Worksheet for Guardrail Damage Assessment

This guardrail condition questionnaire was developed to aid highway maintenance personnel in assessing damage to guardrails and identifying materials needed for repair. The guidance presented herein applies to two of the most widely used strong-post w-beam guardrails – namely the modified G4(1S) and the G4(2W). If the answer to any of the questions in the questionnaire below is "yes" then it is highly unlikely that the barrier will perform acceptably in subsequent impacts, and the relative priority for repair is considered "high".

Name	
Date	
State	
Route number	
Side of road	
Mile post at start of damage	

Notes:

_____

_____

_____

_____

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_____

Document Damaged Components.

If the answer to any of the questions in the questionnaire is "yes" then document necessary materials using the table below.

Panel Type	# of damaged straight panels	# of damaged curved panels
galvanized steel		
painted		
powder coated steel		
weathering steel		

Bolts	# of bolts needed
Post Bolts	
Splice Bolts	
Other	

Post Type	Size	# of posts to be replaced	# of posts to be reset
galvanized steel			
powder coated steel			
weathering steel			
wood			

Block out Type	# of damaged block outs
composite	
steel	
wood	

End Terminal Type	Missing Components

Level 1: System Damage

If the answer is YES to any of the Level 1 questions, replace all visibly damaged components of the system within the limits of the end anchors and reset the undamaged components to a minimum height of 27 ⅝ inches.

___ Q1. Are there more than 9 inches of lateral deflection to the posts and/or rails?

___ Q2. Is the height measured from the ground to the center of the top corrugation of the w-beam less than 23 inches?

Level 2: Splice Damage

If the answer is YES to the Level 2 question, replace the missing or damaged bolts.

___ Q3. Are there any rail splices with <u>two or more</u> splice-bolt deficiencies? Do not count more than one deficiency per splice bolt.

- Missing splice-bolt
- Visibly missing rail material under splice-bolt
- Splice-bolt torn through rail

Level 3: Rail Panel Damage

If the answer is YES to any of the Level 3 questions, replace the damaged rails.

___ Q4. Are there any non-manufactured holes or horizontal tears that meet one or more of the following conditions?

- Intersect either the top or bottom edge of the rail
- Height > 1”
- Three or more non-manufactured holes or horizontal tears on a single panel

___ Q5. Does the rail have any vertical tears?

Level 4: Post Damage

If the answer is YES to any of the Level 4 questions, the missing and damaged posts should be replaced. The displaced and eroded posts should be reset. Any missing or damaged blockouts and/or post bolts should also be replaced.

___ Q6. Are one or more wooden posts missing, broken, rotted, or cracked across the grain?

___ Q7. Are one or more metal posts bent, deformed, or have metal tears?

___ Q8. Are the posts in good condition, but displaced?

___ Q9. Do two or more posts within a four post span length have soil eroded from them at a depth of 6 inches or more, as measured at the back of the post, or does one post have 12 or more inches or erosion?

Note: If there are any rectangular washers under the post-rail bolt heads anywhere in the system, they should be removed.

Level 5: Anchor Damage

If the answer is YES to any of the Level 5 questions, the damaged or missing components should be replaced. Remember to check both upstream and downstream anchors.

___ Q10. Is the end post sheared, rotted, cracked across the grain, bent, deformed, or has metal tears?

___ Q11. Is the anchor cable missing?

___ Q12. Is there more than 3 inches of vertical slack in the anchor cable?

___ Q13. Is the terminal bearing plate missing?

___ Q14. For energy absorbing terminal, are there any missing or failed lag screws?

___ Q15. Does the foundation tube stub height exceed 9 inches?

___ Q16. Is the groundline strut missing or otherwise non-functional?

___ Q17. Is there any other end-terminal damage that would result in more than 50% reduction in anchor capacity?

___ Q18. (*If system has wood posts*) Is there a combination of:

- Hazard located within 50 inches behind w-beam rail
- Stub height exceeds 7 inches
- Line posts have deterioration level of DL1 or greater

Level 6: Steel blockouts

If the answer is YES to the Level 6 question, you should consider upgrading all the blockouts to composite or wood. FHWA encourages agencies to upgrade existing highway safety hardware that has not been accepted under NCHRP Report 350 or MASH when the system is damaged beyond repair.

___ Q19. Does your system have steel blockouts AND have you answered yes to any question above?