

# 上海轨道交通 01A02 型列车拖车抗侧滚扭杆底座区域延寿改造

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**摘 要** 上海轨道交通 1 号线 01A02 型列车拖车是 1992 年设计生产的,目前已接近设计使用寿命。自 2015 年来多次发现该车型拖车车体裂纹,其中抗侧滚扭杆底座区域裂纹数量最多。为满足新造动车与原拖车同期报废需求,需对该车型拖车进行延寿改造。介绍了补强改造方案,并分 2 种工况校核了补强改造后的抗侧滚扭杆底座的疲劳强度。若要使原车体薄弱部位得到补强,延长使用寿命,且考虑到铝合金材质的焊接特性,必须在补强方案中尽量规避对铝合金材料

以采用铆接方式替代原焊接方  
的强度因焊接施工而大幅下降。  
上预制件替代原抗侧滚扭杆底  
与车体进行连接,满足该车体  
;抗侧滚扭杆底座;铝合金;

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**Modification of Anti-  
roll Bar Mounting Seat  
Area of Shanghai Rail  
Trailer Car**

f Shanghai Rail Transit Line 1  
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l original trailer cars, it is neces-  
modification for this type trailer  
ation plan is presented and fa-  
ions of the reinforced and modi-  
t under two working conditions  
e weak areas of the original car-  
e, considering the welding char-  
material, it is necessary to mini-

quirements within the carbody area can be met.  
**Key words** urban rail transit; vehicle; anti-roll bar mount-  
ing seat; aluminum alloy; riveting  
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上海轨道交通 1 号线 01A02 型列车由原 DC01 型列车“6 改 8”(6 节编组改为 8 节编组)增扩编改造而来,其拖车沿用原 DC01 型列车拖车,动车采用新造车辆。01A02 型列车拖车车体为 1992 年 ADtranz 公司设计制造的铝合金焊接车体,主体材料为 7 系铝合金,设计使用寿命为 30 年,目前已运营近 28 年,车体多处出现了裂纹,其中以抗侧滚扭杆底座区域裂纹数量为最。为确保 01A02 型列车能够满足延寿运营的安全需求,对其拖车的抗侧滚扭杆底座区域进行补强改造是关键之一。

## 1 车体裂纹原因分析

01A02 型列车拖车抗侧滚扭杆底座为多铝合金板材组焊的箱型结构,并通过焊接方式与车体相连接。01A02 型列车抗侧滚扭杆底座结构如图 1 所示。

01A02 型电动列车拖车车体主要材质为 7020-T6 铝合金。首先,可热处理强化铝合金焊接时,由于受焊接热的影响,焊接接头中热影响区会出现软化,即强度降低,使得基体金属近焊缝区部位部分

mize secondary and even tertiary welding work on the alumi-  
num alloy material in the reinforcement plan. Therefore, repla-  
cing the original welding method with riveting method can ef-  
fectively avoid a significant decrease in aluminum alloy materi-  
al strength due to welding. The fatigue strength checking calcu-  
lation results indicate that by replacing the original anti-roll bar  
mounting seat with a prefabricated component, which is then  
connected to the carbody by riveting method, the strength re-

的二次甚至三次焊接作业,所  
式能够有效避免铝合金材料的  
疲劳强度校核结果表明,通过  
座,并通过铆接方式将预制件  
区域内的强度要求。

**关键词** 城市轨道交通;车轴  
铆接  
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**Service Life Extension  
of Anti-Roll Bar Mounting Seat  
Area of Shanghai Rail  
Trailer Car**  
YU Zhiyi

**Abstract** The trailer cars of  
Shanghai Rail Transit Line 1  
01A02-type train, designed and  
manufactured in 1992, are cur-  
rently approaching their design  
service life. Cracks are repeat-  
edly discovered on the trailer  
car bodies since 2015, with the  
highest number of cracks obser-  
ved in the anti-roll bar mounting  
seat area. To meet the simulta-  
neous retirement requirements of  
newly produced motor cars and  
original trailer cars, it is neces-  
sary to carry out life extension  
modification for this type trailer  
cars. A reinforcement modifica-  
tion plan is presented and fa-  
tigue strength checking calcula-  
tions of the reinforced and modi-  
fied anti-roll bar mounting sea-  
t are performed under two work-  
ing conditions. To reinforce the  
weak areas of the original car-  
body and extend its service life,  
replacing the original welding  
method with riveting method is  
characteristics of aluminum alloy







