Recycled Parts for Collision Repair

Self-study Narrations

I-CAR®

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Module 1 - Automotive Recycling Industry

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Learning Objectives

The recycling industry has grown over the past couple decades to a multi-billion dollar industry designed to serve the needs of the collision repair industry. As vehicle technologies change, we are seeing an increase in the quality of the parts being supplied by recyclers. We are also seeing the latest communication tools being used for ordering parts to ensure quick delivery.

The learning objectives for this module include: providing an overview of the recycling industry, listing the benefits of using recycled parts, providing I-CAR positions on the use of recycled parts, providing vehicle maker positions on the use of recycled parts, providing insurance company positions on the use of recycled parts, listing the different recycling industry associations and identifying the services they offer, listing considerations for ordering and using recycled parts.

Program Overview

The intention of this program is to provide an overview of recycling facility operations. This program also addresses common misconceptions about the recycling industry and the steps that have been taken to alter these misconceptions.

In addition to showing which parts are commonly recycled, this program provides a list of new communication technologies that are used to provide better customer service between collision repair facilities and recycling facilities. This program will also show how new vehicle technologies affect the use of recycled parts.

Recycling Statistics

According to the Automotive Recyclers Association, the total automotive recycling industry revenue is estimated to be $10 billion each year and employ about 103,000 people. There are more than 8,000 recycling businesses in the United States, with most employing ten or fewer people.

Additional statistics include that recycling represents the 13th largest industry in the United States and supplies approximately 37% of all iron scrap to the scrap processing industry. Recycling saves an estimated 85 million barrels of oil per year that would have been used in the manufacturing of new or replacement parts. Recycling using a recycled engine versus a new engine saves 261 kg (575 lb) of carbon dioxide production.

According to a study published by the United Recycler Group, the recycling of steel fenders each year in the United States saves the mining of over five million tons of iron ore, nearly three million tons of coal, and over 250,000 tons of limestone compared to making an equivalent number of new steel fenders.

Recycling Statistics (cont'd)

The recycling industry has seen an increase in all areas of business. With millions of vehicles taken off the road each year, there seems to be an endless supply of parts. Of those vehicles that are taken off the road, 75% of parts are recycled for reuse, 20% are recycled for scrap, and 5% are sent to landfills.

U.S. vehicle makers have been moving toward a more recyclable product. This follows a similar path in Europe that is outlined by an agreement between several countries called the "End-Of-Life Vehicles (ELV) Directive."

Europe's End-Of-Life Vehicles (ELV) Directive

The ELV Directive was developed to help make sure vehicles are designed to be more environmentally friendly with regard to being recycled. The directive encourages vehicle makers and part producers to use International Standards Organization (ISO) guidelines for part labeling and identification to identify vehicle parts and materials suitable for reuse and recovery.

The directive also includes reducing the use of hazardous materials in vehicle construction. For example, after July 1, 2003, new vehicles should not contain mercury, hexavalent chromium, cadmium, or lead.

Europe's End-Of-Life Vehicles (ELV) Directive (cont'd)

The ELV Directive includes guidelines for the collection of end-oflife vehicles. European Union Member States are required to establish collection procedures for end-of-life vehicles and ensure that all vehicles are transferred to authorized treatment facilities.

For all end-of-life vehicles, the reuse and recycling of vehicle assemblies was increased to a minimum of 80% of average weight on January 1, 2006. It shall be increased to a minimum of 85% of average weight no later than January 1, 2015.

According to the U.S. Environmental Protection Agency (EPA), these directives have impacted the U.S. vehicle makers and part suppliers. In order to continue to compete globally, the U.S. has become very interested in "life cycle thinking." Ideas like "design for the environment" and "design for disassembly" have become common in the industry.

Recycling Industry

To keep up with the increasing demands placed on collision repair facilities, most recyclers have increased their professional standards to ensure better customer service and provide high quality parts to ensure a steady customer base. Recyclers have an updated inventory process that allows customers to search online inventories and provide

better part descriptions to ensure that repairers understand the part condition before it arrives at the collision repair facility. This is critical for proper cycle time.

Benefits Of Using Recycled Parts

The benefits of using recycling parts include saving energy that would otherwise be used for the creation of new parts. This creates environmental benefits, as emissions created when making new parts are reduced since fewer parts are made.

Recycling also reduces the number of total loss vehicles by providing an economic alternative, and can be a less intrusive repair. For example, if a recycled assembly is used, fewer spot welds may need to be drilled out versus if multiple layers of panels must be replaced.

Using recycled parts can also reduce cycle time. For example, if a door shell is ordered from the vehicle maker, all parts must be transferred to the new part. However, if a recycled part is ordered, it may contain the window regulator and electronics that do not have to be transferred. Note that it may be the policy of the insurer and/or repairer to transfer undamaged parts from the original part to the replacement (recycled) part.

It's important to note, however, that recycling may also increase cycle time. For example, if a fender requires removing minor damage, it will increase the amount of repair time compared to using a new, undamaged part.

Benefits Of Using Recycled Parts (cont'd)

One of the main benefits of using recycled parts is that recycled parts are factory parts. This means that the part has the original factory corrosion protection, proper fit, and proper mounting locations.

Potential Liabilities

Potential liability issues may arise from the use of recycled restraint system parts. Improper inspection of airbag assemblies, or not knowing the history of the vehicle that an airbag was removed from, may lead to improper deployment. These concerns extend to all restraint system parts, such as seat belts, control modules, and crash sensors.

Liability concerns also include brake system parts. With advanced electronics integrated into the braking systems, all control modules must be inspected. Additionally, any mechanical part must be inspected for condition to ensure proper operation.

From the recycling facility perspective, it is the repair facility that is the expert. Therefore, it is the repair facility's responsibility to ensure parts meet safety requirements.

Vehicle Maker Positions
While the use of recycled parts is gaining momentum, generally vehicle makers, such as Ford, do not recommend the use of recycled parts. One of the primary reasons given from some vehicle makers, such as Honda, is that there is a lack of systems in place to provide quality control on recycled parts.

Toyota, in their Collision Repair Information Bulletin (CRIB) #157, does not specifically state that recycled parts cannot be used. Similar to other vehicle makers, they voice their concern about quality control. The CRIB attaches a disclosure and authorization form for the use of recycled, aftermarket, and remanufactured parts that is suggested to be used when repairing Toyota vehicles.

Using recycled parts will not void the warranty of adjacent sheet metal parts. However, installing a malfunctioning recycled mechanical part that damages other parts in the system may lead to some warranty issues with other parts in the system.

Insurers' Position On Recycled Parts
Insurers will often recommend the use of recycled parts to their customers. To help put the customers at ease with the use of recycled parts, many insurers offer a warranty or guarantee on sheet metal parts that is good for as long as the consumer owns the vehicle. These warranties address proper fit, corrosion resistance qualities, and part performance. A warranty may not be applicable toward wear and tear parts such as tires, batteries, belts, hoses, and other items.

Terms Used For Recycled Parts
When working with recycled parts and the recycling industry, there are a variety of terms used to describe these parts. They may include used, refurbished, and restored.

On the damage report, or repair estimate, it is important to note that remanufactured, rebuilt, or reconditioned parts are not listed as “recycled” parts. Some in the industry, however, may refer to these parts as recycled since they were rebuilt from recycled cores.

Automotive Recycling Definitions
A term unique to the recycling industry is end-of-life vehicle, which means any identifiable motor vehicle, with or without all component parts, and is in such condition

that its highest or primary value is either in its sale for reusable components or recyclable materials.

Another term is junkyard, which is an obsolete term referring to an automotive recycling facility.

Pre-dismantling is the initial procedures taken to remove and inventory automotive components or parts in anticipation of future sales.

A major component part is any component or assembly which has a VIN or derivative marking.

Another term unique to the recycling industry is remanufactured, which is a used part that has been inspected, rebuilt, and/or reconditioned to restore functionality and performance.

ARA has published these and other definitions related to automotive recycling on their web site.

Automotive Recyclers Association (ARA)

The Automotive Recyclers Association, or ARA, is an international trade association that was started in 1943. It has represented an industry "dedicated to the efficient removal and reuse of automotive parts and safe disposal of inoperable motor vehicles." The ARA has approximately 1,000 direct member companies, and a web site at www.a-r-a.org that provides in-depth information about what the ARA offers.

ARA has developed the Certified Automotive Recycler (CAR) program. The CAR program is a set of professional standards for participating recycling organizations and provides guidance to facilities on how to adhere to these standards.

These standards focus on general business practices, environmental protection, safety, licensing procedures, and regulatory policies.

The ARA has also developed the Gold Seal program. This program addresses customer service concerns and is designed to maintain and enforce reputable, quality business practices throughout the automotive recycling industry.

ARA Training

The ARA has developed a set of curriculum for the recycling industry to fill the need for training required to help automotive recyclers succeed. This training is provided online at the ARA University web site (arauniversity.org) and requires students to be a subscribed member. Purchasing the training requires an enrollment fee and a monthly fee. Course topics include part inventorying, part grading, hazardous materials, and business improvement.

United Recyclers Group (URG)

The United Recyclers Group (URG) was established in 1995 with a mission to provide a state-of-the-art information management system. This system is the Pinnacle system, which is a comprehensive software package that can be used by all areas of a recycling facility such as sales, inventory, billing, and payroll. The URG also provides products and services to URG partners. These include items such as training videos for recyclers on subjects such as sales, quality assurance, inventory, and shipping practices.

United Recyclers Group (cont'd)

The URG provides an online part search database on its web site (u-r-g.com). They have also created accreditation programs. These are called URG 6000, 7000, and 8000. These programs ensure that those that are URG-certified carry out their activities under controlled conditions required in the program. An annual certification is administered by a third party to verify that a recycling facility is following the requirements of the program.

The URG 8000 standards are similar to ISO9000 standards. For more information on the details of the accreditation process, visit the URG web site.

Recycled Part Usage Considerations

When making a determination to use recycled parts, it is important to consider applicable warranties. The use of recycled parts should not void any warranties that would have been maintained had a new part been used. In this instance, warranties from the recycler and insurer may take the place of vehicle maker warranties.

It is also important to look at part durability. It is important to make sure the part has not been compromised by corrosion or by steps in the removal process that may have altered the strength of the metal. Another example is a hood that was bent and straightened. It must be as durable in another collision.

When using recycled parts, all involved in the repair process must be notified about the type of parts being used for the repair. It is also important to verify the practicality of finding a recycled part. For example, finding a rare part may take more resources than buying new.

Recycled Part Usage Considerations (cont'd)

Additional considerations regarding the use of recycled parts include looking at the condition of the part when it arrives. A part that requires extensive repair that was not previously disclosed may not be worth investing the time compared to buying the part new.

It is also important to consider the length of time it will take for the part to be shipped to the collision repair facility. If the part will take several days, it may be necessary to explore alternative options, such as using new or aftermarket parts.

Considerations For Wear Parts

If using recycled parts that are designed to wear over time, they should have equal wear from side to side and the age and mileage should match the vehicle being repaired, or the part being replaced. The insurance company may require that the part be replaced with a part that is the same year or newer.

Deciding To Use Recycled Parts

When deciding to use recycled parts, the customer should be informed about differences between new and recycled parts. Differences may include that the recycled body parts may require minor repair. New body parts may include a factory warranty against corrosion and new mechanical parts include a factory warranty.

The customer should also be informed about the similarities between new and recycled OEM parts such as factory corrosion protection, proper fit, and proper mounting locations. It is also important to note that both parts are factory parts.

Also when deciding to use recycled parts, it may be helpful to compare aftermarket and recycled parts. For this, collision repair technicians may be able to provide insight into which aftermarket parts may not be best suited for a particular repair.

Finally, customer expectations may differ depending on the condition and age of the vehicle. Some customers may be less willing to use recycled parts on a oneyear old vehicle versus a customer with a seven-year old vehicle.

Identify If Recycled Part Is Original Equipment

To help ensure part fit and durability, it is important that the recycled part be factory original. Steps to verify part origins and condition include checking the part for consistent paint film thickness and appearance. There should also be a uniform color consistency across multiple panels. If there is not, it is likely that the panel has been repaired, replaced, and/or refinished.

It also helps to look at the vehicle history using various vehicle history services. However, with increasing privacy laws, using some vehicle history web sites, such as Carfax, may become more difficult.

Other indications of previous repair or aftermarket parts include the absence of VIN labels and other labels, or presence of R-DOT labels. These will indicate that the part has been replaced. The R-DOT label is placed on replacement parts, so this is an indication that the part is not an original vehicle part.

Laws And Recycling

Most laws associated with the use of recycled parts focus on the disposal of hazardous materials, such as oil, antifreeze, brake fluid, mercury, and batteries. These particular laws vary according to each state or province.

The ARA has a link on their web site that provides a state-by-state breakdown of the requirements for working with hazardous materials. This web site is developed through a partnership by the EPA and the ARA to provide compliance assistance for the automotive recycling industry. This compliance assistance source is known as the Environmental Compliance for Automotive Recyclers (ECAR).

The web pages provide specific regulations for handling various wastes. Each waste classification has links to state-specific regulations, a self-audit checklist, best management practices, and other related sources.

There are instances when laws regarding VIN labels must be followed. For example, in some states, the VIN must accompany full-frame assemblies.

Vehicle Check Sites

The National Motor Vehicle Title Information System, or NMVTIS, has a free online database at nmvtis.gov. It is used to protect consumers from unsafe vehicles, fraud, and to keep stolen vehicles from being resold. Data that is available to consumers on this web site includes title data, brand history, odometer reading, total loss history, and salvage history.

According to the NMVTIS web site, over 7,500 insurance carriers, vehicle recyclers, and salvage yards in the U.S. report to NMVTIS regularly.

The National Insurance Crime Bureau, or NIBC, also provides access to a database to determine if a VIN label is off of a stolen vehicle or from a vehicle that has been declared a total loss. The NIBC database can be found on their web site at nicb.org.

Verify The Proper Part
When ordering recycled parts for a repair, parts should match the model and model year, depending on the part. In some instances, the part may require matching a specific build date since there may be changes in vehicle design in the middle of a year.

Whenever practical, it is the responsibility of the collision repair facility, before installation, to determine the usability of the recycled parts and to ensure the parts will not compromise the repair of the vehicle.

Ordering Parts
Parts are typically ordered by category type, such as body, electrical / mechanical, and miscellaneous. When working with body parts, the repair facility should determine if a partial assembly is available, if that is all that is needed. This may be preferable and more economical than ordering a complete assembly.

In some instances, using a recycled assembly, partial or complete, is preferable to using individual new parts. A recycled assembly eliminates the need for having to order several individual parts and helps avoid assembling individual parts.

Using a recycled assembly may result in fewer welds, less intrusion into the original structure, and the original corrosion protection being left intact where it may otherwise be removed if multiple panels would be installed.

Also, when ordering parts, determine if one-time-use fasteners need to be ordered from the vehicle maker. In some situations, the existing fasteners cannot be reused, and new ones must be ordered.

Ordering Parts (cont'd)
When ordering recycled parts, they may be ordered “as is.” Parts that are ordered “as is” may have an unknown amount of damage and may require repair. If this is the case, any repair to recycled parts should be disclosed to the customer. Using these parts, if repair is required, can increase cycle time.

Parts may also be ordered “clean and undamaged.” Clean and undamaged means that the part is generally supplied undamaged, however, in some instances, minor repair may be necessary.

Parts Ordering Etiquette
When ordering parts, the repair facility should not remove the needed parts and send the remaining assembly back to the recycler without consent from the recycling facility. Some parts may not be saleable after they have been stripped of certain parts.

If it has been decided not to use a part, the repair facility should send the part back in similar condition as it was received. If a part is altered, it de-values the part. Additionally, if the part is a brokered part, it is unlikely that the part can be sent back if it is different than how it was shipped.

If any part is going to be returned, the condition of the returned part should be agreed upon between the repairer and recycler.

If it has been agreed that parts can be removed from an assembly and the remaining portion returned to the recycler, adjacent panels that can be resold should not be damaged during the part removal process.

Ordering Interchangeable Parts

In some instances, parts are interchangeable from one model to the next. To determine which vehicle parts interchange with others, there are software programs available that provide an index of parts and their interchangeable equivalents from other vehicles.

One example of a company that provides this software is Hollander. The interchange includes mid-year changes of part designs, or even month-to-month changes.

Collision estimating guides are not a good reference source for interchange information since it will not provide data regarding similarities to other makes and models of vehicles. It is recommended to use documentation sources designed specifically for this purpose.

When using an interchangeable part from a different model, it is important that the attachment locations be in the same position. In some instances, the mounting locations may not be exact, even though part design is the same. This may require new mounting holes to be drilled into the recycled replacement part.

Another consideration for parts ordering is that sometimes part design may slightly differ depending on where the vehicle was built. For example, the apron assembly on a 2009 Toyota Camry has a slight design difference between those built in the United States and those built in Japan. So just because a part was ordered with the same build date does not mean that the part will be identical to the part being replaced. Decoding a portion of the VIN may be necessary in some instances to verify that parts are interchangeable. With Toyota, the first digit in the VIN indicates the country where the vehicle was assembled.

Part Assemblies - Included Parts

When ordering parts, what is included with the part assembly varies depending on the recycling facility. The decision is made based on the dismantling procedure, what is available, and what is undamaged on the donor vehicle.

For example, doors may include trim, glass, motors, lamps, and switches. However, many recyclers may inventory mirrors separately since that item may be in higher demand. Dash panels may include various electronic parts depending on how it was removed from the vehicle. What is included should be communicated to the collision repair facility. Many U.S. states have specific procedures regarding the use of recycled dash panels in that the VIN plate must be removed from the recycled panel and replaced with the VIN for the repaired vehicle.

Mechanical part inclusions may vary. For example, gas tanks may include the fuel filter, fuel pump, fuel gauge, etc. Suspension parts may include the strut, coil, and brake assembly.

Body structure assemblies may include exterior panels, reinforcements, and interior panels.

Recycled Parts Damage Report Considerations

When including recycled parts on a damage report, some considerations may include that parts be disassembled for installation and refinishing. Recycled parts may also require cleaning, trimming a part to size, and measuring the part to verify it is undamaged.

Communications Between Shop And Recycle Facility

There are several tools that are used to communicate between the recycling facility and its customers, such as web sites, which include online ordering at recycler sites and eBay. Instant messaging is also used. This can be done from the repair facility to the recycler, or from a recycler to a recycler. Pinnacle has an instant messaging feature that allows recycling facilities that use this software to send instant messages to other recycling facilities that use Pinnacle software.

Other communication tools include subscription-type services, such as realparts.com, and the telephone, which is still the most popular method.

Module Summary

Module 1 provided an overview of the recycling industry, introduced some common terms used when discussing use of recycled parts, and provided some industry stances on the use of recycled parts for collision repair.

Other topics covered in this module included: listing the benefits of using recycled parts, providing I-CAR positions on the use of recycled parts, listing the different recycling industry associations and identifying the services they offer, listing considerations for ordering and using recycled parts.

Module 2 - Processing Recycled Parts

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Learning Objectives

Once the decision has been made to use a recycled part, knowing the proper ordering and installation processes will ensure the part integrity and durability.

Module 2 provides a discussion of how parts are removed from donor vehicles and how they are classified for resale. This module also discusses proper instructions used to remove parts from the donor vehicles to ensure the parts can be installed properly on the repaired vehicle.

The learning objectives for this module include: explaining how a recycling facility operates, identifying proper cutting locations for body panels, identifying proper cutting techniques and tools, explaining how to grade a part based on the amount of damage, identifying required documentation that should accompany recycled parts, explaining how new vehicle technologies affect the use of recycled parts, listing the considerations for using recycled restraint system parts, listing parts that cannot be recycled.

Recycling Facilities

Recycling facilities acquire, dismantle, inventory, store, and sell recycled parts. These facilities have a variety of job positions. The number of positions depends on the size of the facility. In a small facility, one person may have multiple jobs. It is recommended that recycling facilities comply with ARA and URG standards and codes. Complying with these standards creates a positive and professional image for the recycling industry.

Considerations For Acquiring Vehicles

One of the main functions of the recycling facility is acquiring vehicles for disassembly and resale. The first step in the process is determining which vehicles to acquire in order to meet the needs of the customer.

When a recycling facility is determining which vehicle to acquire, they consider inventory, input from sales staff and purchasing, common vehicles, and customer orders.

Other considerations include the length of time a part has been at the recycling facility. If the part is not selling, more parts are not required. Recyclers also compile data on what parts are more commonly damaged and what parts are in high demand. In some situations, a vehicle purchase may be made based simply on a couple of high-demand parts. Vehicle acquisition is also based on OEM information, such as which parts are on backorder from the vehicle maker. A recycling facility may be able to fill the orders that the OEM cannot.

Sources where vehicles are acquired include auctions, vehicle makers, catastrophe locations, individual owners, and contracts with fleet companies or insurance companies.

Additional Acquisition Options

Other recycling facilities can also be a source for acquiring vehicles or vehicle parts. Facilities may be part of a network that works together to meet customer demands.

These networks are made of multiple partners, connected by a database that searches other yards to look for a specific part. The parts are shipped between recycling facilities. Shipping directly to a customer from a third party supplier is generally not done, as each facility has their own quality control process to ensure their customer receives the right part and matches the part description.

In addition to networks, there are also brokers who will work with recyclers to acquire the part. In some instances, the broker arranges to drop-ship parts from another recycler if the part is not in stock. Using this type of arrangement may also make it difficult to return a part if the collision facility rejects the part.

Parts Removal And Quality Control

The parts removal process, done by the recycling facility, requires determining what is recycled off of each vehicle and which parts will be scrapped. It involves printing out part tags for the person who dismantles the vehicle. The tags are used to determine which parts are removed from the vehicle and inventoried. Specialized software may be used to assist with this process.

All parts must go through a quality control process that requires cleaning the part and inspecting it for damage and categorizing the part according to the extent of damage. Quality control also makes sure the part description matches actual part condition and communicates any discrepancies to the repair facility.

Part of the inspection process is verifying that the part has not been previously repaired and is not an aftermarket part. Inspecting for previous repairs includes checking the panel backside and looking for corrosion, different color primer, and/or weld marks. Also, it involves checking paint film thickness on the panel surface.

The buyer is notified of previous repairs, whether the panel has been simply refinished or refinished and repaired. If the part is not factory, and has been deemed an aftermarket part, this should also be disclosed to the buyer.

Unitized Structure Parts

Recycled parts of a unitized structure are generally supplied as part of an assembly. They are generally removed from the vehicle following cut location recommendations from the repair facility.

Recycled parts that are part of the unitized structure may include, but are not limited to, the front and rear rails, A-, B-, and C-pillars, the radiator core support, bumper reinforcements, quarter panels, and the roof panel.

Exterior Panels

Exterior panels may be supplied as an assembly and with all attached parts. Often times the collision repair facility may have to indicate which parts to include with the panel.

Exterior panels that may be used as recycled parts include deck lids, hoods, doors, fenders, quarter panels, and panoramic roofs. The roofs may be bolted on or bonded on, making the part easier to remove compared to welded-on roof panels.

Shipping And Receiving

When parts are shipped to customers from the recycling facility, the parts are shipped locally and worldwide. With the Internet, the customer base is expanded well beyond the driving range of delivery drivers.

To ensure parts are not damaged in transport, proper care must be taken so that the part is protected. If an item is damaged during transport, there will be discrepancies between the part description from the recycler and how the part was received by the repairer.

To ensure that the part is not damaged in transport, the part is wrapped in protective material and secured so it does not move around while in transit. Loose items on the part are also secured so that they cannot move or swing around and damage adjacent parts.

Identifying Cut Locations

Proper cut locations are critical for a proper repair and it is the repairer's responsibility to determine if a specific cut location is required. When the repair facility is determining the cut location for the recycling facility, the vehicle maker part replacement guidelines should be followed in regard to sectioning or replacing a part at factory seams. It may be important to know how the part is serviced from the vehicle maker to determine where the cut should be made at the recycling facility.

Determining Proper Cut

When removing parts of a unitized structure or frame from a recycled vehicle cut locations used by the recycling facility must be done following the instructions from the

repair facility. The part should be cut longer than needed, not at the actual sectioning joint or factory seam. If the part is cut too short, it makes the part unusable.

I-CAR Recycled Parts Request Form
To aid communication between the repair facility and the recycler, I-CAR has developed the I-CAR Recycled Parts Request Form. This form is used by repairers to relay cutting information to the recycler. Those that use the form should be guided by the vehicle maker recommendations for proper part replacement guidelines.

This form is available at i-car.com, a-r-a.org, and recycler's web sites.

Filling Out The Form
To complete the I-CAR Recycled Parts Request Form, identify the vehicle being requested and complete the contact information. Use the diagrams and multiple views to highlight the cutting locations.

Use the notes section to expand on special instructions. For example, to indicate the exact cut location, make sure it is longer than the vehicle maker's recommended sectioning location. The notes section can also be used to specify measuring points when necessary. For example, directions may include statements like "cut the A-pillar 50 mm below the upper windshield pinchweld flange." The more descriptive the instructions, the less chance there is for miscommunication.

Standard Cut Lines
Some recycling facilities may offer standard cut lines. These cut lines are determined by the recycling facility in order to optimize the number of parts that can be used from a vehicle structure.

The cut line provided by the repair facility may require multiple service parts. For example, standard cut lines for a B-pillar may be in the middle of the front and rear door openings. However, if a repair facility indicates that they would like to move one of the cut lines back to the middle of the dogleg area, this now includes two parts since the quarter panel assembly may not be usable anymore.

Both insurers and repairers need to take note of this to ensure proper communication about part ordering. Depending on the vehicle maker's recommended cut line, it may be necessary to acquire two parts from a recycler, even though the repair is specific to just one part.

Foam Location
Foam location may need to be identified on the request form if the repair facility wishes to preserve a foam-filled area. This may require altering the cutting location.

Avoiding Damage During Part Removal

When the recycling facility cuts the part from the vehicle, proper cutting tools are required for working with advanced high-strength steel (AHSS) parts. If a torch is used, heat levels must be monitored. Heat should not spread into the area that will be used for the repair since it can weaken the metal and create an unintended collapse zone. This is where the heat should be monitored. Placing heat indicators at the factory sectioning joint will help ensure that excessive heat was not applied to the usable piece. This may require the recycling facility to ask the repair facility where the final cuts will be made.

When removing parts from a recycled assembly, avoid scratching the finish. Any scratch can create additional work in prepping the panel for refinishing. If the scratch is deep enough, it can create corrosion hot spots that must be repaired.

Part Removal - Cutting Considerations

Considerations for cutting the desired assembly from the vehicle structure include determining which cutting tools should be used, such as plasma-arc cutters, reciprocating saws, and cutoff wheels.

Understanding the type of metal being cut is required for determining the type of cutting equipment. For example, cutting some AHSS requires special bits and blades that can withstand the hard steel without breaking or dulling.

Using A Plasma-Arc Cutting Tourch

When using a plasma-arc cutting torch, overall use should be limited. It is also important to understand the potential dangers, and what conditions may cause vehicle fires. For example, some foams are flammable, and can increase the chance for vehicle fires if a torch is used. If a torch is used, verify where the foams are used in the rocker panels or pillars before cutting.

ARA has developed a Torch-Use Education and Orientation document that addresses basic facts for using torches and best management practices for safe use. This document is available on the ARA web site.

Assembly Removal Considerations

When a part assembly is removed from the vehicle at the recyclers, the wiring harness is generally left intact rather than cutting. Note that the trim may not be included with the door assembly. If the trim panel had to be removed to remove the mirror, the trim is not inventoried with the door assembly. Because of these variations in how a part is provided, the repair facility must request specific parts during the ordering process.

Communication - Recycler And Repair Facility

During the parts ordering process, there needs to be good communication to ensure that the part being delivered by the recycling facility meets the expectations of the repair

facility. This requires that the part condition be adequately described to the repair facility. To help ensure this, a standardized communication system is used so that there is no confusion on part description regardless of which recycling facility is being used.

Identifying Damage Location on Panel

The first position in the ARA damage code is used to identify the damage location on a panel. There is a chart available, titled the ARA Damage Locator sheet, that assigns numbers to specific areas of a panel. There is a specific sheet for each part on a vehicle, such as hood, fenders, doors, and deck lids.

The locator sheet is part of the ARA Standards & Codes Brochure, which can be found at the ARA web site and can be downloaded at no charge. This brochure is a good resource for understanding the ARA parts grading system.

If there is damage in multiple areas, multiple damage codes are created for the part.

Identifying Type Of Damage On Panel

The second position of the ARA damage code is a letter that refers to the type of damage on the panel.

There are 15 different codes available for identifying the various types of damage.

Identifying Extent of Damage

The last position in the ARA damage code is a number used to identify the extent of damage in repair units. A repair unit represents damage that does not exceed the surface area of a standard size credit card. For example, one unit can be covered by one credit card. Two units can be covered by two credit cards. The damage may be continuous or multiple areas in a single location. The part grade, in addition to the damage code, is used to communicate the condition of the part to the repair facility.

The repair unit does not represent the amount of time required to repair a part, only that the part has a specific amount of damage.

Part Grades

There are four different ARA part grades. These include an A grade, which equals one unit of repair or less than one unit of repair, or is “clean and undamaged.” A non-mechanical part that is labeled as an A grade may also be listed using the code 000.

A “B” Grade equals two units of repair, a “C” Grade equals more than two units of repair, and an “X” Grade means that there is not enough data to grade the part. It is essentially an ungraded part.

Unitized Structure Damage Identification

There is currently no code sheet for structural parts. When identifying damage for unitized structural parts, keep in mind that the part must be dimensionally accurate. There should be no bends, kinks, tears, or pitting-type corrosion on the part.

Process For Inspecting Mechanical Parts

Mechanical parts are inspected for operation, and categorized based on miles or kilometers per year. For example, an "A" Grade part has been used for less than 60,000 miles, a B Grade has been used for more than 60,000, but less than 200,000, and a C Grade has been used for more than 200,000.

For Grades A and B, if the part has over 60,000 miles, the part must have less than 15,000 miles per model year of age.

Additional Parts Grading

The ARA document "ARA Recycled Parts Standards and Codes" provides additional part grading explanations. These include glass, lights, mirrors, and cosmetic parts.

The entire parts grading document can be found on the ARA web site.

Documentation For Recycled Parts

Proper documentation of parts is required by both the recycler and repair facility. Part of the documentation process should include copies of paperwork for parts shipped, where the vehicle was retrieved from, and related warranties.

Paperwork may also include the VIN of the source vehicle for each part, in addition to the make, model, and year, the vehicle title, if required, and any flood damage documentation.

Theft Prevention Measures

Recycling facilities play an important role in reducing the amount of stolen vehicle parts. To accomplish this, a proper documentation process by both the recycler and repair facility is critical. It is important for VIN labels to remain fixed to the recycled parts. A copy of the vehicle title, or the original if required, is kept on file, and copies of the title may accompany any shipped parts.

Theft Prevention - VIN Plates And Part Labels

To assist in theft deterrence, VIN plates or labels that must be transferred should be done following state and local laws. These vary considerably from state to state and require looking into the various legal requirements for VIN transfers.

Anti-theft labels on recycled parts must be left on the part along with any R-DOT labels that may be found on replacement parts. R-DOT labels are provided on replacement vehicle maker parts.

Warranties From Recycle Facility
Warranties vary according to each recycling facility. Those that participate in the Gold Seal program are required to offer written guarantees on their parts. ARA recommends body parts be warranted for fit and corrosion protection for at least one year. Additionally, some recyclers may provide a limited lifetime warranty on sheet metal parts, specific warranty for mechanical parts of sheet metal assemblies such as door parts, and 30–90 days warranty for mechanical parts.

The warranty typically includes language about the recycler not being responsible for improper installation, accident, and misuse.

Advanced High-Strength Steels (AHSS)
To meet federal crash and corporate average fuel economy standards, vehicle makers have been using AHSS, which is stronger yet thinner and lighter. AHSS comes in a variety of thicknesses and strengths.

When using AHSS parts, note that AHSS parts, like mild steel parts, may be used for partial and complete replacement. The vehicle maker recommendations must be followed with regard to straightening, welding, sectioning, and complete installation.

Working With AHSS
When working with AHSS parts, some higher strength steels cannot be straightened. Even minor damage, such as a slight bend, may make a part unusable. For this reason, it is important to identify the strength of the steel, requiring access to vehicle maker service information.

More information on AHSS can be found in the I-CAR live “Steel Unitized Structures Technologies And Repair (SPS07)” training course.

Aluminum Parts
There has been an increase in the amount of aluminum parts used for vehicle design. These parts, though more rare than AHSS, are recycled, especially the bolt-on parts such as decklids and hoods. Aluminum vehicle structures can also be recycled. However, similar to steel, aluminum structures require following specific replacement procedures that are provided by the vehicle maker.

How these parts are attached to the vehicle may differ compared to their steel counterparts. Aluminum unitized structural parts may require specific fasteners and

welding techniques and require drilling out various types of rivets and replacing them with recommended fasteners.

When using vehicle maker's recommendations to replace aluminum parts, the original attachment method is not always duplicated.

The I-CAR Position On Recycled Restraint System Parts

I-CAR does not recommend using recycled airbag modules. Without knowing the condition or history of the vehicle, it is difficult to know if the airbag functioned properly during the last collision. It is also difficult to know if the airbag has been previously repaired. Therefore, using recycled airbags may pose an unnecessary liability risk.

Industry Position Statements

Additional industry positions on the use of recycled OEM nondeployed airbags include no vehicle maker recommends their use, including those vehicle makers that acknowledge the use of recycled parts. Additionally, no insurance companies in the United States will include a recycled airbag on their estimates.

Some industry associations do not approve of their use. For example, the Automotive Service Association's (ASA) position statement is that "ASA discourages the use of salvage airbags. Safety cannot be compromised in this important safety system. While the use of salvage airbags can reduce cost, ASA believes that safety could be severely compromised and that shop owners could be placed at risk for installing salvage airbags. ASA recommends that all shops inquire with their insurance carriers before installing salvage airbags regarding coverage and increases in rates and get this information in writing."

The Society for Collision Repair Specialists position on the use of recycled airbags states that "SCRS recommends that collision repair professionals use exceptional caution when performing repairs to consumers' vehicles, and to only use parts that they know will perform with the same level of quality and safety as the original part; both upon installation, and for the life of the vehicle.

There are many variables introduced by utilizing alternative Supplemental Restraint System (SRS) replacement parts that have the potential to affect SRS operability, and could impair the integral safety function that these parts are intended to provide. Due to the additional liability assumed by the repairer utilizing the replacement part, SCRS encourages repairers to follow the Vehicle Manufacturers' recommended repair procedures when replacing SRS components, and does not recommend the use of salvaged, remanufactured or aftermarket alternatives for this repair."

ARA Airbag Protocol

The ARA approves of using OEM non-deployed airbags, provided they have passed a rigorous inspection process. The ARA has developed a specific protocol for airbag module inspection. Only units that pass the protocol inspection can be sold. The airbags that pass certification are classified as ARAPro Certified. Each airbag is then entered into a database where the certification can be traced. This helps to make sure that flood damaged or recalled airbags are not resold and used.

More information regarding the protocol can be found at www.a-r-a.org.

This airbag protocol training is available online at www.airbagresources.com.

Hybrid Vehicle Safety Considerations

Gasoline / electric hybrid vehicles are equipped with battery packs that may range from 42 – 300 volts or more. This requires that safety procedures be followed during dismantling. Specific disconnection procedures are available on the vehicle maker web sites.

There are hybrid vehicle battery removal guides available at no charge from some vehicle maker web sites.

Safety procedures include wearing the proper safety clothing, checking for the presence of high voltage before working on a vehicle, and being aware of electrolyte spills from damaged high voltage batteries and how to properly neutralize the spill.

More information on safety with hybrid-electric vehicles can be found in the I-CAR live "Electric And Electric Hybrid Vehicles (ALT01)" training course.

Recycling Hybrid Batteries

Recycled high-voltage hybrid batteries are to be charged before storage. Storing batteries that are completely discharged shortens their usable lifespan. The mileage on the battery is recorded and disclosed to the repair facility. Note that battery control modules may not work because they are calibrated at the factory to be dedicated to the original vehicle.

Parts / Systems Requiring Calibration

Most advanced automotive electronics require calibration after installing system parts, such as sensors and control modules. Restraint system parts, such as seat sensors, may also require calibration. Other systems or parts that may require calibration if a replacement part is installed include steering wheel angle sensors, lane departure warning system cameras, the attention assist system, adaptive cruise control sensors, pre-collision systems, and rain sensors.

Parts That Cannot Be Calibrated To Another Vehicle

In some instances, there may be parts that cannot be calibrated to another vehicle. For this reason, the part cannot be recycled as it will not work when installed in another vehicle.

One example includes the control modules that are part of the Audi headlamp assembly. These are equipped with a part protection system in the module programming that prevents using the control modules in other vehicles.

Even with new control modules, each module is registered with a master data bank that is stored at the vehicle maker. When a new module is installed, the dealership programs the new module to the vehicle. It is important to note that not even a new module can be installed without access to the master data bank, and this access is only available at Audi dealerships.

Mechanical Parts

Mechanical parts that should not be recycled may include air conditioning parts exposed to moisture, radiator caps, worn suspension and brake parts, tie-rod ends, and bushings.

Emissions items, such as catalytic converters and charcoal canisters, cannot be recycled or resold according to the Clean Air Act. Fines for installation of recycled catalytic converters may be subject to a penalty of up to $25,000 for each installation.

It is the repairer's responsibility to make sure that any excessively worn parts are not used and that the system works properly.

Sheet Metal Parts Not Recyclable

Sheet metal parts that should not be recycled include those with unrepairable damage, an improper previous repair, missing mounting locations, and corrosion that has caused pitting.

Sheet Metal Parts Not Recyclable (cont'd)

Sheet metal parts that should not be recycled include those with fire damage, damage in collapse zones, and cracks at spot welds or fasteners.

Module Summary

Module 2 discussed how parts are removed from donor vehicles and how they are classified for resale. This module also discussed proper instructions used to remove parts from the donor vehicles to ensure the parts can be installed properly on the repaired vehicle.

Topics covered in this module included: recycling facility operation, proper cutting locations for body panels, proper cutting techniques and tools, how to grade a part based on the amount of damage, required documentation that should accompany recycled parts, how new vehicle technologies affect the use of recycled parts, considerations for using recycled restraint system parts, identifying parts that cannot be recycled.

Module 3 - Recycled Parts And Installation Considerations

I-CAR®

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Learning Objectives

Compared to installing a new part, installing a recycled part on a vehicle requires some different procedures depending on the condition of the part and the location of the repair. Technicians must be aware of these differences to ensure a durable and long lasting repair.

The learning objectives for this module include: listing proper steps for part inspection during part delivery, listing the steps to verify proper part match, identifying the unique procedures for installing recycled panels and unitized structure parts, determining considerations for using multi-layered assemblies, identifying inspection procedures for mechanical parts.

Part Inspection During Delivery

When receiving the part at the collision repair facility, make sure the damage code matches the actual condition of the part. While this is generally done at the recycling facility, it should be done when the part is received by the repair facility as well.

When inspecting the part, try to have the delivery driver present. Variances in part descriptions may lead to returns or price negotiations.

With regard to cycle time, it may be quicker to repair a part with more damage than anticipated rather than wait for a replacement part.

Verifying Proper Part Match

To ensure that the proper part was ordered and received, compare the replacement part with the removed part. The part must be identical to the one being replaced. Verify that the part has the exact mounting locations, and proper part shape, including lines, curves, and trim pieces.

Parts may appear the same on the outside, but have a different interior. This may require removing the electronics, mechanical parts, and trim pieces from the damaged part and transferring them to the replacement part. Some repairers / insurers may do this as part of their repair policy.

When inspecting the part it needs to be as good or better than the part being replaced before it was collision damaged and it should match the condition and integrity of the original.

Preparing Welded Panels For Installation

When preparing recycled welded panels for installation, spot welds are drilled out to remove the panel from the donor assembly. This requires determining which parts of the

assembly will be used before the spot welds are drilled. Welds should be drilled out from the flange not being reused.

The mating flanges should be repaired, cleaned, and dressed before installation. If the panel is being installed using spot welding, or weld bonding, the replacement panel should have no holes in the flange for a quality repair.

Adjacent panels that may have been included on the assembly from the recycler, but are not being installed on the vehicle must also be removed.

Preparing Welded Panels For Installation (cont'd)

When preparing exterior panels for installation, clean the part and repair any dents. Remove all corrosion and any burrs or weld nuggets. Remove foams and sealers in the area of the repair. In many instances, if the foam is not in the direct repair area, these areas are left intact rather than removing and reinstalling. Apply corrosion protection to any areas of the part that will not be accessible for applying corrosion protection or refinishing after installation.

When exterior welded-on panels are being separated from inner structures, heat may be required to loosen foams, adhesives, and sealers between the inner and outer panels. Extreme care must be used when separating the panels because the panels can bend or distort from the pressure exerted from the foams and adhesives peeling away. This is common in the fuel filler door and sail panel areas on a quarter panel.

Bolted-on exterior body panels and assemblies may require removing trim or disassembly before installation and refinishing.

Removing Unitized Structure Parts From A Welded Assembly

Similar to exterior panels, one of the first steps in using recycled unitized structure parts includes identifying how the part will be installed before it is removed from the recycled assembly. This step determines which side of the flange should be drilled. When removing a unitized structure part from an assembly, the mating flanges should be protected before part removal, if needed.

During part removal, note that some parts may have adhesive as an additional attachment method. This can present challenges during the part removal process.

Some parts may be laser welded, requiring the laser weld to remain intact since it cannot be duplicated in the collision repair facility. If the laser weld must be removed, the panel may be prone to damage since the laser weld must be ground away to release the panel.

Laser welds may be continuous and require the panel on the backside of the laser weld to be ground away to avoid damaging the panel being recycled.

Preparing Unitzed Structure Parts For Installation

After the unitized structure part has been removed from the assembly, verify dimensional accuracy. Recycled welded assemblies always need to be checked for dimensional accuracy because the donor vehicle may have had a severe impact that caused indirect damage to radiate into the recycled assembly. Indirect damage may not be evident from a visual inspection, and measuring will be required. It may not be possible to verify the recycled assembly is dimensionally accurate using three-dimensional measuring until it is attached to the vehicle during fitting.

These parts should also be cleaned followed by trimming the part to fit.

Installing Multi-Layered Assemblies

Some assemblies, such as rocker panels, pillars, roof rails, and front and rear rails have multi-layered assemblies. This type of construction may make the installation process difficult since inner panels and reinforcements may need to be accessed for joining. Other issues that may hinder installation include using several access windows on several parts of the assembly or using multiple offset joints. Multiple offset joints or access windows may not be practical for repair.

Installing Multi-Layered Assemblies (cont'd)

If it has been determined that installing a multi-layered assembly is acceptable, outer panels may have to be sacrificed or removed and replaced to access inner panels for joining or sectioning.

AHSS reinforcements may not have a sectioning procedure, requiring replacement at factory seams to maintain structural integrity. Ultra-high-strength steels should only be sectioned when allowed by the vehicle maker. When planning the repair, determine the area where the recycled assembly and the sectioning joints can be properly protected from corrosion.

Installing large welded structural assemblies, such as full-front or full-rear body sections, involves making multiple joints in multiple structural panels and reinforcements. On many newer vehicles, many of the panels in the vehicle side structure are made from high- and ultra-high-strength steels that contribute to the structural integrity and occupant safety of the vehicle. Introducing multiple sectioning joints may affect the performance of the vehicle structure during normal operation as well as during another collision. Most vehicle makers have published warnings against doing full body sectioning on their vehicles.

Bolted-On Unitized Structure Parts And Assemblies
Bolted-on unitized structure parts often have design changes from year to year as well as during model changes. These assemblies also vary in type depending on options and powertrain configurations. When bolted-on recycled parts are being considered for use, it is essential that they be inspected to make sure there are no issues with VIN labels or powertrain and suspension mounting locations and brackets.

It is also recommended to verify that there are no mid-year design changes, damaged areas, or issues with vehicle warranties.

Bolted-on unitized structure parts may include frame assemblies, engine cradles, crossmembers, and suspension assemblies.

Glass
Recycled glass may include stationary glass, such as windshields, and side glass or moveable glass, such as door glass.

Some encapsulated glass may not be able to be removed without destroying the encapsulation. For example, some Toyota models, such as the 2009 Toyota Prius, have encapsulated backglass that is not reusable. Whether or not the glass can be reused once removed is indicated in the service information.

When ordering a windshield, note that there are various glass configurations based on vehicle options. For example, vehicles equipped with high-beam assist sensors or rain sensors may have a different frit design compared with vehicles not equipped with that option.

Glass To Avoid
When inspecting glass for use, make sure to avoid glass that has visible damage, delamination, or improper tint or shade.

Before installation, it is important to note that the original adhesive primer must be removed from the glass to ensure proper adhesion during installation.

Mechanical Parts
Commonly recycled mechanical parts include parts related to air conditioning, steering and power steering, brakes, heating and cooling, suspension, and powertrain.

When using recycled mechanical parts, some may need to go through a remanufacturing process. Most of the mechanical parts are categorized by mileage by the recycling facility.

Preparing Recycled Radiators

Recycled radiators should be cleaned, flow-tested, and pressuretested before installation. The radiator should also be checked for damaged fins and hose connections, corrosion, blocked tubes, and damaged threads. This may be done at the recycling facility in addition to the repair facility. The recycling facility inspection is required to provide an adequate description of part condition to their customers. To do this, it may be required to perform a proper inspection to verify part condition.

Engines

While specific procedures may vary according to each recycling facility, recycled engines may be removed by the dismantler where they may be quality checked and cleaned.

Some facilities test the engine for proper operation. The inspection may include carbon tests, an oil pressure test, and a compression test.

Halfshafts And Driveshafts

If using a recycled halfshaft, do not install halfshafts with evidence of heating, welding, any damage, a damaged or misshaped boot, or evidence of CV-joint contamination.

On driveshafts, do not install parts with damage, evidence of repair, or corrosion, any play between the driveshaft and the U-joints, or runout exceeding the vehicle maker's specification. Replace the U-joints on recycled driveshafts.

Exhaust Systems To Avoid

When considering to use recycled exhaust system parts, do not use parts that have excessive corrosion, flow restrictions, damaged or missing mounting points, or physical damage.

Do not use recycled gaskets or catalytic converters.

Brake Drums And Rotors To Avoid

When using brake system parts, avoid brake drums or rotors with cracks, scoring, or other visible damage. Also avoid parts with improper thickness, radial or lateral runout, and any pitting from corrosion.

Inspecting Anti-Lock Brake System (ABS) Parts

When determining to use recycled anti-lock brake system (ABS) parts, avoid parts with flood damage, or parts taken from the side that had direct damage. Also, recycled ABS parts that contact brake fluid should be sealed.

After recycled parts have been installed, the system must be tested for proper operation.

Suspension Parts

When using recycled suspension parts, the recycled part should be compared to an undamaged part to verify that it has the proper dimensions, is undamaged, and that the part is the correct part. Suspension parts must be inspected for bends or cracks. Dye penetrant should be used if necessary. Any part that has evidence of damage or previous repairs, or any signs of heating, welding, or straightening should not be installed.

Control Modules

Recycled control modules may be used. At the recycling facility, to verify that they are undamaged, the vehicle is checked for malfunction indicator lamps (MILs) before the vehicle is disassembled and the computer is removed. The computer is not used if an MIL indicates a problem.

Wiring Harnesses

Wiring harnesses, depending on the recycling facility, may not be inventoried inside, but stay with the vehicle in the yard. In many instances, the wiring harness is left on the vehicle and removed upon request by their customer.

Recycled wiring harnesses include the restraint system wiring harnesses. However, if there is damage to the harness, some vehicle makers do not allow repair. Others have specific kits that must be used to make repairs. Some vehicle makers allow only one splice per section of wire.

If the recycled wiring harness has minor damage, note that wiring harness repair options vary according to the vehicle maker and the type of electronic system.

Also note that wire damage on the pigtail of control modules should not be repaired.

Module Summary

Module 3 discussed that compared to installing a new part, installing a recycled part on a vehicle requires some different procedures depending on the condition of the part and the location of the repair. Technicians must be aware of these differences to ensure a durable and long lasting repair.

Topics covered in this module included: listing proper steps for part inspection during part delivery, listing the steps to verify proper part match, identifying the unique procedures for installing recycled panels and unitized structure parts, determining considerations for using multi-layered assemblies, identifying inspection procedures for mechanical parts.