



# TECHNICAL FEATURE

Nuts and bolts, tips and tricks from our resident industry experts.

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## WHAT WENT WRONG: A CASE STUDY

The installation of a quarter panel on a 2010 BMW 328xi seems like an easy job, right? Maybe not. In this month's article, we will look at a case study of a vehicle repair that went very wrong.

On or about February 8, 2013, a BMW was taken to a local dealership due to a persistent problem with the battery/charging system. The certified BMW technician discovered excess sitting water in the battery tray area, in the right rear quarter panel area. Additionally, the inspection revealed previous repairs to the right rear area of the vehicle. On or about February 12, 2013, the BMW was sent to Mid Island Collision in Rockville Centre, NY (an Approved BMW Collision Repair Center) to repair the leak. During the disassembly, the BMW-approved technician assigned the repair noticed multiple areas of corrosion to the right rear quarter panel and adjacent components. On or about February 13, 2013, Robert Jesberger, owner of Mid Island Collision, asked us to examine the vehicle with the vehicle owner present.

Jesberger explained to us that the vehicle was repaired at a Direct Repair facility for a particular insurance company to repair damage resulting from a collision event that occurred on or about March 19, 2012. The name of the repair facility was not provided to us, but a redacted copy of the insurance company's final estimate was supplied and listed the replacement of the rear bumper assembly, right tail lamp assembly, deck lid, rear body panel, fuel pocket and right rear quarter panel. No final invoice from the repair facility was provided.

**ANALYSIS:** Examination of the vehicle revealed the following:

**Deck lid:** The lid was visually misaligned. The left and right hinges to the deck lid showed evidence of a 4mm-to-5mm shift to the right, as evident by the original position marks now exposed. Excessive corrosion was present on all four trunk lid hinge mounting bolts, with multiple tool impact markings.

**Battery:** Approximately one half-inch of water accumulated in the battery tray/right rear quarter extension panel area. Excessive corrosion was observed on the battery hold down and bolt. The lower portion of the battery case was stained, while rust-colored residue was present. Severe corrosion build-up was evident from the battery to the luggage compartment positive (+) connection cables (main and auxiliary). This corrosion was sufficient to create excessive resistance at the connection. This resistance, in time, would have caused electrical malfunctions and presented a potential fire hazard.

**Right bumper mounting bracket (plastic):** Nutserts were installed in the two lower mounting areas on the right rear quarter extension panel, and two bolts were installed. BMW utilized coarse-threaded studs resistance welded onto the panel and attached the bracket with plastic nylon nuts. BMW does service the studs and has a part number. The application of butyl tape to the nutserts, in an attempt to prevent water intrusion, was also noted.

**Fuel pocket:** The pocket assembly was loose and the fuel door lock assembly lower clip was fractured and glued. Removal of the fuel pocket requires replacement, due to the four corner clips that must be damaged to remove it.

**Rear body panel:** Squeeze-type resistance spot welds were observed on the mating flanges. The OEM replacement procedure requires rivet bonding.

**Upper inner roof rail reinforcement:** A vertical cut with multiple indications of jagged tool-type impact markings were observed to the reinforcement. This type of damage is consistent with contact with a reciprocating-type saw, carbide blade or similar tool while attempting to cut through the outer panel without utilizing the proper precautions, such as installing metal protective tabs to prevent this type of incident from occurring.

**Right rear quarter panel:** Multiple exposed Metal Active Gas (MAG) plug welds with indications of burn-through on the inner quarter panel brace mating flanges were observed. Indications of bare metal areas with corrosion and tool-type impact markings to the rear area of the outer wheelwell housing were observed. Also noted was excessive corrosion to the outer wheelwell wheel lip mating flange, and multiple incomplete MAG plug welds, suggesting lack of penetration from the inner quarter panel brace to inner wheelhouse panel. Multiple indications of incomplete weld fusion of the squeeze-type resistance spot welds (STRSW) were observed on the quarter panel to inner wheelhouse panel at the door opening mating flange and backlit mating flange areas. The inner flange area showed evidence of burned paint material, supporting that the flange was not properly prepared prior to welding. Additionally, no evidence of any corrosion protection and/or rust-proofing compound applications was observed to the enclosed areas and flanges.

After removal of the right rear quarter panel, we inspected the sectioning joints in the sail panel and rocker panel areas. This revealed multiple indications of burn-through, with welding wire sticking through to the backside of the joint. The right side rear quarter panel to rear door gap was at or near 7mm. Conversely, the left side rear quarter panel to rear door gap was at or near 5mm.

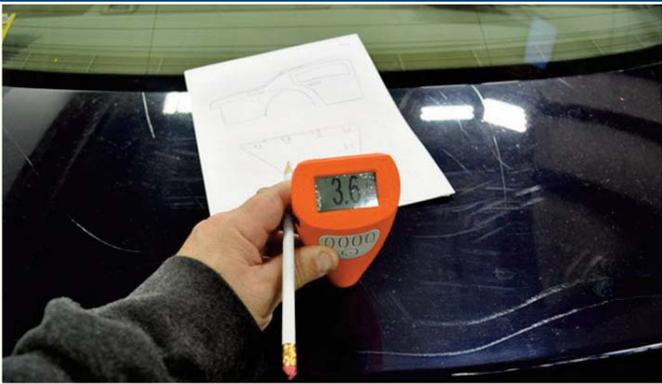
STRSW samples from the quarter panel and rear body panel mating flanges failed visual inspection and destructive peel testing. Intentional separation of the panels at the mating flanges revealed little to no metal tear out. Analysis indicates that bolt-on panels were adjusted to their maximum in attempts to have panels align to adjacent panels. This shows evidence to suggest the structure of the

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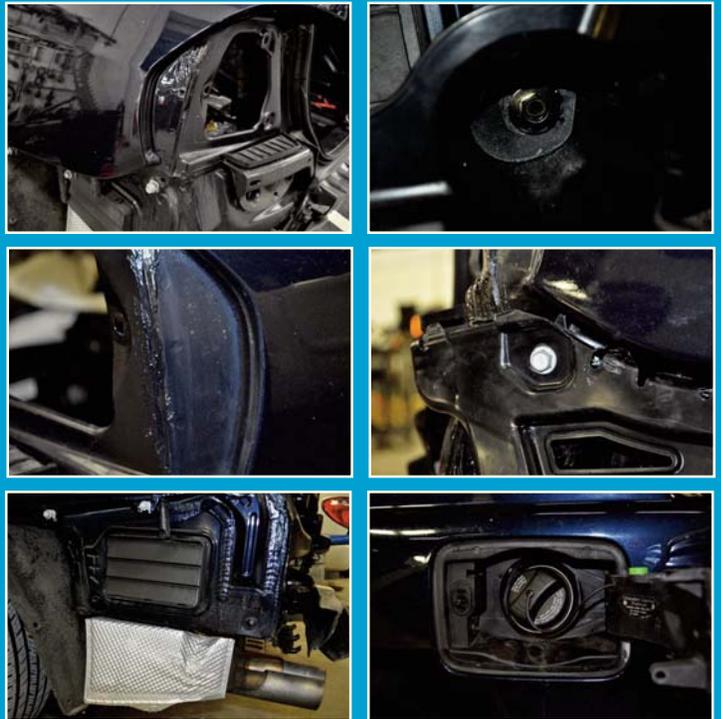
Photos courtesy of Lange Technical Services



Right wheel house to 1/4 extension: MAG plug welds present, requires rivet-bond procedure.



Film thickness measurement of new deck lid, 3.6mils. Slightly thin coating.



Clockwise from top left: Left side tail lamp pocket panel to left rear quarter panel, OEM Original; Bolt installed with butyl on right bumper side mounting bracket instead of a resistance welded stud; Bolt installed with butyl on right bumper side mounting bracket instead of a resistance welded stud; Fuel pocket with missing clips; Left side quarter panel to quarter extension panel, OEM untouched; Right tail lamp to quarter panel flange, seam open.

vehicle is misaligned and/or the replacement quarter panel and rear body were installed in the incorrect position.

The replacement rear body panel and right rear quarter panel were installed utilizing MAG welds and STRSW, although BMW of North America specifically requires panels to be installed with rivets and structural adhesives (rivet bonding). Multiple areas were observed with missing and/or improperly applied seam sealer. The repairs performed on the BMW from the incident of March 19, 2012 show evidence to support a direct relationship to the water intrusion to the battery tray/quarter extension panel.

Paint film thickness readings varied on the panels and were inconsistent. On new panels, readings ranged from 2.4mils to 3.2mils, suggesting not enough material application. On repaired panels, readings ranged from 4.2 mils to 8.8mils, suggesting too much material application.

### CONCLUSION

After our examination, Jesberger called the insurance company to come and inspect the vehicle. After inspecting it and reviewing our report as well as BMW repair procedures, the insurer decided to pay for the re-repairs.

The original estimate was written for \$6,859.59; the re-repair final repair invoice was \$22,595.80. We were later told the shop had paid restitution to the insurance company for the incorrect repairs. This is a prime example of two important things: First, a lack of knowledge and training can lead to disastrous outcomes; second, at least the repairs were performed at the insurance company's DRP facility, so the guarantee was there for proper repairs (to the vehicle owner's benefit in this case). If this repair was performed at a non-DRP facility, it could have taken a couple of years to settle instead of a couple of weeks. It is

unfortunate that in this technically advanced day and age, we still have an epidemic of poor repairs and finger pointing at the insurance company, when in reality the problem is the repair facility's lack of training, education and desire to change. Many times, their ego blocks the path to growth and success.

We hope this article has helped the industry to better understand what could go wrong with a repair, and the ramifications of those incorrect repairs. Feel free to contact us if you have any questions.

**H&D**

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### Executive Director's Thoughts

Understanding a repair-gone-wrong situation only helps everyone, including that person, to grow. Learn from the mistakes of others to prevent putting yourself in this same precarious position. Educate, train and equip, or know your limits and send that repair elsewhere. - Jordan Hendler