

441.

## Vekoma Boomerang coaster car axle cracking

We have received a report from a UK registered inspection body relating to issues found on a Vekoma Boomerang coaster car axle, on a Vekoma MK 1205 train. One is cracking through the cap mounting holes and the other cracking from the weld across the beam. The cracking through the holes extends to both sides of the hole and down to the bearing seat.

The committee notes that the cracking in the weld chassis is previously known (see attached service bulletins from Vekoma), but the second issue is the more unusual one.

*The information contained within the accompanying service bulletins is that of the manufacturer and not NAFLIC. When following the advice from the manufacturer, you are reminded of your duties and responsibilities under HSG175 regarding modifications.*

Committee Members: Mr. D Dadswell (Chairman), Mr. A Mellor (Secretary), Mr. P Smith, Mr. J Green, Mr. D Cox, Mr. I Davies, Mr. J Shilling & Mr. D Inman

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Supported By:



**SAFETY ALERT MESSAGE**

**Reference : P&S/CPE/0408.1707**  
**ISBN : 11111**

Date : 12 August 2004

To : MAINTENANCE DEPARTMENT OF ALL PARKS OPERATING A VEKOMA  
MK1200 RELATED TRAIN SYSTEM.  
From : VEKOMA RIDES PARTS & SERVICES B.V.

Rides involved:

BOOMERANG  
CORKSCREW BAYERN  
CUSTOM DESIGNED ROLLER COASTERS MK1200 system  
DOUBLE LOOP CORKSCREW  
HURRICANE  
WHIRLWIND

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Subject : Incident.

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Recently, an incident occurred with a MK1200 type of train in a park. A main axle of a MK1200 type of train was found broken. This train was delivered in 1997 by Vekoma Manufacturing BV to the park.

Vekoma Rides Parts & Services BV wants to underline the importance of follow up of the maintenance and inspection directives as stated in the owner's manual of the train. These inspection directives ensure that cracks are discovered already in a pre-mature state.

**THE INCIDENT**

During the ride a strange noise was heard. Inspection immediately after the ride learned that one main axle was broken during or just before start of the ride. No passengers were hurt due to this incident.

See pictures below:



## ANALYSIS

The line of the break originated from a crack in the center of the main axle. This crack, due to fatigue and, based on the rust patterns, was already in place for a considerable amount of time. The owner has applied powder paint to preserve the main axle. As a result of this flexible paint cracks could not be discovered in an early stage.

Vekoma Rides Part & Services will carry out further investigations in this matter in collaboration with independent parties. Vekoma Rides Parts & Services will keep all owners and operators of the MK1200 type of train informed on their findings when applicable.

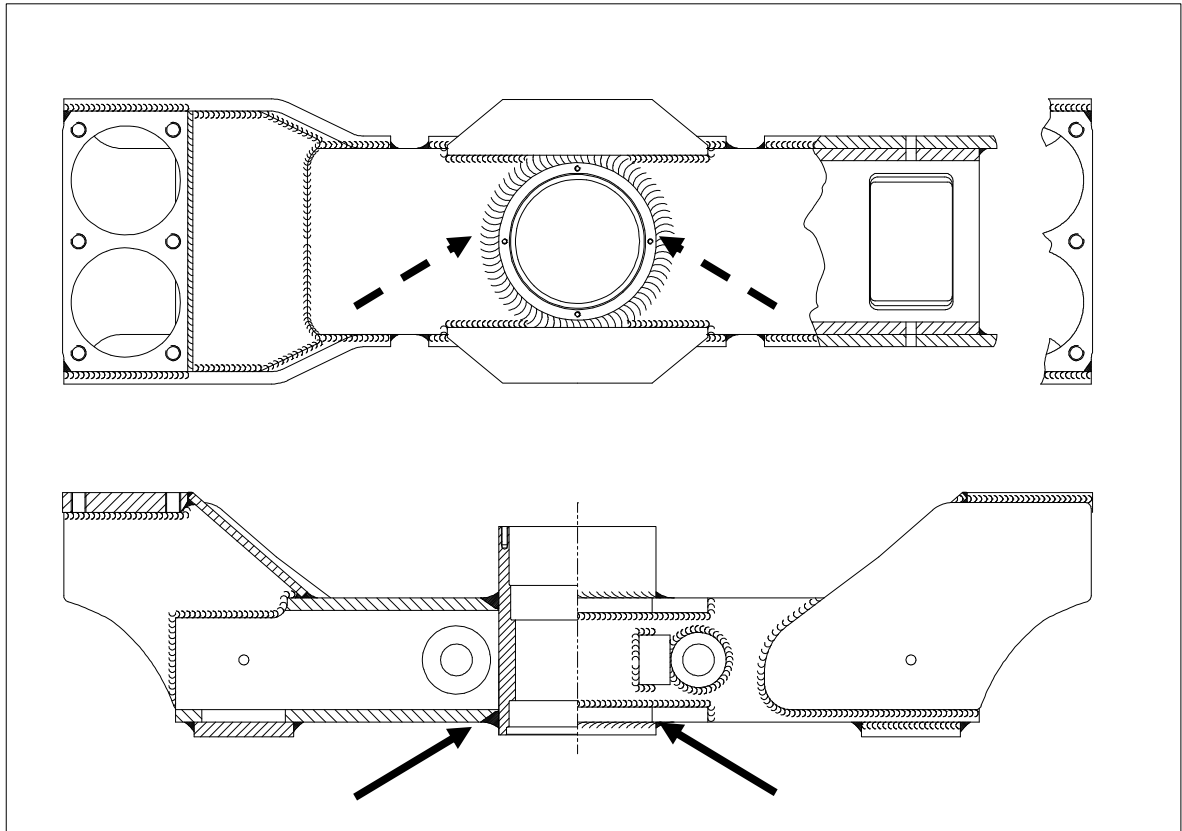
## CONCLUSIONS

Based on our knowledge at this moment we would like to advise owners and operators of the MK1200 type of train to carry out regular maintenance and inspections as described in the owner's manual. For your convenience the required actions are clarified below:

- The picture below shows that the weld itself is visual for inspection.



- Carefully weekly visual inspection as described in the manual to all welds on the axles, with special attention to welds as indicated with arrows on the pictures above and on the drawing below.
- Make sure that the actual paint is brittle, so the paint will crack when the surface below cracks.
- Make sure that the surface is clean and preferable painted in a lighter paint. This makes it easier to see indications.
- When there is any doubt, an additional NDT (UT and ET, or MT) inspection will be needed.
- We strongly recommend performing a major NDT (UT and ET, or MT) examination on these parts during the next winter stop.
- If there are any indications, please contact Vekoma Rides Parts & Services.  
Tel.: +31 475 409 222



If you need any assistance on the above, please feel free to contact Vekoma Rides Parts & Services.

We would appreciate to receive the results of your inspection.

Kind regards,

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Manager Vekoma Rides Parts & services b.v.

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Tech. update.



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Completion Date: Immediately

# Service Bulletin

Original Ride Manufacturer: Vekoma Manufacturing B.V. Vekoma International B.V.	Affected Production Dates: Between 1980 and 24-08-2001
Ride Name: See table 1: Affected serial nos.	Affected Serial Nos: See table 1: Affected serial nos.
Model No: All related main axles	384-1
Abstract of issue: This Service Bulletin gives <b>changed weld inspection of the main axle.</b>	
Reason for release: Recommendations within this Service Bulletin will help to discover cracks in an pre-mature stage. These recommendations are supported by TÜV.	
Action to be taken: Visually inspection of the welded joints of the main axle on weekly bases NDT examination of <b>all welds</b> during yearly maintenance. After 3 years of operation it is strongly recommended to increase the inspection from yearly to every 6 months.	

IB nr.	Ride Name	Project no.
27501	Boomerang	82608
27502	Boomerang	83515
27503	Boomerang	83530
27504	Boomerang	83535
27505	Boomerang	91685
27506	Boomerang	84545
27507	Boomerang	84555
27508	Boomerang	84565
27509	Boomerang	85590
27510	Boomerang	86785

Vekoma Rides Parts & Services B.V. issues notifications for the benefit of owners of amusement rides manufactured by Vekoma Rides Manufacturing B.V. as a service to the industry, and in the interest of employee and public safety. Vekoma Rides Parts & Services B.V. also issue notifications for the benefit of owners of amusement ride equipment for which the manufacturer no longer exists, such as Vekoma International B.V. and Vekoma Manufacturing B.V. In doing so, Vekoma Rides Parts & Services B.V. and Vekoma Rides Manufacturing B.V., including affiliated companies, agents and employees make no warranties and assume no responsibility for any misapplication or misinterpretation of the information provided, ride down time, consequential damages injuries, causes of action, claims, demands and expenses (including legal fees), of any kind or nature, arising directly or indirectly, in whole or in part, from or out of this notification or associated with amusement ride equipment built by manufacturers other than Vekoma Rides Manufacturing B.V.



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IB nr.	Ride Name	Project no.
27511	Boomerang	86780
27512	Boomerang	86725
27514	Boomerang	86715
27515	Boomerang	86640
27516	Boomerang	87505
27517	Boomerang	93104
27518	Boomerang	87610
27519	Boomerang	87685
27520	Boomerang	89587
27521	Boomerang	89605
27522	Boomerang	89610
27523	Boomerang	90510
27524	Boomerang	90523
27525	Boomerang	91678
27526	Boomerang	95155
27527	Boomerang	95163
27528	Boomerang	96378
27529	Boomerang	96372
27530	Boomerang	96340
27531	Boomerang	96293
27532	Boomerang	97105
27533	Boomerang	97117
27534	Boomerang	97153
27535	Boomerang	97128

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Ride Name: See table 1: Affected serial nos.	Affected Serial Nos: See table 1: Affected serial nos.
Model No: All related main axes	384-1

IB nr.	Ride Name	Project no.
27536	Boomerang	97196
27537	Boomerang	98113
27538	Boomerang	98111
27539	Boomerang	99306
27540	Boomerang	97333
27541	Boomerang	99269
27542	Boomerang	98112
27543	Boomerang	20151
<hr/>		
29001	Corkscrew Bayern	78240
29002	Corkscrew Bayern	78820
29003	Corkscrew Bayern	78830
29004	Corkscrew Bayern	78840
29005	Corkscrew Bayern	78850
29006	Corkscrew Bayern	80860
29007	Corkscrew Bayern	80870
29008	Corkscrew Bayern	81500
<hr/>		
28501	CD Roller Coaster	85525
28502	CD Roller Coaster	85530
28503	CD Roller Coaster	91078
28504	CD Roller Coaster	87580
28505	CD Roller Coaster	88692
28506	CD Roller Coaster	92511
28507	CD Roller Coaster	97121



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IB nr.	Ride Name	Project no.
29502	Double Loop Corkscrew	82550
29503	Double Loop Corkscrew	82560
29504	Double Loop Corkscrew	84535
29505	Double Loop Corkscrew	87695
31001	Hurricane	87690
31002	Hurricane	95116
33001	Tornado	81511
33002	Tornado	87640
33003	Tornado	89561
33501	Whirwind	80710
33502	Whirwind	80720
33503	Whirwind	80730
33504	Whirwind	80740
33505	Whirwind	80750
33506	Whirwind	81526
33507	Whirwind	81527

table 1: Affected serial nos.

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Details of issue:

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## Revision summary

Date:	Revised part
22 May 2007	Re-release bulletin: Change NDT examination of <b>all welds</b> during weekly and yearly maintenance.

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Details of issue continued:

## 1.1 Why this service bulletin

It is important to follow up the maintenance and inspection instructions as stated in your owner's manual of the amusement ride. The instructions provided herein will help to discover cracks in a pre-mature stage. Therefore the following paragraphs (weekly and yearly inspections for the main axle) are recommended.

### 1.1.1 General instructions:

- Only use brittle paint. With brittle paint the paint will crack when the surface below cracks.
- Use a lighter color of paint. This enhances the visibility of indications of cracks.
- Make sure the surface is clean. This enhances the visibility of indications of cracks.

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Model No: All related main axles	384-1

Details of issue continued:

## 1.2 Weekly maintenance

- 1 Visually inspect all welds of the axle.

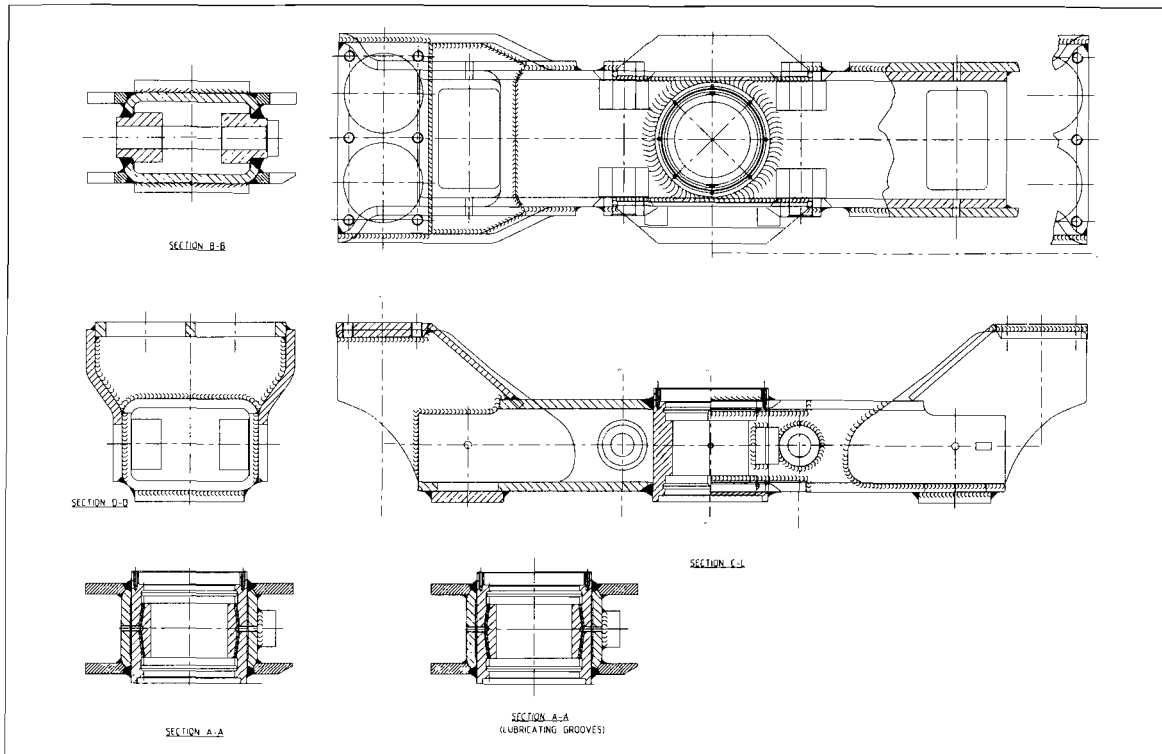


figure 1: Welded joints to be checked

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Model No: All related main axles	384-1

Details of issue continued:

### 1.3 Yearly maintenance

- 1 Check **all welds** of all main axles and rear axle for indications of cracks.

**Note**

*After 3 years of operation it is strongly recommended to increase the inspection from yearly to every 6 months.*

The axles can only be used further if:

- An independent, thorough investigation (according to EN13814 and/ or ASTM F24-standards) shows that the condition of the axles is still acceptable, and;
- They will be investigated again in accordance with the intervals mentioned in these standards

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Details of issue continued:

## 1.4 Non destructive testing

According to the yearly inspection the main axle must be examined by means of a NDT testing.

This section gives general information on how to handle when NDT inspection is required, in a way that:

- all activities relating to NDT examination, will be executed in such a way that this contributes to a uniform performance and,
- the judgements of the results of the NDT testing will be all equal.

### 1.4.1 Related codes and standards

Parts should be inspected according to valid codes and standards.

For example:

Codes	Section / article
ASME V	Article 7
ASME VIII	Division I Appendix 6
EN 10228	Part 1 Magnetic particle inspection
EN 10228	Part 2 Penetrant testing

table 2: Related codes and standards

Vekoma Rides Parts & Services B.V. inspects parts according the related codes and standards mentioned in table 2:

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Details of issue continued:

### 1.4.2 NDT Personnel

- ▼ **To be sure about correct testing and evaluation, NDT personnel must be:**
  - Instructed and trained, by an independent and recognized inspection authority,
  - Qualified and certified to the EN 473 and SNTC-TC-1A, level II.

### 1.4.3 Inspection procedure

- ▼ **In order to check and evaluate parts, proceed as follows:**

- 1 Remove the paint, moisture, oil or grease and dirt.  
Remove the paint by e.g. sand blast or a liquid paint remover.

**Note:**

*Do not use steel grid blast.*

- 2 Remove any slag and spatter work (if still present) from welded joints.



**If cracks are found, contact an experienced party, for example Vekoma Rides Parts & Services B.V.**

### 1.4.4 Results of entity

Fill out all the inspections and repairs that are made to the parts of the ride.

For this purpose use the inspection list and repair list, both added in the logbook.



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Details of issue continued:



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