Mentioned First (N=187)		
Order of importance	Duty	"N"
1	All important/equal	105
2	Structural Repair	56
3	Welding	34
4	Sheet Metal Damage Repair?	30
5	Part Removal/ Replacement/ Alignment	22
6	Refinishing	21
7	Surface Prepareation	17
8	Rust Removal	3
9	Steering and Suspension Alignment	3
19	Computer Diagnostics	2
11	Electrical Diagnositcs/ Troubleshooting	1
12	Detailing and Polishing	1
13	Glass Removal/ Replacement	1

*Respondents were allowed to give more than one response.

Description of the Job (continued)

Table 8

CAR Employer Survey Technical Duties Mentioned Second (N=187)		
Order of importance	Duty	"N"
1	Structural Repair	56
2	Welding	34
3	Sheet Metal Damage Repair?	30
4	Part Removal/ Replacement/ Alignment	22
CAR Employer Survey Technical Duties Mentioned Third (N=187)		
1	Refinishing	21
2	Surface Prepareation	17

Finally, Table 6 summarizes all responses given and provides the following data:

Table 9

CAR Employer Survey Summary of All Mentions (N=187)		
Order of Importance	Duty	"N"
1	All important/equal	105
2	Structural Repair	56
3	Welding	34
4	Sheet Metal Damage Repair?	30
5	Part Removal/ Replacement/ Alignment	22
6	Refinishing	21
7	Surface Prepareation	17
8	Rust Removal	3
9	Steering and Suspension Alignment	3

Education and Training (continued)

Table 10

CAR Employer Survey – Preferred Educational Requirements of Collision Auto Body Repair Technicians		
Education	Percent of total responses (N=187*)	Percent of respondents answering (N=187)
High School Diploma/GED	10.7%	10.7%
High School Vocational Program	5.9%	16.6%
Program Certification In Collision Auto Body Repair	2.7%	19.3%
I-CAR Certification	37.4%	56.7%
Associates Degree in Collision Auto Body Repair	1.6%	58.3
Bachelors Degree or Higher	1.1%	59.4%
Dealership Internship Program	.5%	59.9%
On the Job Experience	16.6%	76.5%
Other	20.3%	96.8%
Don't know/indifferent	3.2%	100%

*Respondents were allowed to give more than one response.

Related Occupations

There are several other occupations directly related to the collision auto body repair field. Repairing damaged motor vehicles often involves working on mechanical components, as well as vehicle bodies. Automotive body repairers often work closely with individuals including automotive service technicians and mechanics, diesel service technicians and mechanics, auto damage insurance appraisers, and painting and coating workers, except construction and maintenance.

Painting and coating workers for example are directly involved in the exterior appearance segment of collision auto body repair. They, like collision auto body repair technicians receive most of their skills on the job. For most operators, training lasts from a few days to several months, but becoming skilled in all aspects of automotive painting usually requires 1 to 2 years. Employment growth for highly skilled transportation painters and automotive refinishers is projected to be slightly faster than for lesser skilled painting, coating, and spraying machine operators.

Many paints and coatings have dual purposes; the paint finish on an automobile not only heightens the visual appearance, but also provides protection from corrosion. Painting, coating, and spraying machine setters, operators, and tenders control the machinery that applies these paints and coatings to a wide range of manufactured products. There are several techniques such as dipping and tumbling barrel, used in painting and coating that requires skill. Dipping is the process of dipping an item in a large vat of paint or other coating. This is the technique used by *dippers*, who immerse racks or baskets of articles in vats of paint, liquid plastic, or other solutions using a power hoist. Similarly, tumbling barrel painters deposit articles made of porous materials in a barrel of paint, varnish, or other coating, which is then rotated to insure thorough coverage.[18]

Another technique is spraying products with a solution of paint or other coating. Spray-machine operators use spray guns to coat metal, wood, ceramic, fabric, paper, and food products with paint and other coating solutions. Following a formula, operators fill the equipment's tanks with a mixture of paints or chemicals, adding prescribed amounts of solution. They adjust nozzles on the spray guns to obtain the proper dispersion of the spray and hold or position the guns to direct the spray onto the article. Operators also check the flow and viscosity of the paint or solution and visually inspect the quality of the coating. When products are drying, these workers often must regulate the temperature and air circulation in drying ovens. Individuals who paint, coat, or decorate articles such as furniture, glass, pottery, toys, and books are known as *painting, coating, and decorating workers.*[19]

Painting workers use various types of machines to coat a range of products. Often, their job title reflects the specialized nature of the machine or the coating being applied. For example, *enrobing machine operators* coat, or "enrobe," confectionery, bakery, and other food products with melted chocolate, cheese, oils, sugar, or other substances. *Paper coating machine operators* spray "size" on rolls of paper to give it its gloss or finish. And *silvering applicators* spray silver, tin, and copper solutions on glass in the manufacture of mirrors.[20]

The adoption of new types of paints often is accompanied by a conversion to more automated painting equipment that the operator sets and monitors. Therefore, technical skills are a necessity. When using these machines, operators position the automatic spray guns, set the nozzles, and synchronize the action of the guns with the speed of the conveyor carrying articles through the machine and drying ovens. The operator also may add solvents or water to the paint vessel that prepares the paint for application. During operation, these

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[18] http://www.bls.gov/oco/ocos240.htm
[19] Ibid
[20] Ibid

workers tend painting machines, observe gauges on the control panel, and randomly check articles for evidence of any variation from specifications. The operator then uses a spray gun to "touch up" spots where necessary. [21]

Although the majority of workers are employed in manufacturing, these workers also refinish old and damaged cars, trucks, and buses in automotive body repair and paint shops. *Transportation equipment* or *automotive painters* are among the most highly skilled manual spray operators because they perform intricate, detailed work and mix paints to match the original color, a task that is especially difficult if the color has faded.[22]

To prepare a vehicle for painting, painters or their helpers use power sanders and sandpaper to remove the original paint or rust, and then fill small dents and scratches with body filler. They also remove or mask parts they do not want to paint, such as chrome trim, headlights, windows, and mirrors. Automotive painters use a spray gun to apply several coats of paint. They apply lacquer, enamel, or water-based primers to vehicles with metal bodies, and flexible primers to newer vehicles with plastic body parts. Controlling the spray gun by hand, they apply successive coats until the finish of the repaired sections of the vehicle matches that of the original undamaged portions. To speed drying between coats, they may place the freshly painted vehicle under heat lamps or in a special infrared oven. After each coat of primer dries, they sand the surface to remove any irregularities and to improve the adhesion of the next coat. Final sanding of the primers may be done by hand with a fine grade of sandpaper. A sealer then is applied and allowed to dry, followed by the final topcoat. When lacquer is used, painters or their helpers usually polish the finished surface after the final coat has dried.[23]

WORKING CONDITIONS

Painting and coating workers typically work indoors and may be exposed to dangerous fumes from paint and coating solutions. Although painting usually is done in special ventilated booths, many operators wear masks or respirators that cover their noses and mouths. In addition, the Clean Air Act of 1990 has led to a decrease in workers' exposure to hazardous chemicals by regulating emissions of volatile organic compounds from paints and other chemicals. This legislation also has led to increasing use of more sophisticated paint booths and fresh air systems, which provide a safer work environment.[24]

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[21] http://www.bls.gov/oco/ocos240.htm
[22] Ibid
[23] Ibid
[24] Ibid

Operators have to stand for long periods of time and, when using a spray gun, they may have to bend, stoop, or crouch in uncomfortable positions to reach different parts of the article. Most operators work a normal 40-hour week, but self-employed automotive painters sometimes work more than 50 hours a week, depending on the number of vehicles customers want repainted. [25]

EMPLOYMENT

Painting and coating workers held about 195,000 jobs in 2000. Lesser skilled coating, painting, and spraying machine setters, operators, and tenders accounted for about 108,000 jobs, while more skilled transportation equipment painters accounted for about 49,000. About 38,000 workers were painting, coating, and decorating workers.[26]

Seventy-one percent of jobs for salaried workers were found in manufacturing establishments, where they applied coatings to items such as fabricated metal products, motor vehicles and related equipment, industrial machines, household and office furniture, and plastics, wood, and paper products. Other workers included automotive painters employed by independent automotive repair shops and body repair and paint shops operated by retail motor vehicle dealers. About 7 percent of painting and coating machine operators were self-employed; most of these were transportation equipment painters.[27]

TRAINING, OTHER QUALIFICATIONS, AND ADVANCEMENT

Most painting and coating workers, much like collision auto body repair technicians, acquire their skills on the job, usually by watching and helping other experienced workers. For most setters, operators and tenders, as well as painting, coating, and decorating workers, training lasts from a few days to several months. Coating, painting, and spraying machine setters, operators, and tenders who modify the operation of computer-controlled equipment during operation may require additional training in computer operations and minor programming.[28]

Similarly, most transportation equipment painters start as helpers and gain their skills informally on the job. Becoming skilled in all aspects of automotive painting usually requires 1 to 2 years of on-the-job training. Beginning helpers usually remove trim, clean and sand surfaces to be painted, mask surfaces that they do not want painted, and polish finished work. As helpers gain experience,

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[25] http://www.bls.gov/oco/ocos240.htm
[26] Ibid
[27] Ibid
[28] Ibid

they progress to more complicated tasks, such as mixing paint to achieve a good match and using spray guns to apply primer coats or final coats to small areas. Painters should have keen eyesight and a good sense of color. Completion of high school generally is not required but is advantageous. Additional instruction is offered at many community colleges and vocational or technical schools. Such programs enhance one's employment prospects and can speed promotion to the next level.[29]

Some employers sponsor training programs to help their workers become more productive. This training is available from manufacturers of chemicals, paints, or equipment or from other private sources. It may include safety and quality tips and knowledge of products, equipment, and general business practices. Some automotive painters are sent to technical schools to learn the intricacies of mixing and applying different types of paint. [30]

Voluntary certification by the National Institute for Automotive Service Excellence (ASE) is recognized as the standard of achievement for automotive painters. For certification, painters must pass a written examination and have at least 2 years of experience in the field. High school, trade or vocational school, or community or junior college training in automotive painting and refinishing may substitute for up to 1 year of experience. To retain certification, painters must retake the examination at least every 5 years.[31]

Experienced painting and coating workers with leadership ability may become team leaders or supervisors. Those who acquire practical experience or college or other formal training may become sales or technical representatives for chemical or paint companies. Eventually, some automotive painters open their own shops.[32]

JOB OUTLOOK

Overall employment of painting and coating workers is expected to increase 10 to 20 percent through the year 2010. Employment growth for highly skilled transportation painters and automotive refinishers is projected to be slightly faster than for lesser skilled painting, coating, and spraying machine operators. In addition to job growth, some jobs will become available each year as employers replace experienced operators who transfer to other occupations or leave the labor force.[33]

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[29] http://www.bls.gov/oco/ocos240.htm
[30] Ibid
[31] Ibid
[32] Ibid
[33] Ibid

An increasing population demanding more manufactured goods will spur employment growth among coating, painting, and spraying machine operators. Employment growth will be limited, however, by improvements in the automation of paint and coating applications that will raise worker productivity. For example, operators will be able to coat goods more rapidly as they use sophisticated industrial robots that move and aim spray guns increasingly more like humans; as the cost of robots continues to fall, they will be more widely used. The Clean Air Act of 1990, which sets limits on the emissions of ozone-forming volatile organic compounds, also is expected to impede the employment growth of operators in manufacturing because firms tend to introduce more efficient automation as they switch to water-based and powder coatings to comply with the law.[34]

Because the detailed work of refinishing automobiles in collision repair shops and motor vehicle dealerships does not lend itself to automation, painters employed in these establishments are projected to experience slightly faster growth. As the demand for refinishing continues to grow, slower productivity growth among these workers will lead to employment increases more in line with the growing demand for their services. [35]

The number of job openings for painting and coating workers may fluctuate from year to year due to cyclical changes in economic conditions. When demand for manufactured goods lessen, production may be suspended or reduced, and workers may be laid off or face a shortened workweek. Automotive painters, on the other hand, can expect relatively steady work because automobiles damaged in accidents require repair and refinishing regardless of the state of the economy.[36]

EARNINGS

Median hourly earnings of coating, painting, and spraying machine setters, operators, and tenders, were $11.37 in 2000. The middle 50 percent earned between $9.11 and $14.11 an hour. The lowest 10 percent earned less than $7.54, and the highest 10 percent earned more than $17.65 an hour.
Median hourly earnings of transportation equipment painters were $14.64 in 2000. The middle 50 percent earned between $11.43 and $19.45 an hour. The lowest 10 percent earned less than $9.12, and the highest 10 percent earned more than $24.79 an hour. Median hourly earnings of transportation equipment painters were $14.45 in automotive repair shops and $18.77 in motor vehicle and equipment manufacturing.[37]

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[34] http://www.bls.gov/oco/ocos240.htm
[35] Ibid
[36] Ibid
[37] Ibid

Median hourly earnings of painting, coating, and decorating workers were $9.55 in 2000. The middle 50 percent earned between $7.56 and $12.48 an hour. The lowest 10 percent earned less than $6.45, and the highest 10 percent earned more than $16.07 an hour.[38]

Many automotive painters employed by motor vehicle dealers and independent automotive repair shops receive a commission based on the labor cost charged to the customer. Under this method, earnings depend largely on the amount of work a painter does and how fast it is completed. Employers frequently guarantee commissioned painters a minimum weekly salary. Helpers and trainees usually receive an hourly rate until they become sufficiently skilled to work on commission. Trucking companies, bus lines, and other organizations that repair and refinish their own vehicles usually pay by the hour. Many painting and coating machine operators belong to unions. Most union operators work for manufacturers and the larger motor vehicle dealers. [39]

[38] http://www.bls.gov/oco/ocos240.htm
[39] Ibid

The Labor Market

Wages and Employment Growth

Automotive body and related repairers held about 221,000 jobs in 2000. Most repairers worked for automotive repair shops or motor vehicle dealers. Others worked for organizations that maintain their own motor vehicles, such as trucking companies. A small number worked for wholesalers of motor vehicles, parts, and supplies. About 1 automotive body repairer out of 8 was self-employed.[40]

Future Outlook

Employment of automotive body repairers is expected to increase about 10 to 20 percent each year for all occupations through the year 2010. Opportunities should be best for persons with formal training in automotive body repair and mechanics.[41]

Demand for qualified body repairers will increase, as the number of motor vehicles in operation continues to grow in line with the Nation's population. With an increase in the number of motor vehicles in use, the number of vehicles damaged in accidents also will grow. New automobile designs increasingly have body parts made of steel alloys, aluminum, and plastics—materials that are more difficult to work with than traditional steel body parts. In addition, new, lighter-weight automotive designs are prone to greater collision damage than older, heavier designs and, consequently, more time is consumed in repair. The need to replace experienced repairers who transfer to other occupations, retire, or stop working for other reasons will account for the majority of job openings.[42]

Changes in body shop management have begun to increase some shops' productivity, profits, and customer satisfaction. Employing a team approach to repairs decreases repair time, improves customer relations, and allows shops to increase their volume of work. By more efficiently managing inventory, shops also may be able to replace the large portion of their space occupied by parts inventory with additional work bays to service vehicles, requiring additional body repairers.[43]

The automotive repair business is not very sensitive to changes in economic conditions, and experienced body repairers are rarely laid off. However, although major body damage must be repaired if a vehicle is to be

[40] http://www.bls.gov/oco/ocos181.htm
[41] Ibid
[42] Ibid
[43] Ibid

restored to safe operating condition, repair of minor dents and crumpled fenders can often be deferred during an economic slowdown. During slowdowns, most employers will hire few new workers, some unprofitable body shops may go out of business, and some dealerships might consolidate body shops. [44]

Earnings

Median hourly earnings of automotive body and related repairers, including incentive pay, were $15.00 in 2000. The middle 50 percent earned between $11.12 and $20.02 an hour. The lowest 10 percent earned less than $8.49, and the highest 10 percent earned more than $26.06 an hour. Median hourly earnings in the industries employing the largest number of automotive body and related repairers in 2000 were as follows:

New and used car dealers	**$15.76**
Automotive repair shops	**15.05**

Median hourly earnings of automotive glass installers and repairers, including incentive pay, were $12.46 in 2000. The middle 50 percent earned between $9.65 and $15.86 an hour. The lowest 10 percent earned less than $8.03, and the highest 10 percent earned more than $19.18 an hour. Median hourly earnings in 2000 in automotive repair shops, the industry employing the largest numbers of automotive glass installers and repairers, were $12.51.[45]

The majority of body repairers employed by automotive dealers and repair shops are paid on an incentive basis. Under this method, body repairers are paid a predetermined amount for various tasks, and earnings depend on the amount of work assigned to the repairer and how fast it is completed. Employers frequently guarantee workers a minimum weekly salary. Body repairers who work for trucking companies, bus lines, and other organizations that maintain their own vehicles usually receive an hourly wage. [46]

Helpers and trainees usually earn from 30 to 60 percent of the earnings of skilled workers. Helpers and trainees usually receive an hourly rate, until they are skilled enough to be paid on an incentive basis.[47]

Some automotive body repairers are members of unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the

[44] http://www.bls.gov/oco/ocos181.htm
[45] http://www.bls.gov/oco/ocos180.htm
[46] Ibid
[47] Ibid

International Brotherhood of Teamsters. Most body repairers who are union members work for large automobile dealers, trucking companies, and bus lines.[48]

[48] [48] http://www.bls.gov/oco/ocos180.htm

APPENDIX

Collision Auto Body Repair Terminology

General Terms

ABRASIVE: Substance used to wear away a surface by friction.

ABRASIVE COATING: In closed coat paper, the adhesive is completely coated with abrasive, and in open coat paper, the adhesive is partially exposed, for the abrasive is not put on the paper close together.

ACCUMULATOR: Assembly that acts as a refrigerator storage container to receive liquid, vapor, and refrigerant oil from the evaporator.

ACETYLENE: Gas used for oxyacetylene welding.

ACID CORE: Solder in a tubular wire form in which the interior contains a flux.

ACRYLIC RESINS: Synthetic resin that has excellent color retention and clarity and that is used in both lacquer and enamel.

ACTIVATOR: Additive used to speed up the curing of paint resins.

ALTERNATOR: Device on a vehicle that when turned produces electricity.

ALUMINUM OXIDE: Sharp and hard abrasive that is made by fusing mineral bauxite at high temperatures.

AMBIENT TEMPERATURE: Temperature of the air surrounding an object.

ANTICORROSIVE: Materials applied to metal to give corrosion resistance.

ANTICORROSIVE AND INHIBITOR: Protective coatings applied on metal surfaces to retard or prevent corrosion and said to be anticorrosive or corrosion inhibitive.

ARMREST: Part of the door trim on which the arm may be rested.

ASSEMBLY: A number of auto body parts that are either bolted or welded together forming a single unit.

ATOMIZATION: Breaking up a fluid with an air stream, such as with a spray gun.

ATOMIZE: Air at the gun nozzle breaks up the paint and solvents into fine particles.

AUTOMATIC LOAD-LEVELING SYSTEM: System used on some vehicles to raise the vehicle to counteract the weight of the passengers.

AUTOMATIC PRESSURE SWITCH: Used on a compressor to release the air pressure in the cylinders.

BACK-SANDING: Technique of sanding a surface to taper the paint film away from the metal repaired area.

BACKFIRE: Malfunctioning of a torch, causing the flame to go out with a loud snap or pop.

BACKHAND WELDING: When the torch, in the case of a right-hand operator, is moved in the opposite way from left to right instead of right to left as in the usual practice.

BAFFLE: Part used in a spray gun to divert the air stream. Also a part of the radiator support on some cars.

BAKING: Application of heat to cure and dry a coating. In automotive refinishing, baking is used to speed up the drying of air-drying lacquers and enamel and is sometimes called force drying. The metal temperature in refinish baking usually does not exceed 180 F (82.2 C).

BANDING: Single coat of paint applied to frame in an area to be sprayed.

BASECOAT/CLEARCOAT: Type of paint coating.

BATTERY: Part used in vehicles to store electrical energy used to start the vehicle.

BETTERMENT FACTOR: Term used in the insurance industry when a part such as a tire is replaced, and the insurance company pays for the unworn part and the customer pays for the amount that was worn.

BINDER: Resin used to hold the pigment in a paint film.

BLEEDING: Action whereby the color of a stain or other material works up into succeeding coats and imparts a certain amount of color. This is characteristic of certain red pigments used in lacquers and enamels. A nonbleeding color is one that is not soluble in materials used over it and, consequently, does not work up into succeeding coats. Bad body filler will also cause bleeding.

BLENDING: Mixing together of two or more materials or the gradual shading of paint from one panel to the next to assure color consistency.

BLISTERING: Bubbling up of the paint film in the form of small blisters.

BLUSHING: White or grayish cast that sometimes forms on a lacquer film as it dries, particularly under conditions of hot, humid weather.

BODY FILES: Variety of files used in accurately locating surface irregularities (high and low spots) on damaged areas after they have been "bumped" out. Also used in trimming down solder and plastic filled areas.

BODY SOLDER: Alloy of tin and lead. Its properties may vary but the most common mixture consists of 30% tin and 70% lead or 30/70 solder as it is usually called.

BODY STRAPS: Specially designed straps made out of strong vulcanized belting material equipped with wide hooks that snugly fit around the flanges of various body panels. They are used in repositioning and pulling different assemblies and parts closer together.

BODYING: Thickening in the package, usually due to evaporation of solvents or volatile material because of excessive heat or exposure to air during storage.

BOILING POINT: Temperature at which the vapor pressure of a liquid exceeds the atmospheric pressure and the liquid begins to boil.

BONDING STRIPS: Narrow strips of laminated fiberglass bonded to the inner surface of the replacement panel and the adjoining body panels. When properly installed, the strips greatly strengthen the joint and make alignment of the replacement panel with the rest of the body panels much easier.

BRAKE SYSTEM: Hydraulic system of levers, cylinders, surfaces and fluid used to stop or slow down a vehicle.

BRAZE WELDING: When bronze welding rod in a molten stage is deposited on metals that are heated to a cherry red; similar and dissimilar metals are bonded together.

BRIDGING: Ability of an enamel or lacquer to cover a crack, void, or other small gap.

BUBBLES, BLISTERS AND BULGES: Damage that occurs on vinyl roof covers.

BUFFING: Technique used to polish an area to remove sanding marks of surface imperfections.

BUFFING COMPOUND: Soft paste containing fine abrasive in a neutral medium, used to eliminate fine scratches and polish the topcoat.

BULL'S-EYE: Edge of a repaired area of a paint film that shows up after a surface has been repainted.

BURNING: Condition resulting from rubbing a topcoat too hard. The heat generated by the friction of the rubbing pad may soften the surface and cause it to stick to the pad, thus permanently marring the finish.

BUTT WELD: Two pieces of similar metal are aligned closely edge to edge. The edges are tack welded first and then by running a good bead are solidly fused together.

CAKING: Gathering of sanding dust into solid cakes sticking to sandpaper. Compare Gumming.

CALCIUM CARBIDE: Chemical used to make acetylene gas.

CALIPER: Part of the disk brake mechanism that holds the brake pads.

CAMBER: Inward or outward tilt of the wheel at the top. It is the tire-wearing angle measured in degrees and is the amount the centerline of the wheel is tilted from true vertical.

CARBON DIOXIDE: Gas that can be used for MIG welding.

CARBURIZING FLAME: Used mostly for heating parts and for soldering. It burns more acetylene than oxygen through the torch. Its inner core is whitish in color and has a feather. Sometimes also called a reducing flame.

CASE HARDENING: Surface coating that will dry hard on top and remain more or less soft underneath. Compare Lifting.

CAST: Tendency of one color to look like another.

CASTER: Backward or forward tilt of the king pin or spindle support arm at the top. It is the directional control angle measured in degrees and is the amount the centerline of the spindle support arm is tilted from the true vertical.

CATALYST: Substance that causes or speeds up a chemical reaction when it is mixed with another substance and that does not change by itself.

CAULKING COMPOUND: Semi or slow-drying plastic material used to fill crevices or seal joints.

CENTER PLANE OR CENTERLINE: Line in the center of vehicle from which all side measurements are taken.

CENTRIFUGAL PRESSURE SWITCH: Switch used on a compressor to release the pressure in the cylinder.

CHALKING: Formation of soft white powder on the surface of a finish, which may be removed by friction of the finger or similar methods.

CHECKING: Small, irregular cracks going partly or completely through a paint film. Like "alligatoring", only very fine cracks. Compare Cracking and Crazing.

CHEMICAL STAINING: Spotty staining or discoloration of the paint topcoat caused by atmospheric conditions (acid rain, tree sap, etc.).

CHIPPING: Condition of the finish flaking off or chipping away from the surface underneath.

CHIPPING HAMMER: Special hammer used in removing slag deposits from a weld so that it can be inspected for quality.

CHROMA: Quality of a color that combines hue and saturation.

CLEAN: Opposite of dirty. Describes a color with a bright appearance rather than one that has a drab appearance. The exclusion of black makes colors cleaner.

CLEAR: A coating of paint that has no color.

CLEAR COAT: A clear, shiny coat of paint (e.g. urethane or acrylic enamel) applied over the base or color coat of paint on a vehicle.

CLIP: A group of related vehicle parts purchased from a salvage yard as an assembly (usually the complete front or complete rear section of a vehicle). Also known as Salvage Clip.

CLOSED-COAT DISK: Disk on which the abrasive grains are very densely spaced. Used in disk sanding and polishing repaired sheet metal.

COAT DOUBLE: Two single coats applied one after the other with little or no flash-off time for the first coat.

COAT SINGLE: Coat produced by two passes of a spray gun when one pass overlaps the other 50 percent or by half steps.

COLD CRACKING: Cracking of a paint job resulting from a sudden drop of temperature.

COLD RAZOR KNIFE: Knife used to cut the adhesive of windshields and backlites.

COLLAPSED HINGE BUCKLE: Formed whenever a simple hinge buckle extends and crosses over a stamped-in reinforcing flange, head, or ridge on a flat or reverse-curved (concave) surface of an auto body panel.

COLLAPSED ROLLED BUCKLE: Formed whenever a hinge buckle extends or crosses over into the crowned surface of a panel causing the metal to collapse and shrink severely and a general shortening up in the overall length of the panel to occur.

COLOR COAT: The single stage or BASECOAT that provides the final color of a coating system.

COLOR RETENTION: When a color is exposed to the elements and does not change is said to have good color retention.

COMPARTMENT: Separate enclosure or section, such as the engine, passenger and luggage compartment, in an auto body.

COMPATIBILITY: Ability of two or more materials to blend into a homogeneous mixture and upon drying, a homogeneous film without a subsequent negative chemical reaction.

COMPOUNDING: Use of an abrasive either by hand or machine to smooth out and bring up the gloss of an applied topcoat.

COMPREHENSIVE COVERAGE: Term used to describe a type of insurance protection designed to cover loss from accidental damage caused by other than collision.

COMPRESSOR: Machine used to compress air from atmospheric pressure to a high pressure.

CONDUCTOR: Material such as an electric wire through which electricity flows.

CONE MANDREL: Special attachment used with an abrasive cone in sanding hard-to-get-at concave surfaces around headlights, fender flanges and trim moldings.

CONNECTORS (MALE AND FEMALE): Attachments used in coupling two or more extension tubes together and to the various rams.

CONSTANT VELOCITY JOINT: Type of joint that provides constant, even transfer of power.

CONTACT TIP: Part of the MIG gun through which the welding rod moves.

CONTAMINANTS: Any polish, wax, tree sap, tar, oil, and the like that would damage the paint film or spoil the adhesion of a new paint film.

CONTRACTION: Area that reduces in size.

CONTROL POINTS: Areas in the vehicle body that are used to measure for dimensions or to correct damage.

CONTROLLED HEAT: Heat from an acetylene torch that is usually controlled by the operator.

CONVENTIONAL BODY CONSTRUCTION: Type of construction where the body and frame are two entirely separate units held together at various points by means of body bolts.

CONVERSION COATING: Part of a metal treatment system that modifies a metal substrate to increase adhesion and corrosion protection.

COOLING SYSTEM: System of parts and fluid used to cool the engine.

CORRECTIVE PULL: Application of force to remove collision damage.

CORROSION: Chemical reaction of oxygen and moisture, or corrosive materials on a metal surface. Usually referred to as rusting or oxidation.

CORROSION RESISTANT: Material that resists the effects of corrosion.

COUPLER: Permits the removal of the coupler tube without the loss of hydraulic fluid from the ram making it possible to use the same pump with a variety of rams and spreaders.

COVERAGE: Quality some colors have to cover other colors and the area a certain quantity of paint will cover.

COWL: Front part of the vehicle passenger compartment.

DARKEN: By eliminating white, solid colors become darker; eliminating metallic flake makes metallic colors darker.

DATA SHEETS: Sheets that contain the required measurements for straightening the frame or body to specifications.

DATUM LINE: Imaginary line that appears on frame blueprints or charts to help determine correct frame height.

DEDICATED BENCH: Type of frame repair equipment using jigs to align a unibody vehicle.

DEFLECTOR UNIT: Unit used on a rail to deflect the laser beam.

DIAMOND: Frame misalignment resulting from a heavy impact on the corner of either side rail of the frame that is sufficient to push the side rail back. As a result the cross members are pushed out of a right angle with the side rail.

DILUTANTS: Volatile liquids that are not solvent for nitrocellulose. They are used in nitrocellulose lacquer to lower viscosity and give certain other properties.

DINGING: Reshaping and leveling out of damaged metal by means of on and off-the-dolly hammering after the metal has been unlocked and roughed out.

DINGING HAMMER: Specially built hammer used for the removal of the smaller dents on body panels.

DIRECT DAMAGE: Damage that occurs to the area that is in direct contact with the damaging force of impact.

DIRECT PULLING: Pulling on the damage using a direct pull.

DIRT NIBS: Small specks of foreign material in a dried film of finishing material. They should be removed by scuff sanding.

DIRTY: Opposite of "clean". Describes a color that has a drab appearance rather than one with a bright appearance. The addition of black makes colors "dirty".

DISINTEGRATION: Dried film of a finishing material completely breaks down.

DISK SANDER: Power sanding tool used for grinding, sanding and polishing repaired metal areas. It is manufactured in either the 7-in. standard or the 7 and 9 in. heavy-duty model and is available with a round, flexible, molded rubber, backing pad 5.7 and 9-inch in diameter.

DISK TRIMMER: Special tool used to cut down a worn-out sanding disk to a somewhat smaller size, giving it a fresh cutting edge.

DOG-TRACKING: Condition in which a vehicle's wheels do not follow in direct line but at an angle.

DOLLY: Tool that is made in different shapes, usually held in one hand on inner side of a dented panel while the outer side is struck with another dolly or dinging hammer.

DOOR PANEL FLANGE: The 90 degree projecting edge all around the edge of a door replacement panel, by means of which the replacement panel is attached to the doorframe or inner construction.

DOUBLE HEAD-COAT: Usually called one coat but meaning an application of material sprayed horizontally and immediately followed by an application sprayed vertically. Also called a cross-coat.

DRIERS: Salts of certain metals or metallo-organic compounds, which when added to an enamel, paint, varnish, or oil hasten the drying or hardening of the film through proper ventilation.

DRY SPRAY: This term is used if in applying a finish by spray the atomized paint is not absorbed in the film, leaving a rough, dry finish.

DUCTILITY: Refers to the property whereby a material can be worked, drawn or bent without breaking.

DURABILITY: Life of a paint film.

DUST FREE: Condition when a film has dried so that it will no longer allow dust to penetrate and stick to the finish.

ECONOMY PART: Any new vehicle part of accessory that is purchased from a source other than the OEM parts distribution network.

ECT: Engine coolant temperature sensor or its signal circuit.

EGO: Exhaust gas oxygen sensor or its signal circuit.

EGR: Exhaust gas recirculation system that is designed to allow the flow of inert exhaust gases into the combustion chamber to cool the combustion and therefore reduce the amount if nitrous oxides in the exhaust.

ELASTIC LIMIT: Amount that a piece or a metal panel will bend without causing distortion or separation in the structure of the material.

ELASTIC METAL: All V channels, valleys and buckles extending outward from the area of direct damage but not including the extreme outer high ridges that bound them are called elastic metal.

ELECTRIC HOT KNIFE: Type of electrically heated blade used to cut some adhesives.

ELECTRONIC VEHICLE INFORMATION CENTER: Electronic receiving unit that receives information from all the sensors in the vehicle.

EMBLEM: Decorative piece of plastic or metal attached to a vehicle.

ENAMEL: Pigmented alkyd varnish usually characterized by a glossy surface. Dulux is such a pigmented synthetic resin solution.

ENERGY ABSORBER: Device used on bumpers to absorb energy from a collision.

EPOXY RESINS: Resins obtained by the condensing reaction that occurs between phenols and epichlorohydrin.

ESTIMATE: The written determination made by an appraiser or estimator, upon inspection of a damaged vehicle, regarding the cost required to restore the vehicle to the condition it was in prior to the loss.

ESTIMATE DOCUMENT: Form on which the cost of accomplishing repairs is written; often used as the basis for repairs.

ESTIMATED TIME: Amount of time given to repair or remove and replace an item or part.

ESTIMATING MANUAL: Manual that has the information on the replacement of parts and their standardized lab or times on a vehicle.

ESTIMATOR: An appraiser or insurance company representative who inspects a damaged vehicle and determines the cost required to restore the vehicle to the condition prior to the Loss.

EVAPORATOR: Part on a vehicle with an air-conditioning system that causes the refrigerant liquid under pressure to change to gas.

EXCESS ACETYLENE FLAME: See Carburizing flame.

EXHAUST FAN: Fan that moves the air in a spray booth and pushes it out to the atmosphere.

EXHAUST SYSTEM: System of many parts used on motor vehicles to move the gases from the engine to the rear of the vehicle into the atmosphere.

EXPANSION: Condition in which an object becomes bigger.

FACE: Appearance of a color viewed straight on. This term is most often used in comparison to the "pitch" of a color, which is the appearance of the color when viewed at any angle other than 90 degrees. The face color is often different in lightness or darkness.

FACE BAR: Large chrome-plated extrusions that provide protection for both front and rear of an automobile and which are generally held in position by means of brackets bolted to the side rails of the frame.

FADE: Denotes the change in the color of a surface coating where and when such a coating has been subjected to sunlight. It is a dying away or bleaching action.

FALSE STRETCH: Bulge formed in the flatter areas of an outer panel whenever the collapsed rolled buckle in the crowned surface of that panel extends into the flatter, more central portions of the panel (in the area of indirect damage). Even after the damage has been roughed-out and straightened as accurately as possible, false stretch cannot be completely eliminated.

FAN: Spray pattern of a spray gun.

FANNING: Use of pressurized air through a spray gun to speed up the drying time of a paint finish; it is not recommended.

FEATHEREDGE SPLITTING: Cracks or stretch marks along the featheredge which occur while drying or shortly after the topcoat has been applied over a primer-surfacer.

FEATHEREDGING: Sanding down a surface to a very fine edge; that is when one coat of material is made gradually thinner around the edge until it finally disappears.

FEATHERING: Action of moving a spray gun trigger lightly at each end of a stroke.

FEELING THE METAL: Used in detecting surface irregularities. The repair technician slides the palm of a hand back and forth over the work and is able to detect or feel any hollows or high spots that may be present.

FENCE-OFF: Method of shrinking sequence to prevent a highly stretched metal area from moving.

FENDER FLANGE: Outer rim or bend along the lower edge of a fender that gives shape and strength to the side of the fender.

FERROUS METAL: Any metal composed of or containing iron.

FIBERGLASS Very fine staple fibers of glass that are spun together; it is used as insulation and for repairs on automobile and truck bodies.

FILING: Pushing or drawing a file back and forth over the surface of the work in order to detect high and low spots (surface irregularities) or to wear down a surface to an exact size and shape.

FILM: A layer of applied coating material.

FILM THICKNESS: See Mil

FLOW: Ability of paint droplets to melt or merge together to form a smooth paint film.

FISH PLATE: Repairing of a cracked frame rail by first of all welding the cracks and then reinforcing the rail by welding another plate that covers and extends well beyond the repaired area.

FISH-EYE ELIMINATOR: Additive put in paint to prevent the occurrence of fish-eyes in a freshly painted surface.

FISHMOUTH: Part of a window regulator where the drive tape is inserted.

FLAKE: Particles added to a color to achieve a metallic or iridescent finish.

FLAKING: Condition when the finish does not knit properly to the undercoating, causing the finish to chip off the work by breaking into small pieces.

FLAME CUTTING: Use of an oxyacetylene flame to cut metal.

FLANGE: Projecting edge, rim, or bend on the outer edge of a panel that stiffens it.

FLASH-BACK: Malfunctioning of the torch when the flame goes inside the torch and it starts to hiss and squeal.

FLAT: Finish that has no luster or gloss.

FLAT RATE: Piecework method of paying for repair operations.

FLEX HEADS: Sometimes called rubber bases; conform to any contour, and are most often used as a terminal point for pushing against concave surfaces.

FLINT PAPER: Inexpensive but short-working-life abrasive paper, not used extensively in body shops.

FLOOD: Floating of a pigment to the surface of a coating, giving a changed color to the surface and lack of uniformity in color appearance through the film.

FLOP: Appearance of a color when viewed from any angle other than straight on. The flop of a color is also referred to as its pitch. The pitch is often different from the face when working with iridescent colors.

FLUID CONTAINERS: Containers designed to store different types of fluids.

FLUID NEEDLE: Part in a spray gun that opens and closes fluid passages.

FLUID NEEDLE ADJUSTMENT: Adjusting the amount of fluid that will go through the opening of the fluid tip.

FLUID TIP: Part of a spray gun that meters and directs the fluid stream.

FOG COAT: Thin, highly atomized coat applied in such a way as to obtain a fast flash-off; and thereby achieve a minimum penetration of the thinner into the old finish.

FORCE DRY: See Baking

FORGING: Repair operation used in restoring welded butt joints to as near as possible the same thickness and molecular structure as that possessed by the surrounding sheet metal.

FRAME ALIGNMENT: Procedure by which the frame of a car, truck or bus that has been damaged in an accident, or from wear, is restored to the manufacturer's specifications.

FRAME GAUGES: Used in determining the type of misalignment that has occurred and also the extent of the damage.

FRAME HORNS: Extending ends of the side rails of a frame to which the bumper brackets are fastened.

FRAME RACK: Equipment used to repair damaged frame and unibody members.

FRONT-END SHEET METAL: All parts from the cowl assembly forward are considered front end sheet metal. This includes the grille, the hood, and right and

left fender and the front bumper assembly.

FUSIBLE LINK: Wire designed to open a circuit by melting, when too much current flows through it.

FUSION WELD: Operation in which two pieces of the same kind of metal are made into one is called fusion welding.

GARNET PAPER: Hard, sharp, red abrasive; more expensive than flint paper but will last much longer.

GARNISH MOLDINGS: Moldings that fit around the inside of door, windshield and rear window openings, generally held in position by countersunk metal screws.

GEL: General consistency of a jelly; the material being soft but not free flowing. The term "gel" is generally applied to a vehicle as contrasted to false body caused by pigmentation.

GLASS RUN CHANNEL: Part used in the doors where glass moves up and down that prevents the glass from being damaged.

GLAZING: Application of a filler by means of a putty knife, the material being filled into the depression but scraped off the higher areas.

GLOSS: Shine, sheen, or luster of a dry film.

GRILLE: Open-work structure made out of plastic, die cast, aluminum or stamped out of sheet which covers the air intake opening in front of the radiator, but allows the air to pass freely through it.

GRITTY: A product is said to be gritty when it contains large particles, either from insufficient grinding, which would mean seed, or by the presence of large, hard particles of foreign materials.

GROMMET: Rubber or plastic insulator used to protect electrical wires or other lines from being damaged by the sheet metal edge.

GROUND CABLE: The ground cable clamped to the work allows the electric current produced by the welding machine to flow through the electrode cable and the electrode to the work when the arc is formed. The current completes its circuit by flowing through the ground cable back to the welding machine.

GROUND (ELECTRICITY): Part of the circuit that allows the current to return to the negative (-) terminal of the battery.

GUIDE COAT: Coat of a different color from the other coat is used to serve as a guide coat in rubbing or sanding to determine when a smooth surface has been reached.

GUMMING: Condition where the sandpaper becomes clogged by the abraded surface coating. Compare Caking.

GUN BODY: Part of the spray gun to which all required parts are bolted or attached.

HAIRLINING: Very fine lines or checks on the dried surface coating of a finished material.

HARDENER: Special additive designed to promote a faster cure of the enamel paint film.

HARDNESS: Quality of the paint film that gives it resistance to surface damage.

HATCHBACK: Part used on a vehicle to close the rear section.

HEADER BAR: Framework or inner construction that joins the upper sections of the windshield, pillars, forms the upper portion of the windshield opening and reinforces the turret top panel.

HEADLIGHT: Light used to light the road ahead of a vehicle.

HEADLINING: Different types of materials used to cover the inner surface of the roof in a car.

HIDE GLUE: Made from animal hides and used in making abrasives that can only be used in "dry" sanding and grinding work.

HIDING: The hiding power of a finishing material is a measure of its opacity or its ability to cover solidly over another color as to obscure or prevent the original color from showing through.

HIGH-CROWN METAL: Outward curving portion of a body panel.

HINGE EFFECT: Effect of expansion and contraction that causes the metal to move as if it was on a hinge.

HINGE PILLAR: Framework or inner construction to which the door hinges fasten.

HOLD OUT: Ability of a surface to keep the topcoat from sinking in.

HOOD PANEL: Large metal panel that generally fills in the space between the two fenders and covers over the engine compartment.

HSLA (HIGH STRENGTH LOW ALLOY): Type of steel with low alloy used in the fabricating of certain parts for motor vehicles.

HSS (HIGH STRENGTH STEEL): Type of steel used that is very strong, but is thin and light.

HUE: Basic color that is blue, red, yellow, green, violet, or orange. Hue is used to determine where the color would fall generally on the color wheel.

HUMIDITY: Water vapor present in the air in varying amounts.

HVLP (HIGH VOLUME, LOW PRESSURE): Type of spraying system that uses a high volume and low pressure of atomizing air to apply material to a surface. Reduces over spray of product into the atmosphere.

HYDRAULIC JACKING UNIT: System of using a hydraulic pump, hose, ram, and required attachments to provide the transfer of hydraulic power.

HYDRAULIC OIL: Special type of oil used in hydraulic systems that does not deteriorate or attack the rubber seals in the jack or its hose.

INDIRECT DAMAGE: Any damage that occurs as a result of direct damage.

INDUCTION BAKING: Heat used for baking finishes, induced by electrostatic or electromagnetic means.

INDUSTRIAL FALLOUT: Chemical compounds present in the air which are deposited on the horizontal surfaces of vehicles and which under certain circumstances will affect the finish, particularly metallics.

INNER CONSTRUCTION: Framework and inner panels that hold and reinforce the outer body panels.

INNER SKIRT: Part used in the front section of a vehicle between the upper and lower rails.

INSERT: Fabricated part used to reinforce a section when it is being sectioned.

INTAKE FILTERS: Filters used where the air enters the spray booth to remove the dust

in the air stream.

IRIDESCENTS: All colors that contain aluminum, mica, or other particles that impart a metallic appearance to the color. Used interchangeably with the word metallic. Iridescent colors must be carefully matched on the face and the pitch in order to achieve a desirable appearance.

ISOCYANATE: Additive that is part of many paint and plastic hardeners; injurious to the lungs.

JERKY OR FLUTTERING SPRAY: Intermittent amount of fluid delivered by a spray gun; occurs in the suction feed type.

JIG: Mechanical device for holding work in its exact position while it is being welded.

JIGSAW: Narrow bladed saw usually driven by an electric motor. Used to cut body panels.

KNIT: Adhere or bond together.

LACQUER: Refinishing material that dries by the evaporation of the thinner.

LAP: Point where one coat extends over another.

LAP WELD: Type of weld made by overlapping two pieces of metal and joining them by running a bead along only one of the edges.

LATERAL RUNOUT: Amount a wheel moves from side to side when rotated, due to being bent.

LEAD (TIRE): A pulling condition in a radial tire causing the steering to want to turn to that side when rotated.

LET DOWN PANEL: Panel made by a paint technician with different methods of application and amounts of material, resulting in different shades of the same color.

LEVELING OUT: Flowing or settling to a smooth, uniform surface.

LIFTING: Disruption of a paint film by the application of a succeeding coat, caused by the solvents of the succeeding coat penetrating and partially dissolving or swelling the preceding dried film.

LIGHTEN: Addition of white to make solid colors lighter; the addition of metallic flakes makes metallic colors lighter.

LISTING BOWS: Slightly tempered, bowed steel rods that are inserted into Headlining to keep them in proper position inside the passenger compartment.

LIVERING: Coagulation of paint into a viscous liver-like mass.

LOAD VOLTAGE TEST: Test given to a battery to find its condition.

LOCKSTRIP: Part of a weather strip that applies pressure to keep the windshield or glass in position.

LOW-CROWN METAL: Portion of a body panel with just a very small amount of outward curve.

LOWER INNER AND OUTER RAILS: Parts used in the front structure of the vehicle to give the assembly the required strength to hold the other parts.

LUSTER: Gloss of sheen of a finish.

MACPHERSON STRUT: Type of suspension using a lower control arm and an upright shock absorber assembly, spring, and spindle.

MAKEUP AIR: System that brings and heats air from outside to a desired airflow and temperature.

MAP: Manifold Absolute Pressure sensor or its signal circuit.

MASH: Type of frame damage in which a portion of the side rail is bent down causing buckles to be formed on the underside.

MASKING: Application of paper or other material and masking tape to cover an object that must be protected from overspray.

MASKING PAPER: Paper designed to prevent paint bleeding through and resist water soaking to a certain degree.

MASKING TAPE: Special paper that is coated with adhesive used to protect body parts or to attach masking paper to the car.

MASTER CYLINDER: Part of the brake system that stores the brake fluid and when the pedal is depressed, forces the fluid to the cylinders in the wheel assembly.

MATCHING: In painting, to make colors look the same.

METAL CONDITIONER: Acetic acid preparation that is used to prepare metal, remove rust, and etch the metal slightly to provide a good adherence between the metal and the paint.

METAL FINISHING: Operation in which hidden surface irregularities are detected and removed by means of filing and picking the straightened metal unit all low spots have been eliminated and a perfectly smooth and level surface is obtained.

METAL STAMPING: Process of manufacturing auto body parts in which straight sheets of metal are placed in between dies operated by huge presses and die formed or stamped into the finished part.

METALLIC: General term applied to finishes containing aluminum particles.

MIG (METAL INERT GAS WELDING): Continuous welding system that uses the electrical arc and gas to protect the weld.

MIL: Measure of film thickness equal to 0.001 inches.

MILKINESS: Cloudy, whitish, not clear.

MIST COAT: Light spray coat of volatile solvent by itself or with very little color in it.

MODIFIED UNITIZED BODY CONSTRUCTION: Form of body construction consisting of half frame and half unitized body construction.

MOLDINGS: Metal or plastic parts used to beautify a vehicle or to protect the panels from damage.

MOTTLING: Striped or spotty appearance that occurs in metallics when the flakes flow together because of poor spraying techniques.

MURIATIC ACID: Sometimes called hydrochloric acid. A strong acid used for cleaning metal and when "cut" is used for soldering.

NAMEPLATES: Ornaments with the vehicle's name that is used to identify the make of the vehicle.

NATURAL MINERAL ABRASIVE: Abrasive made from materials found in nature.

NEUTRAL FLAME: Oxyacetylene flame burning equal parts of acetylene and oxygen.

NITROCELLULOSE: "Gun cotton" or "proxylin"; a compound of nitrogen and cellulose prepared from nitric acid and cotton or wood fiber.

NONELASTIC METAL AREAS: Areas in auto body panels that have been permanently deformed and that will not spring back to their original shape after stresses and strains have been released.

NONFERROUS METALS: Metals that contain no iron.

NORMALIZING: Removing of stresses and strains in metal. This is done by hammering, heating up the metal, or by a combination of both.

O. E. M.: Original equipment manufacturer. Usually refers to replacement parts for a vehicle that were made by the same manufacturer as the car, rather than replacement parts made by a different manufacturer.

OFFSET: Part that has an abrupt change in dimension or profile of an object.

OHMMETER: Electronic gauge used to measure resistance of an electrical circuit or part.

OPAQUE: Impervious to light; not transparent.

OPEN CIRCUIT: Break or open condition in an electric circuit that interrupts current flow.

OPEN COAT: Noncontiguous spacing of the grit on sandpaper or grinding disk.

OPEN TIME: Term used in repairs when the time cannot be estimated and the employee uses a clock to calculate the amount of time required to accomplish the repair.

ORANGE PEEL: Uneven, pebbly surface somewhat resembling the skin of an orange; appears in a paint film that has been applied by spray.

ORBITAL SANDER: Type of sander that uses an orbit motion to accomplish the sanding of different materials.

ORIGINAL FINISH: Paint the car manufacturer applies at the factory.

OVERALL REPAINTING: Refinish repair job in which the whole vehicle is completely repainted.

OVERLAP: Amount of the spray pattern that covers the previous spray swath.

OVERSPRAY: See Dry Spray.

OXIDATION: The act or process of combining with oxygen.

OXIDIZING FLAME: Oxyacetylene flame that uses more oxygen than acetylene in its flame.
OXYACETYLENE WELDING: Process where oxygen and acetylene are burned using a torch to produce a flame hot enough to melt metal.

PAINT ARRESTOR: Filter used to clean the air of paint fumes before it is exhausted.

PAINT FILM: Coating of paint that is applied to a material.

PAINT REMOVER: Fast acting blend of solvent used to remove enamels, lacquers and varnish.

PAINT STRAINER: Filter used to clean paint as it is poured into the gun cup.

PARALLEL CIRUIT: Circuit that provides more than one path for the current to flow.

PARTIAL REPAIR PROCEDURE: Procedure used in painting when only a part of the panel is painted.

PCV: System that controls the flow of crankcase vapors into the engine intake manifold, where they are burned in combustion rather than being discharged into the atmosphere.

PEARL LUSTER: Paint system that uses mica chips to give a pearl effect in the paint film.

PEBBLING: Excessively large orange peel.

PEELING: Loss of bond or adhesion of paint film from the surface to which it is applied.

PENETRATION: Term often used in welding to indicate how deep the weld has penetrated the metal.

PERCHLORETHYLENE: Solvent used in determining whether the finish is acyrlic lacquer, nitrocellulose lacquer, or enamel.

PHENOLIC RESIN: Resin that is based on the reaction between formaldehyde and phenol.

PICKING: Raising up low spots with the sharp pointed end of a pick hammer.

PICKS: Special tools used in the metal finishing operation for raising low spots located in the more central areas of inaccessible body panels.
PIERCING: Small holes in door panels into which special nylon clips used to hold the weather strip are forced or pushed in.

PIGMENT: Any fine, insoluble, dry, solid particles used to impart color.

PILING: Heaping, or applying too heavily.

PIN SHRINK: Very small type of shrink used for delicate shrinking purposes.

PINCH WELD FLANGE: Flange that is formed when the framework and outer panels are clamped and spot welded together as found on windshield and rear window openings.

PINCH-WELD PRIMER: Primer used on a pinch weld before applying the adhesive for better adhesion.

PINHOLING AND PITTING: Minute hollows or holes no larger than the head of a pin in a film produced by the bursting of trapped air, moisture, or thinner during drying.

PITCH: Appearance of a color when viewed from any angle other than straight on. Most often used in comparison to the face of a color, which is the appearance of the color when viewed at a 90 degree angle or straight on. Pitch is also referred to as the "flop" of a color. The pitch is often different from the face when working with iridescent colors.

PLASMA TORCH: Arc torch used to cut metal.

PLASTIC FILLER: Compound of resin and fiberglass used to fill dents on car bodies.

PLUNGER: Male threaded part, that acts like a piston moving in and out of the ram body and onto which different lengths of extension tubing and attachments can be connected.

POLYCHROMATIC: Term used by some paint manufacturers for color coats that contain aluminum powder in flake form.

POLYESTER FILLER: Special kind of putty like filler used in filling slight imperfections and low spots on panels.

POLYESTER RESIN: Bonding liquid that forms a good bond with fiberglass surfaces only.

POLYMERIZATION: Drying of enamel by formation of a polymer from monomers.

POLYOLEFIN: A plastic material used to make flexible bumper covers.

POLYURETHANE: Chemical structure used in the production of resins for enamel

paint finishes; also used for some plastic bumper covers.

POOR ADHESION: Material that has poor bond to the underlying surface.

POP RIVET: Rivet that uses a mandrel that is pulled out by a special tool to collapse and set a rivet.

POWDERED FIBERGLASS: Processed fiberglass that has been crushed into a powder. It not only gives bulk but also strength to the filler.

POWER STEERING PUMP: Pump driven by the engine which uses fluid to help turn the front wheels.

POWER TRAIN: Motor, transmission, and drive assembly, especially on front-wheel drive vehicles.

PRESSURE FEED GUN: Spray gun equipped with a separate paint container that is pressurized and connected to the spray gun by means of two hoses.

PRIMARY COLORS: Main colors from which other colors are formulated.

PRIMER: Undercoat applied to improve the adhesion of the color coat.

PRIMER COAT: Used in a paint system to improve adhesion; requires sanding.

PRIMER-SEALER: Undercoat that improves the adhesion of the topcoat and seals the old painted surfaces.

PRIMER-SURFACER: High-solid type of primer used to fill small imperfections in a substrate.

PUBLIC LIABILITY: Type of insurance that covers damage that can occur to other people.

PULL PLATES: Several types of special plates that can be bolted, soldered or braze welded onto the damaged panel. The damaged area can then be pulled out by attaching the hydraulic jack to the pull plates in a variety of pulling combinations.

PULL RODS: Rods that are equipped with hooks on one end and handles on the other. The hooked ends are inserted into small holes drilled in areas of direct damage and used in roughly aligning the areas of direct damage before they are soldered or welded.

PUNCHES: Special tools used in driving shafts and pins and in aligning holes in

panels so that they can be bolted together. Different punches are used in the metal finishing operation for raising low spots located around the outer edges of inaccessible body panels.

PUSHING: Hydraulic jack set up to push out collision damage.

PUTTY GLAZING: Heavy bodied nitrocellulose or polyester material used to fill small flaws that are in the surface and are too large to be filled by primer surfacer.

PUTTY KNIFE: Special knife used in applying glazing putty.

QUARTER PANEL: Side panel that is generally a quarter of the total length of the vehicle and extends from the rear door to the end of the car.

QUARTZ HALOGEN: Headlight system noted for the extra amount of light it gives a driver if the vehicle is so equipped at night.

QUENCHING: Cooling of a shrink spot or solder fill with a wet rag or sponge.

RADIATOR: Part of the vehicle through which the coolant flows to be cooled.

RAIN OR WATER SPOTTING: Marks on the surface due to rain or water absorption.

RECYCLED PARTS: Parts of a vehicle that have been used and are bought from a recycler.

REDUCE: Lower or make less in consistency; to cut.

REDUCER: Referred to as the volatile substance used to thin the viscosity of enamel prior to application.

REFINISH: Term used to designate that a part or a vehicle is to be repainted.

REFLOW: Heat process used to melt lacquer to produce a better flow or leveling.

REGULATOR (DOOR): Mechanism in a door used to raise and lower the glass.

RELATIVE HUMIDITY: Condition of the atmosphere with reference to its content of water vapor at a given temperature.

RELIEVING: Process of removing and correcting stresses in a panel due to collision damage.

RESPIRATOR: Filtering device worn over the mouth and nose to filter out particles and fumes and prevent them from reaching the lungs.

RETARDER: Slowly evaporating thinner used to retard drying.

RETEXTURE: To apply texture paint over a repaired area

RETRACTOR: Mechanism that pulls a safety belt back into its proper place.

ROCKER PANELS: Assemblies of box type construction located directly below the doors, that are not only spot welded to the cowl assembly in front and to the rear quarter panel assembly at the rear but also to the side of the under body section.

ROLLED BUCKLE: Buckle created by a force that extends over the crowned surface of a panel.

ROOF RAIL: Reinforcements welded to the pillars and to which the roof panel is welded.

ROSIN: Natural gum or resin; residue of the distillation of crude turpentine.

ROTOR ASSEMBLY: Part of the wheel brake assembly to which hydraulic pressure is applied to stop a vehicle.

RUBBER OR SPACER DAM: Rubber strip installed on the pinchweld fence to prevent the adhesive from oozing out.

RUBBING AND POLISHING COMPOUND: Special type of abrasive used to smooth out and polish a paint film.

RUN-SAGS: When too many or too heavy coats are applied at one time causing the film to droop under its own weight.

SAG: Type of frame damage in which one or both side rails bend and sag at the cowl causing buckles to be formed on the top of the side rails.

SAND SCRATCH SWELLING: exaggerated reproduction and distortion of the sanding marks in the underlying surface.

SAND SCRATCHES: Reproduction in the topcoat of the sanding marks in the underlying surface.

SANDBLASTER: Piece of equipment used to clean metal using sand and pressurized air.

SANDER: Power driven tool used with abrasives to sand car bodies.

SANDER POLISHER: Power tool used to speed up the rate of polishing or sanding surfaces.

SANDING BLOCK: Hard rubber or plastic flexible block used to provide consistent backing for hand sanding.

SATURATION: Refers to a color's purity and richness.

SCUFF SAND: To lightly sand a surface with an abrasive pad.

SEALER: Paint product used to prevent bleed through of the previous coat or the sinking in of the new paint, resulting in loss of gloss.

SECTIONING: Process of joining two different sections of a part or vehicle by welding to make one part,

SEEDINESS: Being gritty or sandy or full of small grains.

SELF-CENTERING GAUGE: Gauge used in frame repair that centers at all times as it is pulled out or pushed out.

SEPARATION: Non-uniform mixture.

SERIES CIRCUIT: Circuit through which current flows in an angle continuous path.

SERRATED SADDLE: Attachment used to protect the threads on the extension tubing and the ram plunger. Its serrated face serves as a base that doesn't slip or slide easily when pressure is applied.

SET-BACK: Term used to indicate that one of the front wheels is farther back than the other.

SETTING UP: Period during which solvent evaporation from the film flowing ceases and the film surface becomes tack free.

SHADE: Variation of a color. Assuming that a color is generally blue, it can have a red shade or a yellow shade as well as being blue. Shade is also called undertone since it describes the subtle tone of a color.

SHAPE: Form to which a metal panel was stamped.

SHIFTING LINKAGE CABLE: Cable used to shift the gears in a vehicle.

SHOCK ABSORBER: Mechanism that uses fluid, pistons, and valves to dampen the oscillation of a vehicle.

SHORT CIRCUIT: Current that flows in a continuous path that bypasses a portion of its intended circuit, usually directly to ground or into another circuit.

SHRINKAGE: Operation by means of which stretched areas on damaged auto body parts and panels are disposed of and brought back to their original shape and size.

SHROUD: Sheet-metal or plastic part used on cars to direct the flow of cooling air.

SILICON CARBIDE: Abrasive made by fusing silica and coke in an electric furnace. The abrasive is very hard, shiny black and iridescent.

SIMPLE HINGE BUCKLE: Formed when flat sheet metal is forced to bend either inward or outward by a damaging force or impact. It is similar to the bending of a hinge on a door and the change in the grain or molecular structure of the metal that occurs will vary greatly, depending on the sharpness of the bend.

SIMPLE ROLLED BUCKLE: Outer ridges formed at either end of a hinge buckle that extends or crosses over into the crowned surface of auto body panel.

SINGLE COAT: Usually referred to as a coat of paint. Once over the surface with each stroke overlapping the previous stroke 50 percent.

SINGLE-STAGE COMPRESSOR: Compressor in which atmospheric air pressure is compressed to container pressure in one operation.

SINKING IN: Term applied when one coat is partially absorbed by the previous one. SKINNING: Oxidation, hardening or drying of a paint at the surface of the liquid while in its container.

SLIDE HAMMER: Weight that slides along a bar until it hits a stop. The bar usually has attachments to pull dents out, and the impact that results when the weight hits the stop helps to pull the dent out.

SMC (SHEET MOLDED COMPOUND): Fiber plastic type of material that is molded to a certain form and used as an outer panel on a vehicle.

SMEC (SINGLE MODULE ENGINE CONTROLLER: Computer module that controls the functions of the various components of the power train.
SOLDER: Mixture of lead and tin used to fill dents and joints on body panels.

SOLDERING SALTS: Non-acid flux employed in the tinning of metal.

SOLIDS: Part of the paint that does not evaporate and stays on the surface.

SOLUTION: Homogeneous liquid or mixture of two or more chemical substances.

SOLVENCY: Ability or power of causing solution. Ability to dissolve.

SOLVENT: Any liquid in or by which a substance can be dissolved.

SOLVENT POPPING: Blisters that form on a paint film caused by trapped solvents.

SPECIFIC GRAVITY: Weight of a certain amount of liquid compared to the same amount of water at the same constant temperature.

SPEED FILE: Special file that has a straight solid base about 2 inches wide and 17 inches long onto which strips of sandpaper are fastened. This file is used in sanding down solder and plastic filled areas to their final shape and contour.

SPIRIT LEVEL: Instrument used to find if an item is level.

SPLICE CLIP: Joint used to join two or three pieces of wire.

SPOON: Tool that is designed to perform the same work as a dolly, but is thin, wide, and fairly long and can be used in areas that have very little clearance.

SPOT OR PLUG WELDING: Weld made through a hole in a panel.

SPOT REPAIR: Small refinish repair job in which a small section of a panel is refinished.

SPRAY BOOTH: Enclosure used to paint a vehicle that has air moving through it.

SPRAY GUN: Device that mixes paint and compressed air to atomize and control the spray pattern as the paint leaves the fluid needle and cap.

SPREADER ADJUSTMENT VALVE: Valve in a spray gun that adjusts the spray pattern.

SPREADER TOES: Attachments designed to anchor combinations against frame members, braces, and the heads of body bolts.

SPRING HAMMERING: Elimination of a high ridges generally formed at the outer edges of indirect damage by means of hammering them down with a surfacing spoon and bumping hammer.

SPRINGBACK: Amount that a section of a vehicle will move back once the hydraulic pressure is removed.

SQUARING: Operating of straightening a damaged section and equalizing the diagonal measurements to bring the section back to specifications.

SQUEEGEE: Rectangular piece of rubber approx. 2 inches wide and 3 inches long. It is used in applying glazing putty and filler on concave surfaces.

STARTER: Electric motor used to turn the engine to start it.

STATE: To remove the stresses accumulated when distorted by a collision and completely relieved.

STATIC BALANCE: Condition in which a wheel and tire can be rotated and the assembly will not stop at the same place after each rotation.

STATIC LOAD: Load that is exerted by the weight of the vehicle and the frame members, at rest.

STEEL MUSIC WIRE: Wire used in a piano that can be used as a cutting edge to cut adhesive.

STEERING AXLE INCLINIATION: Inward tilt of the king pin or spindle support arm at the top. It is a directional control angle measured in degrees and is the amount the spindle support center line is tilted from the true vertical.

STEERING COLUMN: Mechanism used to steer the vehicle.
STRAIGHT LINE SANDER: Sander that uses a back and forth movement to sand a surface using sandpaper on its shoe.

STRAIGHT TIME: Timing an operation by the elapsed time as punched in on a clock.

STRENGTH: Amount of pigment. High strength bases contain a lot of pigment. The additional pigment gives the bases good hiding.

STRESS: Amount of pressure that is applied to a piece of metal when it is bent and the metal cannot return to its original shape.

STRETCHED: Amount by which a metal surface has become larger or longer.

STRIKER PLATE OR BOLT: Part that is installed on the door frame in which the lock engages to lock the door.

STRIP CAULKING: Sealer sold in the shape of a strip.

STROKING: Motion used when painting with a spray gun.

STRUCTURAL ADHESIVE: Adhesive used to repair the structure of a plastic part such as a bumper cover.

SUB-ASSEMBLY: An assembly within a multi-level assembly that is available individually from the vehicle manufacturer.

SUBLET: To let work that one has contracted to do to a subordinate contractor.

SUBLET REPAIRS: Repairs to be performed for a negotiated or contract price, or by a subcontractor. All applicable materials, labor, markup, and taxes should be included when a Sublet Repair is indicated.

SUBSTRATE: Surface to be painted whether an old finish or bare metal.

SUCTION-FEED GUN: Spray gun that has the paint container connected directly to it. It is designed to create a vacuum and thus draw the paint from the container.

SUN ROOF PANEL: Panel in the roof panel of a vehicle which can be raised up slightly or slid back in the opening to let the sun rays enter the vehicle.

SUPPLEMENT: A Supplement is created if a change or addition must be made to an estimate where a final print has been produced.

SURFACE DRYING: Drying of the topcoat while the bottom coats have remained soft.
SWEATING: Separation and appearance at the film surface of the oil in lacquer.

SYMMETRICAL: Regular well balanced arrangement of parts and opposite sides of a line or plain or around a center axis.

SYNTHETIC RESIN: Any resin not produced by nature; manmade.

TACK COAT: The first enamel coat. A full coat that is to dry only until it is quite sticky.

TACK RAG: Cloth impregnated with varnish; used as a final cleanup to remove dust before applying the finishing paint.

TACK WELDS: Short welds placed at intervals along a break or the joining edges of two pieces of metal, keeping the metal in alignment while the bead is run.

TACK-FREE: That point of time in drying at which the surface of the film will not fingerprint; yet the film is not dry and hard throughout.

TEE WELD: Welding procedure that forms a T.

TEMPLATE: Pattern made from a part so that another part can be made to the exact same shape.

TENSILE STRENGTH: Amount of axial elongation pressure that can be exerted on a material before it begins to deform.

TENSION PLATES: Metal plates used to pull damaged metal back to its former shape; fastened to the metal surface by using solder or plastic filler.

TEST LIGHT: Usually, a light used to check for voltage or current in a circuit to locate open conditions; the ground cable back to the welding machine.

THERMOPLASTIC: Type of plastic that can be softened with the application of heat, can be reshaped, and can also be welded.

THERMOPLASTIC POLYURETHANE: Plastic that can be softened by applying heat, reshaped and welded.

THERMOSETTING: Type of plastic that is permanently set. It can't be softened with heat or reshaped or welded. Minor damage can often be repaired with a structural adhesive.

THERMOSTAT: Mechanism used to control heat.

THICKNESS OF FILM: Measurement of a film usually expressed in mils of the distance from top to bottom or at right angles to its surface.

THINNER: Commonly known as a lacquer solvent, which reduces the viscosity of a lacquer to spraying consistency.

TIE RODS: Rod-like component of the steering linkage composed of strong steel tubing that links a steering arm to the center link.

TINNING: Process of applying a thin coat of material to metal to improve adherence.

TINT: Mixture of two or more pigments.

TINTING COLOR: Finishing lacquer or enamel in which only one pigment or color

is normally used.
TOE-IN: Distance the front of the front wheels is closer together than the rear of the front wheels.

TOOTH: Roughened surface that affects adhesion of the coating.

TOPCOAT: Last of final color coat.

TORQUE ROD: Type of a spring used to help open and counteract the weight of the trunk lid.

TORQUE STEER: Condition in some front wheel drive vehicles wherein more torque is applied to one wheel than the other.

TOW, FIRST: Accident tow.

TOXICITY: Pertaining to poisonous effect.

TRACKING: When the rear wheels of a vehicle follow the front wheels evenly on each side.

TRAM GAUGES: Gauges used to accurately measure and diagnose body and frame collision damages for all conventional and unitized vehicles.

TRANSAXLE: Drive system used mainly on front wheel drive vehicles.

TRANSFORMER: Equipment used to regulate and clean air used to paint vehicles.

TRANSPARENT: Bases that contain a small amount of pigment. You can see through the base.

TRICOAT PAINT JOB: Paint system that uses a base color coat then a pearl luster coat, followed by a clearcoat.

TRIGGERING: Procedure used on a spray gun to move the trigger.

TRUNK LID: Panel used to close the open area between the quarter-panels.

TURNING RADIUS: Tire wearing angle measured in degrees. The amount one front wheel turns more sharply than the other wheel does on turns.

TURRET TOP: Part of the vehicle that covers the passenger compartment.

TWIST: Type of frame damage in which both side rails are bent out of alignment, so that

they do not run horizontally parallel to one another.

TWO-COMPONENT SYSTEM: Materials such as some paints, fillers, and adhesives that require the addition of an additive to accomplish a chemical reaction causing it to harden.

TWO-STAGE COMPRESSOR: Compressor that compresses air to cylinder pressure in two stages using two cylinders.

TWO-TONE: Two different colors used on a single paint job.

UHSS (ULTRAHIGH STRENGTH STEEL): Very high strength steel which is used for parts such as door guard beams.

UNDERCOAT: Material used to protect the underbody sections of a vehicle.

UNITIZED BODY CONSTRUCTION: Construction in which the frame and body are made out of a large number of sheet metal panels of varying sizes and shapes assembled and welded into a single unit.

UNLOCKING THE METAL: Unfolding and reshaping of the V channels, valleys and buckles as gently as possible, without further stretching, creasing or upsetting the metal.

UPPER RAIL: Part used on top of the shield to increase the strength of the front section.

UPSETTING: Application of heat on metal that is restricted from expanding in all directions and yet allowed to contract in all directions when it cools.

URETHANE ADHESIVE: Plastic type of adhesive.

USED CLIP: Section of a vehicle purchased from a recycler and welded or bolted to a vehicle.

VACUUM PUMP: Pump that creates a vacuum condition, such as on air conditioning systems.

VANDALIZED: Intentional damage to a vehicle.

VAPORIZATION: Process of solvent evaporation.

VEHICLE: Liquid portion of a paint.

VINYL COATED FABRIC: Fabric coated with vinyl material.

VINYL GUARD: Vinyl paint applied to the lower portion of an automobile to protect it from stone bruises.

VINYL-CLAD URETHANE FOAM: Combinations of these materials used as padding on such items as the crash pad on a dash.

VISCOSITY: Thickness of a fluid; resistance to flow.

VOLATILE: Capable of evaporating easily; an area that readily vaporizes

VOLTMETER: Electronic meter used to measure voltage.

WADDLE: Condition caused by some defective radial tires which cause the vehicle to have sideways back and forth motion due to broken or defective belts.

WATER SPOTTING: Condition caused by water evaporating on a paint film before it is thoroughly dry resulting in a dulling of the gloss in spots.

WEATHERING: Change or failure in paint caused by exposure to the weather.

WELDING: Process of joining two pieces of metal to form a single piece of metal.

WET SANDING: Procedure of sanding paint film with sandpaper and water.

WET SPOTS: Discoloration caused where the paint fails to dry and adhere uniformly; caused by grease or finger marks usually.

WHEEL ALIGNMENT: Procedure of aligning wheels to the manufacturer's specifications.

WHEEL BALANCING: Proper distribution of weight around a tire and wheel assembly to counteract centrifugal forces acting upon the heavy areas in order to maintain a true running wheel perpendicular to its rotating axis.

WHEELHOUSES: Deep curved panels that form the compartments in which the wheels rotate. They are generally bolted to the front fenders and spot welded to the rear quarter panels.

WINDSHIELD: Glass installed on the front of a vehicle to protect the occupants from the elements.

WINDSHIELD HEADER BAR: Reinforcement by which the windshield is supported and to which the roof panel is welded.

WOODGRAIN TRANSFER: Plastic film that has adhesive on one side and a wood grain effect printed on the other side, applied to some motor vehicles.

WORK HARDENING: Process of metal being made harder by rolling or hammering the material.

WRINKLING: Term used when a paint film buckles at its surface causing a shriveled appearance.

YIELD STRENGTH: Resistance a particular type of material possesses to permanent stretching.

ZIRCONIA: Very rugged synthetic abrasive that is used mainly for rough cutting.

ZONE SYSTEM: Method of using a series of zones to enable writing an accurate estimate

Collision Auto Body Repair Terminology

Unibody Terms

ACCESS OPENING: The process of cutting an opening or hole in the back side of a panel or rail to gain access to a buckle or deformation in the metal for repair purposes.

ANALYZE REPAIR PROCEDURES: The process of using the information from the measurements obtained as well as the information from a visual inspection to formulate a repair plan in which the structural integrity will be restored to the vehicle.

BEND: Damage to a frame rail or structural component in which the component is out of correct dimensional specification but is not severely weakened. The damage to a component has no sharp edges on the damage and forms a smooth transition from the undamaged area to the damaged area. A bend can normally be repaired without any permanent deformation to the metal.

BODY TWIST: A condition to a unibody in which the datum plane of the vehicle is out of specifications from side to side and front to rear. An example of this type of damage is if a vehicle is high in the left front, low in the right rear and the rocker panels are not parallel to each other.

BUCKLE: A condition to a frame rail, reinforcement or apron from which a visible compression from stress is evident.

CENTERLINE BOW: A condition in which the center section is out of tolerance to the vehicle center line. It is normally due to a hard impact to the side of the vehicle. This

condition has often been referred to as banana.

CONTROLLED DIMENSIONING: The process of aligning a suspension mounting point, arm or other control point or bracket which may not be a part of the actual frame rail but is crucial to proper wheel or body alignment.

COSMETIC RESTORATION: The process of restoring the factory appearance to a repaired rail, apron, pillar, rocker panel or other structural component. Also is used to describe the repairs to a spliced rail or component that hide the splice or seam to return the component to a factory type appearance.

DIAGNOSE DAMAGE: The process of actually measuring the control points of a damaged vehicle and determining which ones are not dimensionally correct.

DIMENSIONAL PULL FOR STRUCTURAL REPLACEMENT: The dimensional correction to a structural member prior to the replacement of that member. It has sometimes been referred to as a pre-pull or pull prior to replacement.

DIRECT SECONDARY DAMAGE: A condition to a firewall, floor pan or other similar component in which the component is pushed back due to an impact to a frame rail or apron. The damage is a result of the impact to another component that was directly hit in the collision. This type of damage generally occurs to parts that are welded or joined to the parts receiving the primary impact of a collision.

INDIRECT SECONDARY INERTIAL DAMAGE: The damage to the opposite end of a vehicle from which the primary damage occurred. It is caused by the inertia forces present during a collision. An example of this type of damage is if the rear end of a car is out of dimensional tolerance as the result of a front end impact. This type of damage has often been referred to as Kick Up or Kick Down. It can also be used to describe the cause of damage to mechanical components such as motor mounts or front suspension as the result of a rear end collision.

KINK: A condition to a structural component in which the metal is folded back against itself through direct impact or through compression of the component. The metal is severely weakened and if repairs are attempted much of the strength of the component will be lost. This type of damage normally requires the component to be replaced if proper strength and crushability are to be maintained in the component.

MINIMUM OVERLAP SECTIONED PART: The process of sectioning a structural panel such as rocker panel, pillar or frame rail using Tech-Cor's recommended repair procedures in which the panels are slightly overlapped and welded.

PILLAR OR PANEL FORWARD/BACK: A condition in which a structural member such as a hinge pillar is out of tolerance to the length dimensions.

PILLAR OR PANEL HIGH/LOW: A condition in which a structural component such as a hinge pillar or rocker panel is out of tolerance to the datum line of the vehicle.

PILLAR OR PANEL IN/OUT: A condition in which a structural component such as a rocker panel or hinge pillar is out of dimensional tolerance to the vehicle centerline.

PILLAR TWIST: A condition in which a hinge pillar is out of square from the inner pillar to the outer pillar. The pillar rolled from forces applied to the hinges or outer panels.

PULL FOR ACCESS: The process of using some type of pulling equipment to pull a damaged part of a vehicle out so repairs can be performed to the vehicle by allowing access to the necessary parts to perform repairs. An example of this may be if a fender has jammed a hood shut, the fender will need to be pulled prior to being able to open the hood.

RAIL HIGH/RAIL LOW: A condition to a frame rail, apron or reinforcement in which the dimension from the datum line to the measuring point is out of specification. This condition has sometimes been referred to as sag.

RAIL SHORT: A condition to a frame rail, apron or upper reinforcement in which the dimensions of the vehicle are out of specification from front to rear of the vehicle. This condition has sometimes been referred to as collapse, mash and crush.

RESTORE CORROSION PROTECTION: The process of preparing and applying corrosion resistant materials in accordance with ICAR's recommended procedures.

RUSTPROOFING: The application of an aftermarket rust inhibitor, applied by someone other than the automobile manufacturer, such as the dealer or other vendor.

SETUP: The process of mounting or attaching a vehicle to a pulling system.

SIDESWAY: A condition to a frame rail, upper apron or apron reinforcement in which the dimensions from the vehicle centerline are out of specification on one or both sides.

SLEEVE SECTION: The process of a partial structural member replacement using the I - CAR process of building and installing a sleeve at a non-factory seam of the sectioned component.

SQUARE AND FIT: The process of fitting an opening for proper body alignment such as a door, windshield, deck lid or hood opening.

SUPPORT FOR STRUCTURAL REPLACEMENT: The process of supporting a vehicle in the correct dimensional tolerance while crucial structural components are being replaced. This includes parts such as inner and outer rocker panels, uniside assemblies

or other major components in which the car will lose its rigidity and tend to flex during the repair process.

UNDERCOAT: The process of spraying a tar or rubber based material on the underside of a vehicle. This may be done for road noise suppression and/or as part of the factory corrosion protection or as part of an aftermarket rust proofing process.

Collision Auto Body Repair Terminology

Insurance Terms

ACCIDENT: An unforeseeable event which may produce injury or property damage.

ACCIDENT DATE: Date (month/date/year) when the accident occurred.

ACCIDENT FREQUENCY: A method of measuring the safety performance of a policyholder for a specified period by multiplying the number of injuries by one million and dividing by the total number of work hours worked; or when the actual work hours are unknown, the measurement may be in terms of number of accidents for each $100,000 or payroll. With automobile policyholders the exposure may be either number of miles or number of vehicles.

ACCIDENT YEAR: The year during which an accident takes place without regard to the year in which it is reported.

ACTUAL CASH VALUE: An amount equal to the replacement cost of lost or damaged property at the time of loss, less depreciation.

ACTUAL DAMAGES: Damage that really exists as distinguished from potential or possible damage.

ACTUARY: A highly specialized mathematician professionally trained in the risk aspects of insurance, whose functions include the calculations involved in determining proper insurance rates, evaluating reserves, and in various aspects of insurance research.

ADJUDICATION: The process of deciding whether to pay, pend, or reject a claim based upon the information submitted, the eligibility of the recipient, and the available benefits.

ADJUSTER: A person who investigates and settles losses for an insurance carrier.

AGENCY SYSTEM: Insurance distribution system utilizing licensed agents.

AGENT: Laws of all states require all insurance agents to be licensed by the state

to sell insurance.

ALL RISK INSURANCE: Property and liability coverage for all perils except those specifically excluded in the policy,

ALTERNATE DISTRIBUTION SYSTEM: Any insurance distribution system that does not utilize person-to-person contact.

AMOUNT OF LOSS: The extent of loss, expressed monetarily.

APPRAISAL: A survey by an impartial expert estimating quantity, quality or value of property to determine its insurability or the amount of loss sustained.

ARBITRATION: Determination by impartial experts of the value of property or the extent of damage. Many insurance policies provide for appraisals where the company and the insured cannot agree on the amount or the extent of a loss.

ARSON: The willful and malicious burning of property.

ASSIGNED RISK: A risk that is assigned to a pool of participating insurers who agree to accept either the profit or loss associated with the risk.

ASSURED: Synonymous with "insured". One who has an insurance policy with an insurance carrier.

AUTOMOBILE DEATH INDEMNITY COVERAGE: Provides limited life insurance protection to insured persons specifically named in the policy in the event of a death that is a direct result of a vehicle accident. Payment is not contingent upon the establishment of negligence, but death by an intentional act of the insured is not covered.

AUTOMOBILE DISABILITY INCOME COVERAGE: Provides persons specifically named in the policy with the weekly benefit shown in the policy in the event of continuous total disability as a direct result of bodily injury, sickness, or infection caused by an auto accident.

AUTOMOBILE PHYSICAL DAMAGE INSURANCE: Covers damage or loss to automobile of policy holder.

AUTOMOTIVE INSURANCE, COMPREHENSIVE: Insurance against any physical loss to an automobile except by collision or upset.

Oakland Community College
Collision Auto Repair (CAR) Labor Market Analysis
January 2003

Source: OCC, Office of Institutional Research

2/27/03

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