



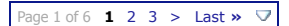
-- M3Forum Original (Updated)

[Mobile M3forum](#)

 DIY: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds)

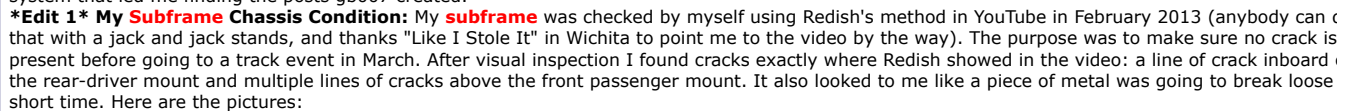
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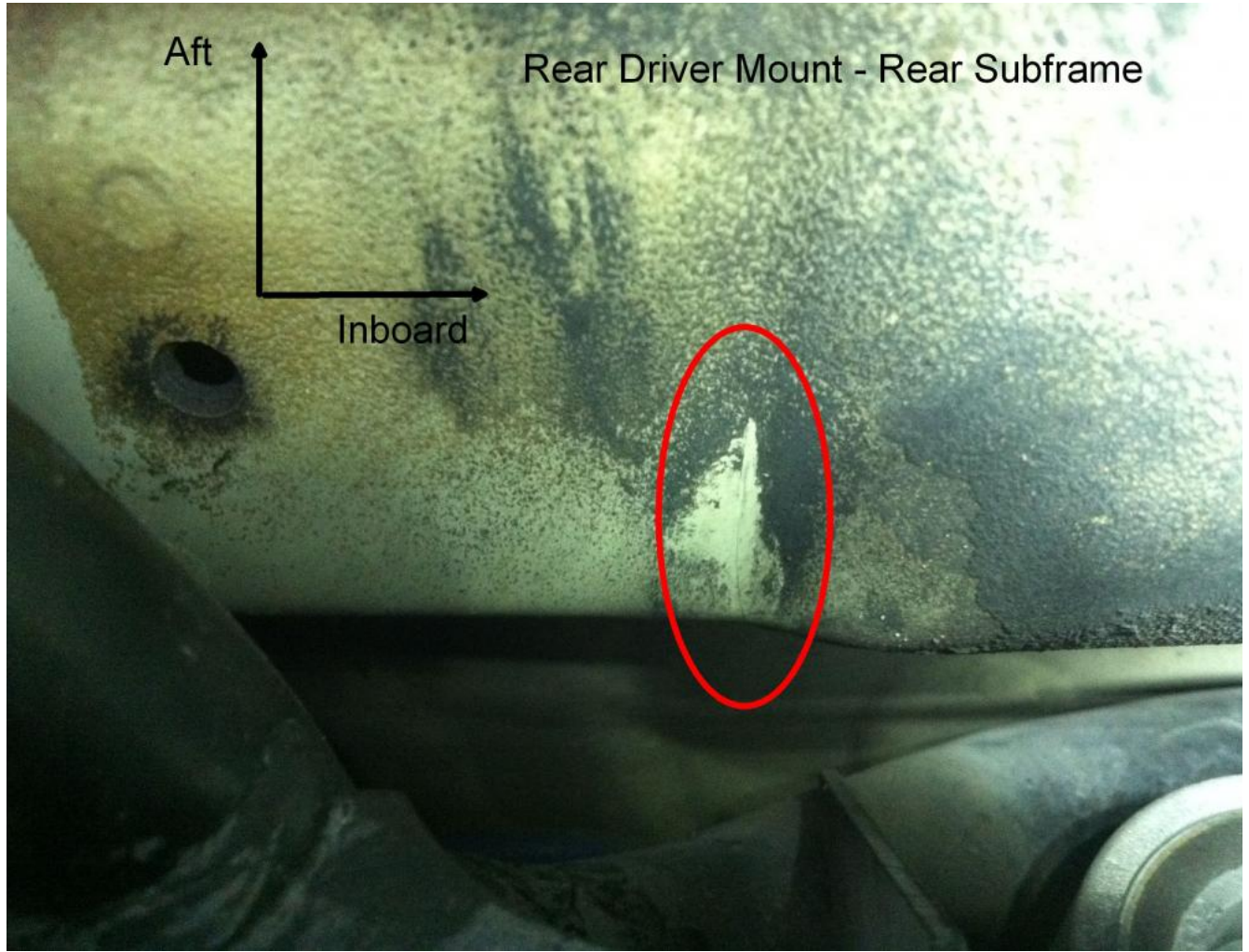
E46 M3 (2001-2006) Engine: S54 - Max Hp: 333 hp at 7,900 rpm / 262 lb/ft at 4,900 rpm
Total Produced: 45,000+ - Years Produced: 2001 to 2006.

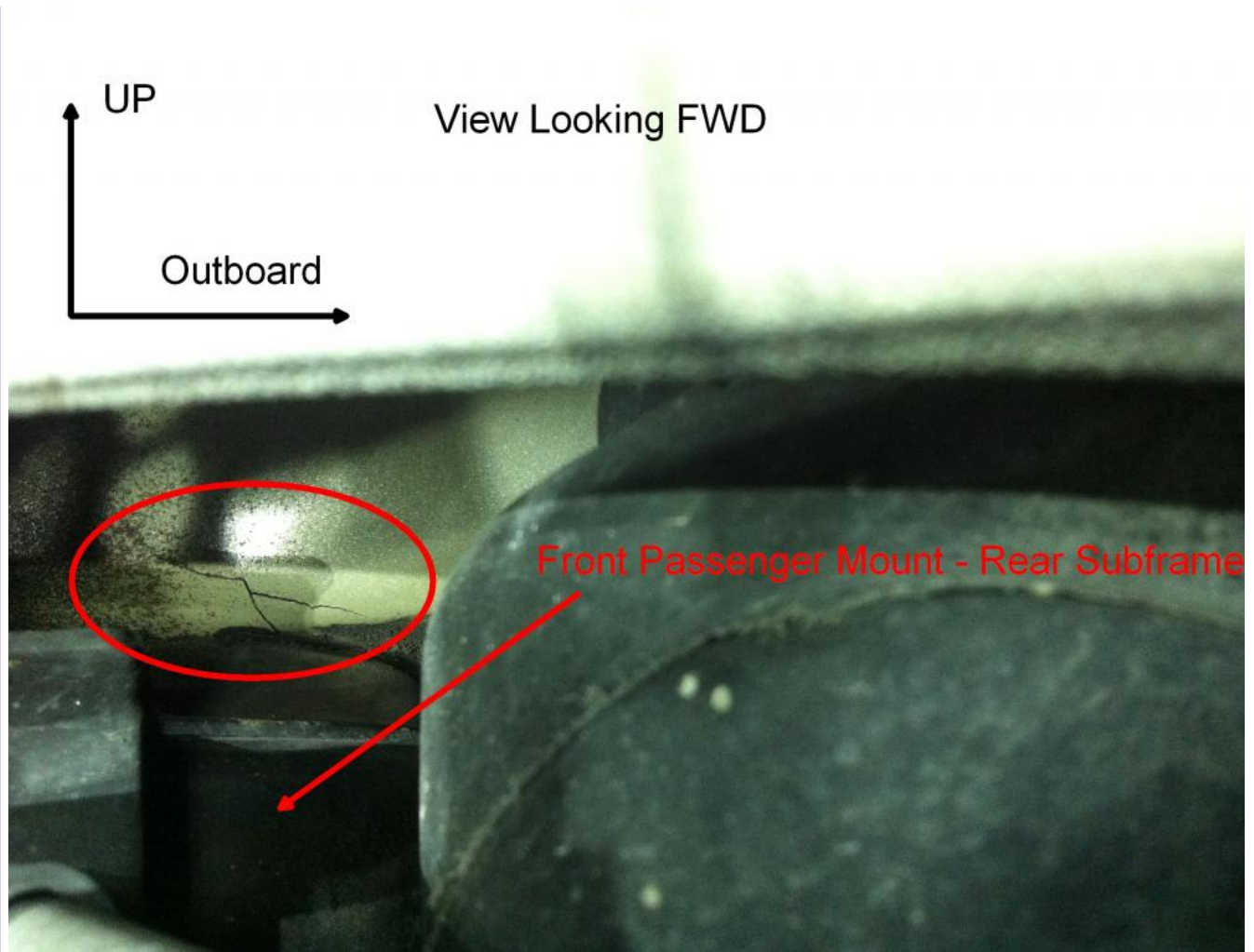


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Join Date: Mar 2012
Posts: 30
In the garage:
['01 BMW M3](#)
Reputation: 0 
Location: Wichita
iTrader: [3](#) reviews,
100%





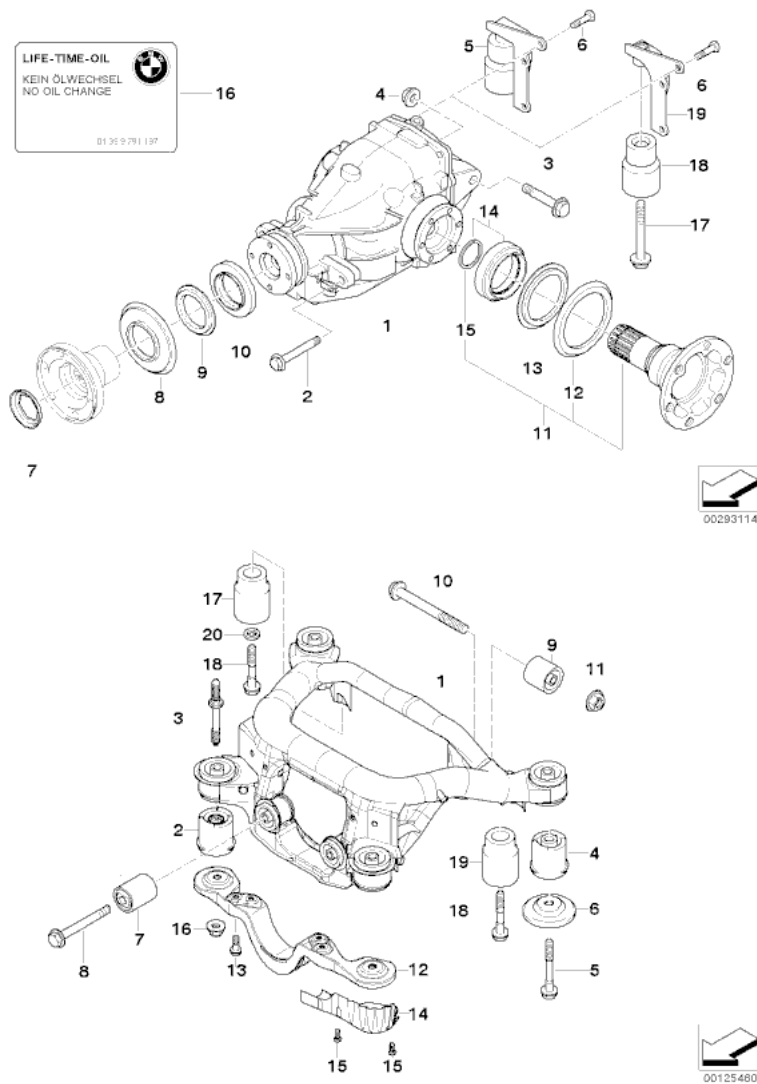


Research for Repair Method: I started to investigate for the best possible and permanent solution: reinforcement plate, structural foam, mason engineering's **subframe** support bar, or some kind of custom design reinforcement bar that will reinforce the **subframe** while save my rear seat and tr (mine is a family car with child seats in the back) were all being considered. However, as a structural engineer, without fully understanding the structure design, how the load was generated and transmitted from the drivetrain to the chassis, and the failure mode and cause, applying one or more of the existing repair does not mean it will guarantee a permanent long term fix. I say that because there are posts in this forum and e46fanatics that many owners out there that did the reinforcement plates, years later finding cracks in the **subframe** chassis somewhere outside of the reinforced area.

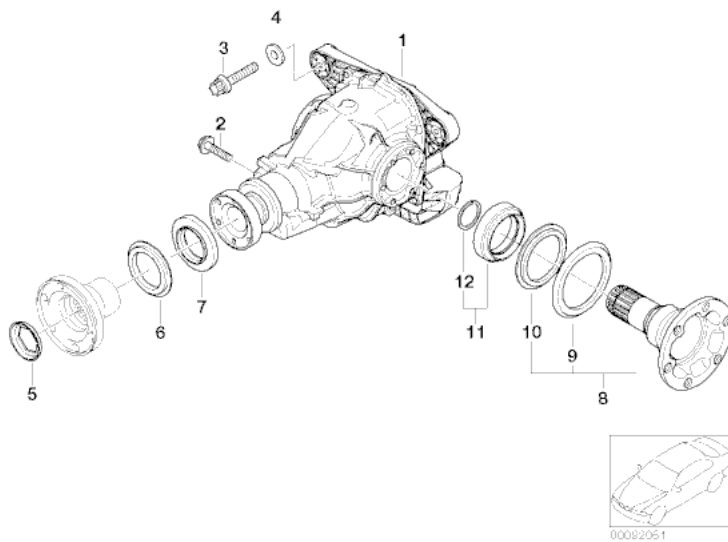
E46 Rear Subframe Structure Investigation: Search "E46 **subframe**" in Google will give you tons of pictures and posts from all over the world. You can find where and how the cracks look like on ALL THE M3 ARE EXACTLY THE SAME AND THE REST OF THE 3 SERIES ARE EXACTLY THE SAME! This led me to investigate the design differences between the two (M3 vs. Regular 3s).

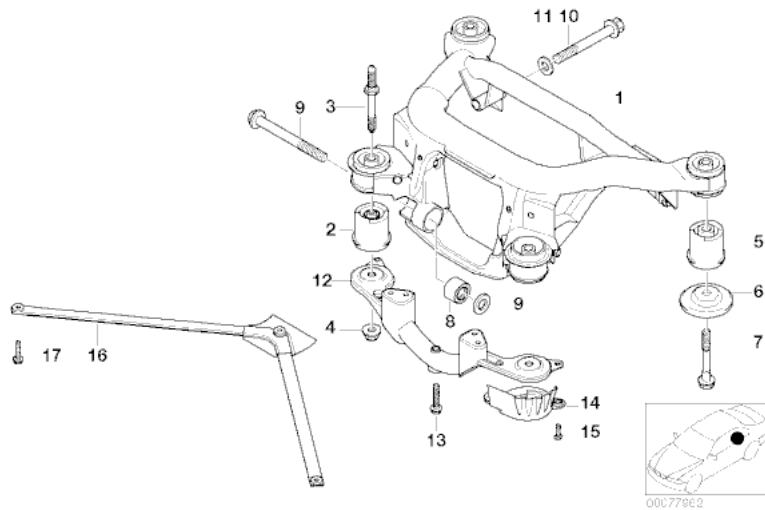
Subframe Mount & Differential Differences: Both the M and the regular 3's differential have 3 mounting points to the **subframe** carrier, however, the location is slightly different and that caused a big difference on how the load transfer to the unibody chassis. The regular 3 series' differential has 2 front driver rear mounts vs the M, 1 passenger front + 2 rear mounts.

Here is a picture of the regular 3 series diff (#5 & #18 are for automatic transmission but not for all models) and **subframe** carrier from realoem:



A picture of the M diff and M **subframe** carrier:





Detailed explanation on load transfer will be added later.

Credit of this repair method: many of the DIY'ers and contributors in m3forum and e46fanatics forum, European Car Company of Wichita KS that gave me countless hours of advice, some of my colleagues, some friends who helped me on final installation and most importantly: Redish Motorsport from LA. Redish posted and shared some of the greatest information about the **subframe** floor structure and failure cause about the E46 M3. It was their YouTube video that helped me find the (typical E46M3) cracks on the sheet metal panels and spot weld cracks. I highly recommend every E3 owner to watch all of their **subframe** YouTube videos. These are my favorite ones and explained why the convertible is better (not because of stronger floor but with the bulkhead aft of the rear seat to provide out-of-plane stiffness to the floor/subframe chassis):





To be honest I wouldn't be able to find the problem, analyze the structure, come up with the solution and implement the solution myself without any of the parties mentioned above. My solution might not be the best but in my opinion better than using the reinforcement plate and structural foam. I will edit this thread later to include my opinion why.

Summary of this repair:

Edit 1 I ended up drilling the holes of the front mounts, enlarged them to 0.5" diameter, then installed an aircraft grade bolt (AN8) for each hole. For the rear driver mount, I didn't cut and weld the top like other suggested because in my opinion the top side will never fail for the M3 due to the extra factory vertical welds. I repaired the spot welds, added a line of weld for the bottom flange on the wheelwell, and add fasteners around the failed spot weld to provide additional strength. I bought the reinforcement plate but didn't weld them on because it won't help anything. I already change how the load transfer on the front mounts. The bottom panel will never fail with the top panel connected always by the bolt.

I thought about creating a massive DIY thread in one shot but since there are many other people out there doing the **subframe** repair I hope to start this thread and share the information before it's too late for some folks. Again, I will edit it as I continue putting more information on it.

I have uploaded some pictures to my photobucket account. Descriptions of the picture will be adding in when I have time (Picture worth a thousand words so I am sure you all can figure out what I did).

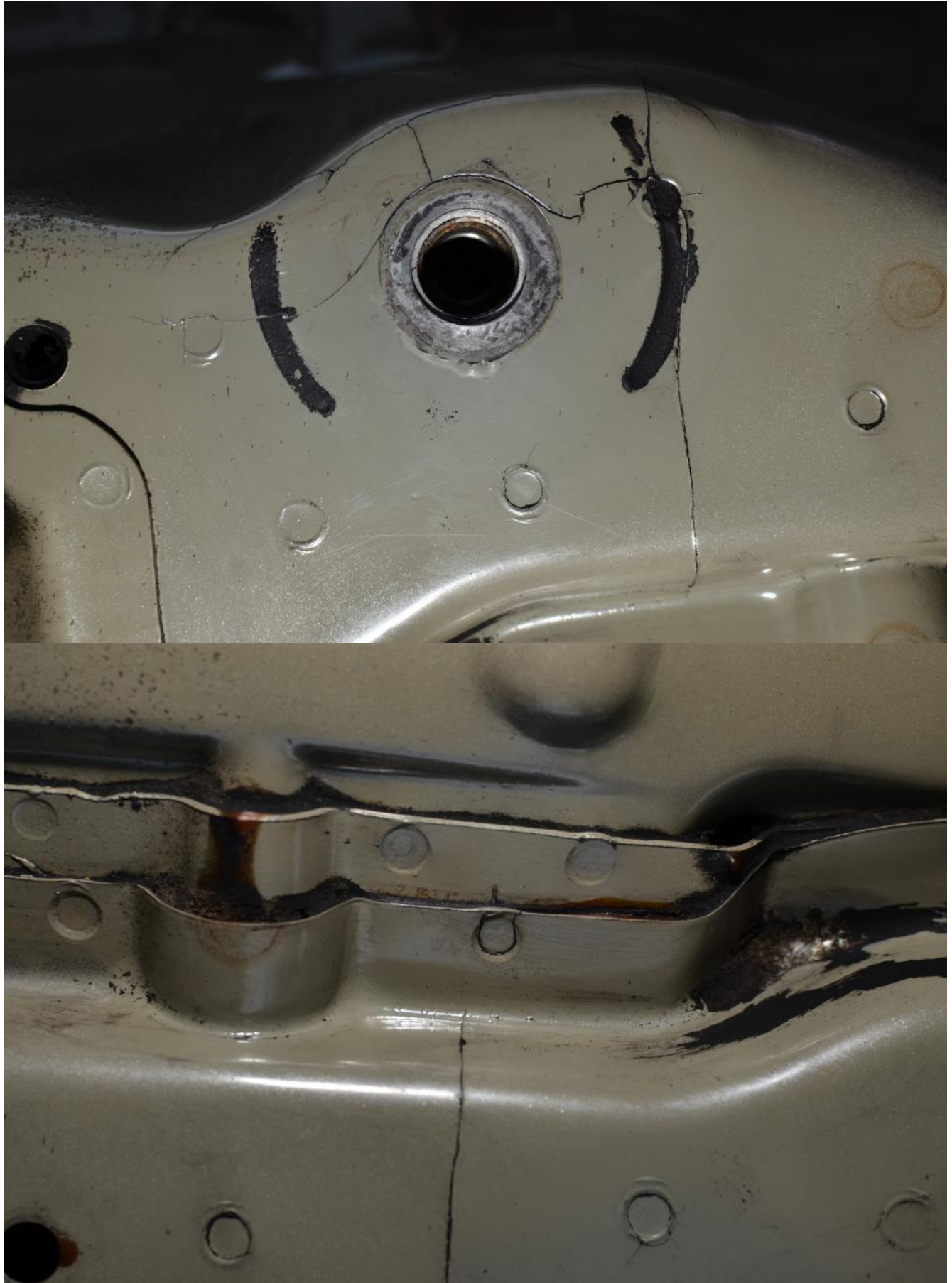
Here is the link to my album: <http://s1289.photobucket.com/user/CC...assis%20repair>

Edit 1 A few pictures from the album:





















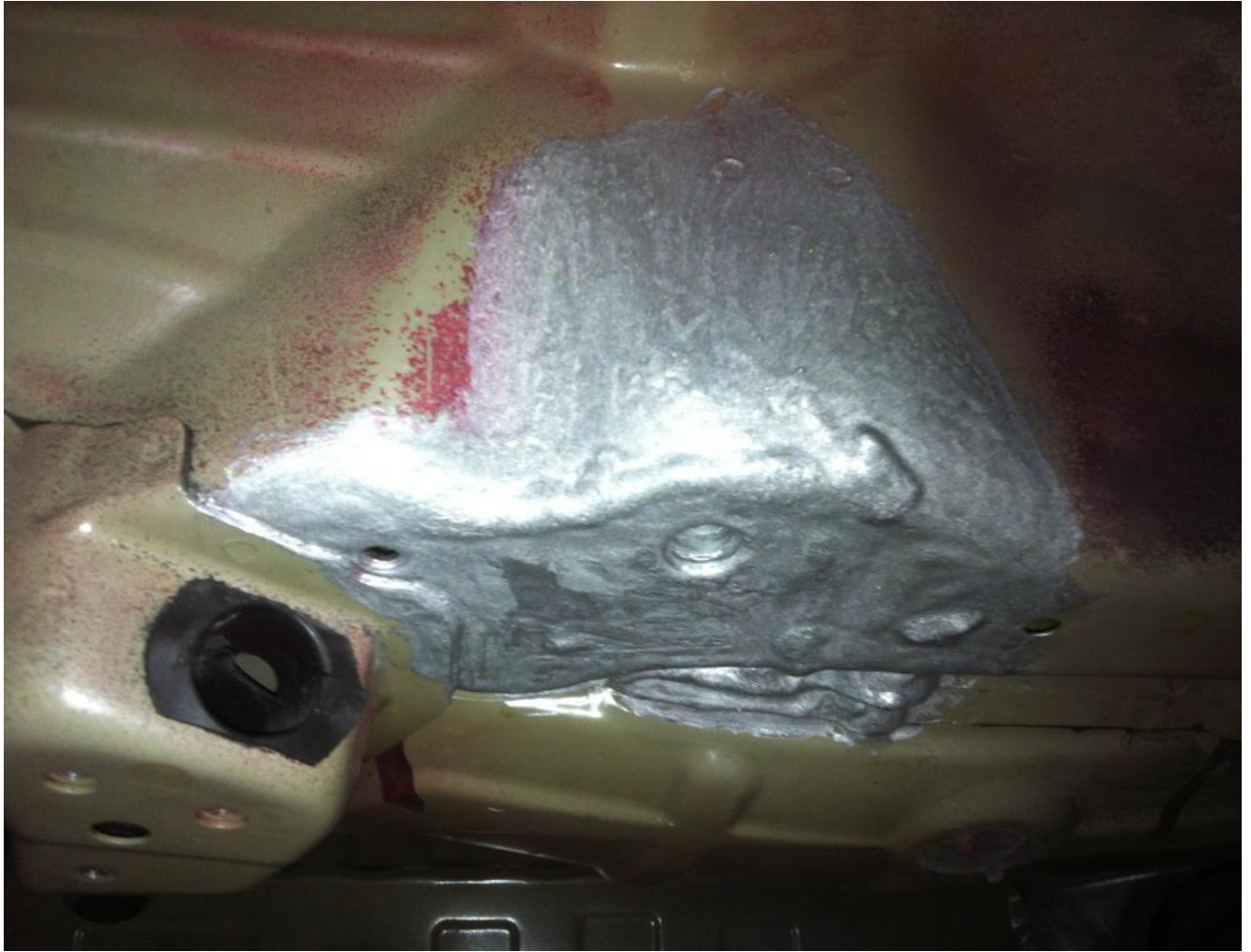






















I also created two videos to show you guys:

1.) how the top side of the front passenger mount looks like under hand-applied load on the stud when it was broken off from the top panel:



2.) with hand-applied force, how easily the bottom chassis panel near the rear driver mount was flexed without any spot weld holding on it (after spot welds were cracked)



Hope this would help someone out there trying to have their **subframe** repair/reinforced in the future.

Questions and comments about the repair are welcome. Ignorance individual will be disregarded.

Cheers.

Last edited by CCE46M3; Wed, Jul-24-2013 at 08:30:59 PM. Reason: Added extra information and pictures



Wed, Jul-24-2013, 08:32:33 PM

#2

CCE46M3

Registered User



Join Date: Mar 2012
Posts: 30
In the garage:
['01 BMW M3](#)
Reputation: 0
Location: Wichita
iTrader: [3](#) reviews, 100%



Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds)

Added additional information and pictures

Wed, Jul-24-2013, 10:24:40 PM

#3

kokgo20

Registered User



Join Date: Jan 2011
Age: 31
Posts: 2,092
In the garage:
['09 MERCEDES-BENZ CLS550](#)
['03 BMW M3](#)
['06 BMW 325](#)
Reputation: 0
Location: Memphis
iTrader: [9](#) reviews, 100%

Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds)

Nice work.



06/2003 SMG Tiag/IR - 600 TCKline - Euro Headers & Cats - Stoptech BBK 6 pod front & 4 pod rear with steel lines - 75mm Studs conversion - PF RTABs & FCABs - Multi color AEs - Iconz one piece bumper Lip - Roof & interior trim CF wrap - Smoked Side markers - painted bumper reflectors - V1 with hard wire&Stealth one - M Track Mod - ZCP steering rack - BMW MS 4.10 - Dual LI - CSL SMG flash - Euro DME flash - CSL Style diffuser - Dinan Intake - Borla Exhaust - E9x Door handle LEd retrofit - Seibon CSL bootlid



Thu, Jul-25-2013, 12:04:54 AM

#4

NZ M3
Registered User

Join Date: Apr 2005
Posts: 332
Reputation: 0
iTrader: [19](#) reviews, 100%

Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds

Interesting ...

Can you point out where you've placed these two bolts??





Are they directly over these weld fixes?? If so did you grind down the welds? Seems unlikely that you did!!



Very interesting fix - waiting to read a bit more on your analysis as to how you've transferred the loadings.



Thu, Jul-25-2013, 02:53:36 PM

#5

CCE46M3

Registered User



Join Date: Mar 2012
Posts: 30
In the garage:
['01 BMW M3](#)
Reputation: 0
Location: Wichita
iTrader: [3](#) reviews, 100%



Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds)

Thanks NZ_M3.

I assume you are asking where I purchase the bolts from (since it's pretty obvious the bolts are used for the front mounts). I bought them online from aircraftspruce.com.

I did grind down the factory weld, then used dye penetrant to check for cracks, then drilled holes 1/16" at the end of the crack as "cracker stopper", then welded the crack, then grind down the weld bead flat to the surface, then drilled the front mount from the bottom hole, then step drilled the hole 1/64" at a time until the diameter reached 0.5", then paint the area with POR15 Silver for corrosion protection and providing surface strength (and fill out tiny holes), then installed the long AN8 bolt with washers from top down. That's the picture I took after all that work.

More detailed information can be found here:

<http://s1289.photobucket.com/user/CC...assis%20repair>

I will move the descriptions from the album to this post so eventually everything will be captured here. Hopefully I can do that over this weekend.

For everyone doing the subframe repair, I highly recommend fixing the top side of the front mount if you have cracks on the bottom because they fail first.



2001/03 Titanium Silver/Black M3 Coupe Manual
2001/11 Steel Gray/Dove Gray 540i Touring Auto



Thu, Jul-25-2013, 04:06:52 PM

#6

kokgo20

Registered User



Join Date: Jan 2011
Age: 31
Posts: 2,092
In the garage:
['09 MERCEDES-BENZ CLS550](#)
['03 BMW M3](#)
['06 BMW 325](#)
Reputation: 0
Location: Memphis
iTrader: [9](#) reviews, 100%



Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds)

whats the part number for those big rubber pieces covers?



06/2003 SMG Tiag/IR - 600 TCKline - Euro Headers & Cats - Stoptech BBK 6 pod front & 4 pod rear with steel lines - 75mm Studs conversion - PF RTABs & FCABs - Multi color AEs - Iconz one piece bumper Lip - Roof & interior trim CF wrap - Smoked Side markers - painted bumper reflectors - V1 with hard wire&Stealth one - M Track Mod - ZCP steering rack - BMW MS 4.10 - Dual LI - CSL SMG flash - Euro DME flash - CSL Style diffuser - Dinan Intake - Borla Exhaust - E9x Door handle LED retrofit - Seibon CSL bootlid



Thu, Jul-25-2013, 04:14:41 PM

#7

DJAM3

Registered User

Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds)

Great info. Thanks for doing the analysis and taking the time to post it here.



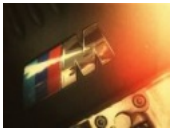
Join Date: Nov 2011
Posts: 121
Reputation: 0
iTrader: 0 reviews



Thu, Jul-25-2013, 04:22:00 PM

#8

CCE46M3
Registered User



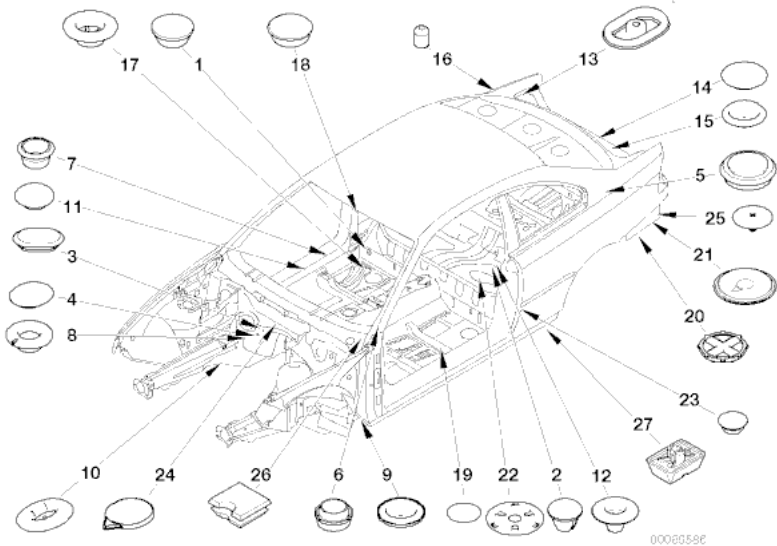
Join Date: Mar 2012
Posts: 30
In the garage:
'01 BMW M3
Reputation: 0
Location: Wichita
iTrader: 3 reviews, 100%



Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds

Quote:
Originally Posted by kokgo20
whats the part number for those big rubber pieces covers?

I used realoem.com to check part number:
<http://realoem.com/bmw/showparts.do?...57&hg=51&fq=80>



No.	Description	Supplement	Qty	From Up To	Part Number	Price	Notes	Photo
i D = hole-circle diameter in the body								
01	Blind plug D=12MM	63	51718110199	\$0.18				
02	Blind plug D=6,5MM	13	51718407016	\$0.18				
03	Plug D=6X12	1	51717052734	\$0.50				
03	Blind plug 19,6X5,8MM	1	51718163996	\$0.40				
03	Grommet bottom part 43X64 MM	1	64538380986	\$3.42				
04	Blind plug 30X36MM	1	51711872829	\$0.89				
05	Blind plug D=35MM	3	07147140849	\$0.73				
06	Cover lid D=12,7MM	1	12901722005	\$0.53				
07	Blind plug D=25MM	11	51718126605	\$0.39				
08	Blind plug D=11MM	7	51718235734	\$0.32				
09	Plug D=25MM	2	51718238450	\$0.79				
10	Plug 20X40MM	1	51718235717	\$1.92				
11	Blind plug D=20MM	32	07147140850	\$0.19				
12	Blind plug D=8MM	4	51718204406	\$0.18				
13	Blind plug D=25X45MM	4	51718226005	\$0.79				
14	Blind plug D=22MM	2	51711855009	\$0.50				
14	Blind plug D=6MM	2	51711904603	\$0.32				
15	Blind plug D=40MM	4	51712258519	\$0.89				
16	Cap 9	51718255004	\$0.33					
17	Blind plug D=10MM	6	51718226004	\$0.23				
18	Blind plug D=15MM	5	51718170298	\$0.23				
19	Sealing film PUR, D=30MM	8	51711922189	\$0.82				
20	Blind plug D=35MM	4	41007140847	\$0.68				

20 Blind plug D=20MM 8 41007140848 \$0.43
21 cover, floor panel rear 2 41127128476 \$6.58
22 Cover lid D=144MM 2 41128200462 \$5.07
23 Blind plug D=16MM 8 51718257286 \$0.40
23 Blind plug D=16MM 8 07147161442 \$0.28
24 Blind plug 1 64118373060 \$2.93
25 Plug D=30MM 4 51478217362 \$1.03
25 Clip D=30MM 4 51488245867 \$0.35
27 SUPPORT LIFTING PLATFORM 4 51718268885 \$14.75

I measured the diameter of all the different holes and ordered a bunch of different sizes from the dealership. These plugs and caps are cheaper to buy from dealership than online (about \$0.30 each).

I still have the bags of leftover. I will go check and report back.



2001/03 Titanium Silver/Black M3 Coupe Manual
2001/11 Steel Gray/Dove Gray 540i Touring Auto

Thu, Jul-25-2013, 04:24:10 PM

#1

kokgo20
Registered User

Join Date: Jan 2011
Age: 31
Posts: 2,092
In the garage:
['09 MERCEDES-BENZ CLS550](#)
['03 BMW M3](#)
['06 BMW 325](#)
Reputation: 0
Location: Memphis
iTrader: [9](#) reviews, 100%

Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds

I'm looking for this one that covers this hole

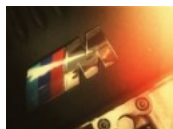


06/2003 SMG Tiag/IR - 600 TCKline - Euro Headers & Cats - Stoptech BBK 6 pod front & 4 pod rear with steel lines - 75mm Studs conversion - PF RTABs & FCABs - Multi color AEs - Iconz one piece bumper Lip - Roof & interior trim CF wrap - Smoked Side markers - painted bumper reflectors - V1 with hard wire&Stealth one - M Track Mod - ZCP steering rack - BMW MS 4.10 - Dual LI - CSL SMG flash - Euro DME flash - CSL Style diffuser - Dinan Intake - Borla Exhaust - E9x Door handle LED retrofit - Seibon CSL bootlid



Thu, Jul-25-2013,
04:36:55 PM

CCE46M3
Registered User



Join Date: Mar 2012

Re: Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds)

The part number for that one is 07147140850 (D=20mm)

The one on the lower left hand.

Posts: 30
In the garage:
'01 BMW M3
Reputation: 0 
Location: Wichita
iTrader: 3 reviews,
100%



It looks a little different than the old, dried, and cracked ones on my car but they fit tightly in the hole. That's all I cared.



On the other side



2001/03 Titanium Silver/Black M3 Coupe Manual
2001/11 Steel Gray/Dove Gray 540i Touring Auto



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E46 M3 (2001–2006)

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Discussing Alternate Rear Subframe Repair Method (Check the top of fwd mounts AND Spot Welds) in the E46 M3 (2001-2006) Forum - Engine: S54 - Max Hp: 333 hp at 7,900 rpm / 262 lb/ft at 4,900 rpm

Total Produced: 45,000+ - Years Produced: 2001 to 2006. at BMW M3 Forum.com (E30 M3 | E36 M3 | E46 M3 | E92 M3 | F80/X)