

TECHNICAL BULLETIN

V90-3

Subject : Corkscrew trains type MK 1200, MK 900 and
Suspended Coaster trains

Concerns : Wheels

Date of issue : October 1990

Type : All the wheels (make Arrow)

Reference : Service Department

Prepared by : A. dan Otter

Summary contents : Regular inspection of the wheels

Background information

The polymer wheels of the roller coaster systems are subject to wear and therefore are recovered regularly by many park. Experience in practice learns us that because of this recovering process, which is carried out under rather high temperatures, the quality of the material decreases. As a result, the process of fatigue is speeded up.

Until now, some of our clients have detected cracks in the aluminium rim of the wheels. It happens that in these cases the wheels had been recovered many times.

Recommendations

Since it is very hard to determine the progress of this fatigue process, we recommend to exchange the wheels completely after they have been recovered for 5 times at the utmost. Thus, possible risks can be avoided.

Many parks now carry out the recovering under own supervision. Taking into account the care that is required for this heat treatment, Vekoma wants to emphasize that this process only has to be carried out by companies qualified for this kind of treatment.

Furthermore, we think it necessary to check all recovered wheels visually for cracks at least once a week. For a good inspection it is necessary to remove all the oil, dirt and grease.

In the enclosed sketch those parts have been indicated that need most attention.

Supplementary information

Current experiences with our clients learn us that until now, this phenomenon has only appeared in cases that the wheels have been recovered many times. It goes without saying that this kind of wear is normal with products that are subject to dynamic loads. Taking into account the safety aspect, we strongly recommend to carry out the inspections regularly.

Should you still have questions, please do not hesitate to contact our service department.

TECHNICAL BULLETIN

V90-4

Subject : Corkscrew trains type Mark 1200 and
Suspended Coaster trains

Concerns : Shoulder bar

Date of issue : October 1990

Type : All Corkscrew (Arrow) trains

Reference : Service Department

Prepared by : A. den Otter

Summary of contents : Extra inspection of the shoulder bar.
Introduction of new design

Background information

Some parks experienced breakage of the shoulder bar (make Arrow). This fracture can occur in the thin tube at the place where this has been pushed into the thick tube quite near the point of rotation of the bar. The crack starts at the welded joint between the thin and the thick tube.

Experience in practice learns us that after a while, crack formation and/or fracture formation may occur because of frequent high and varying stresses. Vekoma now has designed a bar with a stronger construction, that also can be visually inspected much easier.

Recommendations

Since the safety of the user can be at stake, we recommend to replace all the Arrow shoulder bars for the newly designed Vekoma bars. Taking into account the varying use, fatigue symptoms are very hard to detect and therefore it is not possible to guarantee a specific operational life.

At the same time it showed that in practice it is impossible to determine the remaining operational life, because the welded joints cannot be inspected by means of X-rays and the PUR coating does not allow a visual inspection.

Furthermore, we assume that the daily inspection includes inspection of possible play in the bar. In case of play, the bar has to be replaced immediately.

Caution:

Do not have the existing bars recovered, but exchange them for a new Vekoma bar. The heat treatment influences the strength of the construction in a negative way.

Supplementary information

All the recently developed Vekoma Mark 1200 trains have been provided with Vekoma designed bars. The bars meet the German T.U.V. norms.

Should you still have questions, please do not hesitate to contact the Vekoma service department.

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

Subject : Incident.

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.

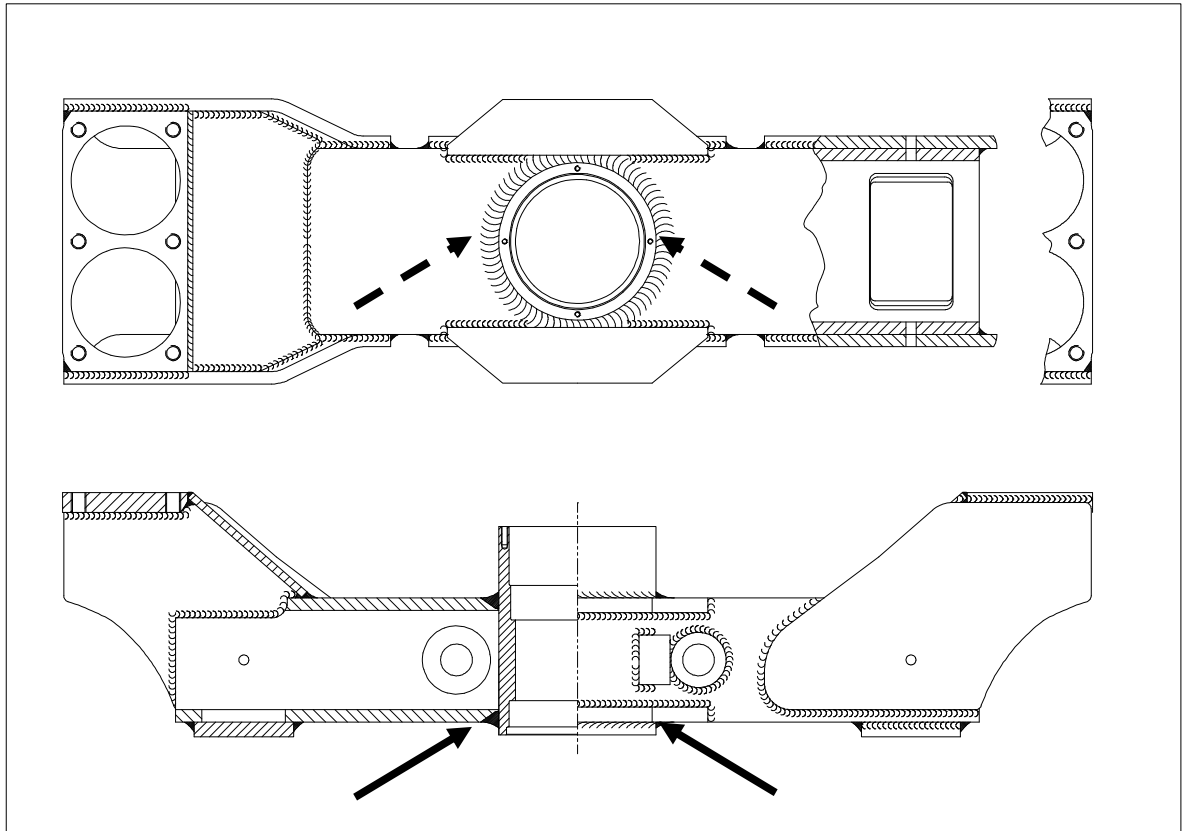
CONCLUSIONS

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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