

Der GARTENBAHN *profi*

1 / 2005

www.gartenbahnprofi.de

INTERNATIONALES MAGAZIN FÜR GROSSE MODELLBAHNEN

© 2005 GARTENBAHNprofi
ALL RIGHTS RESERVED

Translated by: Hans-Joerg Mueller

If you require additional information regarding the English version of the **GARTENBAHNprofi**
please contact Eastern Mountain Models Ltd.
sales@easternmountainmodels.com or phone: 250-558-1867 or FAX: 250-558-6186

Pre-View Copy

Prototype

Heavy Weight from the Harz – the “22” ... Page 14

The compact size of the 99 7222-5 is impressive. Jürgen Rech draws a portrait of the last surviving example of the standardized Series dating from 1931. The type which LGB chose for its most recent product.

She reached the required age some time ago - however 99 222 of the Harz Narrow Gauge Railways (HSB) knows no retirement. The last reminder from a series of engines built in 1931. Almost 40 years after her transfer to the Harz she still powers trains on a daily basis to the top of the “Brocken”.

The engineers on the HSB refer to her simply as “the 22”. LGB is now producing a model in 1:22.5, which is a fitting tribute to this type of Meter gauge steam engine.

The origins of this series dates back more than 75 years. The railway directorate Erfurt reported requirements for new steam engines to the main administration in Berlin late in the 1920s, since the Prussian engines running on the Meter gauge network were completely outdated. The motive power department at headquarters in cooperation with the standardization office of the German Engine Producers Association designed a 1' E 1' h2 tank engine designated as Series 99 22. The technical short form stands for a steam engine with a lead axle (independent of main frame), five connected driver axles and a trailing axle (independent of main frame), powered by two cylinders using super heated steam. Originally it was planned to use this type

not just in Thuringa, but also - with necessary adaptations - in Bavaria, as well as in Baden and Württemberg.

In 1930 the initial order for three engines of this type went to the Berliner Maschinenbau AG (BMAG - Berlin Machineworks Co.), formerly Schwarzkopf. They delivered the engines numbered as 99 221 through 223 (according to the DR numbering scheme) to RD Erfurt (the builder numbers were 9920 - 9922). The engines which deliver 750hp were the most powerful on the DR (Deutsche Reichsbahn - German State Railway) and influenced the design of the later Standard Gauge-Series 84 and 85.

RD Erfurt utilized the powerful engines on the Eisfeld - Schönbrunn line to haul passenger and freight trains. The engines were able to haul 145 metric tons on a 1% grade with curve radii as small as 60m (187 ft) at a speed of 45kmh (28mph). On 2.5% grades 195 tons could be hauled at 20kmh (12.5mph). Despite this impressive performance the Series was not enlarged.

During WW2 (June 1944) numbers 99 221 and 223 got transferred to German occupied Norway and pressed into service on the copper ore line between Thamshaven and Lökken, where they remained after the war. Since there really was no call for engines of that performance capacity 99 223 was retired in 1947.

99 221 was scrapped six years later.

Prototype for a series of new engines

99 222 survived the war on her home line in Thuringa. In the 50s she became the “how to” model for the engineers at VEB Lokomotivbau Karl Marx (State owned engine producer), who were designing new Meter gauge engines. The Babelsberg producer delivered 99 231 through 99 247 between 1954 and 1956, which had marked differences to 99 222. Worth mentioning are: welded boiler and the frame assembled from plate steel on these new engines. The steel plates are considerably lighter and the sides of the frame correspondingly higher in order to achieve the same rigidity. The 99 222 had also a plate frame but of much heavier material thickness. But for appearance the real eye catcher was the squared off pre-heater above the smokebox, this in contrast to the Knorr preheater (nicknamed the rolling pin because of its shape) on the 99 222. The 99 222 remained in Thuringa until 1966. She was assigned to the Eisfeld - Schönbrunn line, together with 99 231, 235, 236 and 237. On Aug 1, 1966 she was transferred to Wernigerode in the Harz, to be used on the Harzquerbahn. Soon the old engine started to show considerable wear and several technical modifications were the result. In 1973 the pre-heater was replaced with one similar to the newer engines. A short time later the engine was fitted with a simplified version of the “Troffimoff” pressure equalizer valve (to

reduce valve gear wear). Prior to that the loadtransfer plate of the center buffer had been extended to conform with Harz standards. In Spring of 1970 the engine was renumbered to 99 7222-5 (according to computerized scheme). But 99 7222 was spared the conversion to oil, which was refitted on the other engines in the late 70s.

Plenty of damage in daily use

With the re-assignment of the oil-fired engines, now called the 99 0231 etc. DR decided to take 99 222 out of daily duty. An additional steam line was fitted and she was now relegated to pre-warming duty for the oil-fired engines. The appearance of the engine declined progressively, the boiler suffered considerably during this duty.

Only after the newer engines were converted back to coal - a result of the oil crisis in the early 80s - was the star of 99 222 again in ascendancy.

After a stint in the repair facility at Görlitz she returned to regular duty, albeit only for a short period. The competitions for "The Blue Ribbon" which the crews engaged in on the "Steinerne Renne" to "Drei Annen Hohne" section, sidelined

the engine soon enough.

Reason: Cracked cylinder! Repeated attempts to weld the crack on the cast iron cylinder ended without success, to machine a new cylinder was at that time not feasible.

As a result 99 7222 was transferred to Gernrode and saw regular duty - despite cylinder cracks - on the light trains of the Selke Valley Railway. Since she required a larger - in comparison to the newer engines - minimum radius (60m), it wasn't long before the running gear started to wear badly. The engine had to be set aside again.

Luckily the engine underwent a major overhaul in 1991. The cylinders were replaced with new, welded types and the running gear was reconditioned. April of 1991 saw the engine back in regular duty on the Harzquerbahn and 1993 on the newly reactivated Brocken line.

On the afternoon of Aug. 21, 1994 engine 99 7222 was at the head of a valley bound passenger consist and at km 53.4 - the Thumkulental curve which has very limited visibility - collided head on with mountain bound Diesel 199 892. The Diesel was a write off and 99 7222 was heavily damaged, but the sturdy frame escaped without damage.

On the line as 99 222

During the winter of 1998/99 the engine was at locomotive works Meiningen to be repaired and in some instances converted. The original round pre-heater was reinstalled. The toolbox behind the stack was removed and replaced with a Knorr compressed air powered bell. The unsightly addition in front of the cab was removed. The engine was fitted with the old 99 222 number plates and since end of March 1999 she is back on the tracks of the HSB. Doing regular daily duty as well as powering special excursion trains and being admired in her old glory.

Between Oct 8 and 10, 2004, the engine was a major attraction at the "Modell und Hobby" expo in Leipzig, both for the HSB as well as LGB's new model of the same engine. For the occasion the engine was fitted with the 99 7222-5 number plates. Since Oct 13 the engine is back on her home turf, hauling trains up to the Brocken.

Jürgen Rech/HJ

Captions to pictures:

Page 14 (Small picture). Faces of an old steamer: The above shows the engine at Wernigerode (1997) with the squared pre-heater. This is the version of the current LGB production (first issue of engine).

Page 15. Since an overhaul during winter of 1998/99 the engine sports the

old, round pre-heater and the old numbers. Jürgen Rech took the picture of 99 222 in Feb 2001 at Kirchstrasse (Church Street) in Wernigerode.

Page 16 (top). 99 222 after back-conversion to the distinctive "rolling pin" pre-heater with a photo-freight of standard gauge cars on dollies near Stiege, Feb 2001.

Page 16 (bottom). Current version at

whistlestop Hochschule Harz in Wernigerode.

Page 17. Prior to the conversion of the squared pre-heater and various other items; 99 7222-5 at the head of a passenger consist in the Dränge Valley near Drei Annen Hohne. Sept 1997

All pictures; Jürgen Rech

A Puzzle with 600 pieces... Page 18

The development of the 99 7222-5 Harz steam engine in 2m scale came to more than 1.2 Million Euro.

GARTENBAHN*profi* had the chance to learn more about the special challenges during the construction of this large steamer from LGB CAD-designer Ralf Schiffermüller.

Nokia does it, the auto industry does it and likewise LGB plans ahead during the construction phase. By the time a new model appears in the stores, the marketing department is already aiming at the next two. This is necessary because the expenditures for design and tooling are major cost factors with smaller and shrinking production numbers.

Foresight during the planning phase pays dividends since early design consideration will avoid expensive changes. Thus with the Harz engine there were at least three versions in planning from the very start; whoever doesn't count the 99 7222-5 among his favourites will most likely find "his version" in the LGB product line within a few years.

The times are gone when Lehmann used different colour and lettering schemes to quickly add a "NEW" item to the catalogue. Consumers have become more discriminating and demand in large parts correct replicas of prototypes, not colour variations of approximately accurate engines. In turn they are willing to pay an appropriate price.

Lehmann decided, as can be seen by the new Harz engine and some of the newer RhB items, to not only attempt doing the splits between durability, scale and detailing; they opened a new chapter and presented a model of the Harz engine which has nothing to like about it.

The clientele will appreciate that. Even if some self appointed critics in the Internet fora haven't noticed the fresh breeze in Nürnberg and still stubbornly cling to their prejudices.

The engine was a "sure thing" back in 2002

The decision to build the 1' E 1' (2-10-2) Harz engine was taken in 2002. The first info was very discreetly assembled. The

HSB provided drawings, even the originals from 1931 were dug up. Master model builder Walter Lechner (model builder is a proper profession in Europe, complete with a diploma!) spend 800 hours to build a scale prototype model. "May of 2003 was the start of the CAD design on the 99 7222-5" mentions designer Ralf Schiffermüller. Of all the possibilities the Old Timer - the only remaining sample at the HSB - was chosen as the first version. The reason: one was going to follow the LGB-Aster model of that engine. However the engines which were more numerous with the HSB and the DR predecessor (99 7231 - 47) followed swiftly to the planning stage.

Doing the splits was unavoidable: the newer engines measure 12555mm over buffers, the Old Timer only 11636mm. In 1:22.5 this would mean 555.56mm and 517.16mm. The LGB model of the 7222 was built to 550mm - almost as long as one of the newer engines. However apart from 23mm length discrepancy there are few compromises the HSB fans will have to put up with - otherwise this version wouldn't have been built.

"Many of the parts cost me sleepless nights"

For the last ten years the design in Nürnberg has happened on the computer rather than the drawing board; first in 2D and for the past five years in 3D. It fell to designer Schiffermüller to transform the prototype model into a three dimensional computer model. More than 2'000 hours (til Aug 2004) were spent in front of the monitor using "Autodesk Inventor" to create 99 7222-5 and the other versions as virtual engines. The engine was divided into 4 main assemblies with 32 sub-assemblies. More than 500 of the total 600 parts had to be designed, with each not just being a faithful scale reproduction but also allowing for easiest production assembly. Threaded, inserted, pressed on, shrunk on, glued?

"Many of the parts cost me sleepless nights" admits Schiffermüller. For instance the "clean outs" which are mounted in different positions on the boiler and can't simply be inserted since plastic injection technology only allows for certain angles regarding pin positions.

Which meant the "clean outs" had to have an oblique locator pin to fit all the positions. Producing special part with individually angled locator pins for all the positions would have meant extra expense. "Besides, we have very, very few parts that are molded to the boiler" mentions the designer. This allows design freedom for the other versions. Some of them are already known: on 99 7222-5 the bell is mounted on the left side, on the Museums version 99 222 (today's execution) in the center and on the newer engines on the right. Which means the base for the bell is added appropriately and the location hole which isn't used gets plugged. This compromise is unavoidable since individually drilling the required hole by hand or, worse yet, building a separate boiler mould would increase the production costs. The different positions of the generators and the varieties of pumps were also taken into consideration. This means that the piping, both steel wire and plastic, had to be individualized: complicated piping with multiple bends and various angles.

Advantage through Know-How

The people at LGB exhibit special ambition as regards placing the ejector pins in such a manner as to be invisible on the finished product. These pins are used to pop the newly moulded part from the mould when it opens. With some manufacturers, with less meticulous design practices, these can end up clearly visible on the outside.

"We have seen quite a few "pieces of art" of Chinese production i.e. ejector pins on window surfaces" the designer says with a smirk. Schiffermüller, who made his apprenticeship as a mould maker with Lehmann, places the ejectors in unobtrusive positions which aren't visible on the finished model. The injection channels, familiar items for modelbuilders because of the sprues, have to be positioned in a manner that allows for easy detachment of the sprues without causing damage to the parts. The designer takes pride in the grating on the coal bunker. "Unfortunately it later transpired that, in the mean time, HSB installed wooden boards."

HSB has in the meantime changed the appearance of 99 222 (Museums engine): The number board on the smoke box cover was moved and instead an imitation hand wheel installed. Instead of the modern pre-heater the old Knorr version was placed in front of the stack. Those who visit the Harz and photograph the engine today will have a different version. "Then they are quick to carp or grumble about the model" - this or that isn't according to prototype. The hard lot of a designer and model railway producer.

Much care was taken with the wheels. These are not "standard wheels", but careful scale reproductions of the originals. "Look at the spokes" Schiffermüller beams "We have never had anything as fine as this, even the casting flash is present." The flanges are naturally oversize, but the overall impression is excellent. And the designer mentions another important item: "The leading and trailing wheels on the Old Timer have five spokes, on the newer engines seven. Our model has also just five."

Lehmann took much care and did the research. Are the hand wheels in the cab chromed, black or polished steel?

"If you ask the experts and check yourself, you will find all types of assertions and versions" Schiffermüller says knowingly. Which means the big and small HSB experts will still find "a fly in the ointment", however those who compare pictures of the 99 7222-5 from a few years will recognize the obviously different appearances. The drawings in the various books will also confirm that and as a precaution they mention "no guarantee as

regards completeness!". LGB didn't want to go as far as to produce a model which would be according to "the one precise day". But "beginning of the 1990s" will certainly fit.

And those who like to, can fit the legendary "golden" rings to the lights, Schiffermüller quips with irony. These are, to the delight of the model railroaders, not included. A sound module can be retrofitted, if one doesn't decide to buy the sound version to begin with.

Well, even the couplers are special. The extended bumper plate is correctly modeled, as is the balance mechanism. But one can't couple with the links. "We made them purposely too short, otherwise they would be torn off in the tight radii" the designer comments.

Was the large contingent of R1 users considered? Yes they were. "It works on R1, but R2 is certainly more recommended. I personally would prefer R3." says the designer. Tight radii cause more wear and tear on both engine and track. Apart from that, the 80mm (>3") overhang of the rear portion of the engine in R2 is not exactly a pleasure to the eyes. On account of the tight radii the frame has been divided, two Bühler motors power two axles each. The rear portion of the drive train swivels sideways and is mechanically connected to the front portion. "The Bühler motors have minimal differences in RPM" ascertains Schiffermüller, so that the drives complement each other. For test purposes one of the engines ran for six weeks continuously on a figure eight made up of R1 track, only

then did one of the motors fail. And the glitches which were discovered during the Leipzig Fair on a turnout were on account of the "not so new" condition of the turnout.

Assembling 600 pieces by hand

The CAD-designer has a few statistics on hand. The Harz engine consists of 600 pieces. Of those 82 are painted and 29 have print on them. 15 employees, under the guidance of Gerd Sykora, spent 20'000 hours (since June 2003) to produce 54 injection moulds. "We underestimated this enormous requirement" admits Schiffermüller freely - but obviously pleased with the result.

"Never before was the assembly of a model as intricate and time consuming." This is also the reason why delivery of the engine was delayed til mid November.

At the roll-out in Leipzig four of the piping pieces were still parts from the "rapid prototyping" arsenal. The last production moulds were still in process!

20 ladies started with the assembly of engines at the beginning of November, the first batch was delivered mid November. Those who pre-ordered will have their Harz engine under the Christmas tree, running in the garden or on the indoor layout.

The 99 7222-5 is a beauty made in Germany which does not just the LGB designer, mould makers and management proud, it does the buyers proud, too.

Friedhelm Weidelich / HJ

Captions to pictures:

Page 18 (top & bottom). The 99 7222-5 consists of four main assemblies, which then are divided into 32 sub-assemblies. The engine has about 600 parts. Which are hand assembled. The switchman's handrails are missing in the bottom picture.

Page 18 (center) CAD-designer Ralf Schiffermüller.

Page 19 (top). This is the view requested by the consumer...

Page 19 (bottom) And this is what the CAD designer sees on his computer display.

Page 20 (top). Slightly confusing at first glance, the domes and pipes on the boiler in front of the cab. Also modeled the water level indicator (orange part on the tank). There is plenty of Know-How in the design and tooling development

Page 20 (lower). The wheel needed to be reinvented for the Harz engine. Never before had Lehmann produced such finely detailed wheels.

Page 21 . The nicely detailed backhead of the boiler, with correctly sized handwheels and the obligatory LGB switch for light and motor. The footplate has the typical non-slip safety tread.

Alluring engine... Page 22

The narrow gauge lines of the Harz are rightfully some of the most popular. The new HSB 99 7222-5 engine from LGB entices with exceptional detailing, high pulling capacity and a few compromises, which can certainly be cause for arguments.

Three conclusions for a start: Firstly: The Harz engine is the most beautiful and appealing steam engine Lehmann has built so far. It represents the beginning of a new era of management decisions. Secondly: It is suitable for toy train fanciers. Thirdly: For that reason there are deliberate compromises, most of all in regards to negotiating of curves. Enabling the model of the largest German narrow gauge engine to negotiate the LGB-R1 radius has to have certain side effects. But one at a time.

One could, or actually should, have a heated argument why Lehmann chose an engine of 12.5m length of much more recent provenience, to produce a model of an older 11.6m engine - and a sole survivor at that. One reason is mentioned in the article concerning the design phase. Nonetheless, it would seem like a "cart before the horse" exercise. Just as well that Lehmann has several engines in planning which fit the model dimension much more closely - for all those who consider scale more important than the enjoyment of running.

If one accepts, most of all, the coal bunker which is too long, one can be very satisfied with the transformation of difficult givens. Since the model not only shows all the pertinent details, but carries it much farther: free standing piping, valves, gauges, very fine valve gear, reproduction of the special frame, the almost perfect cylinders with the drain cocks. Most of the parts are made from the tough standard LGB plastic ASA, flexible parts from Triax, for the piping they used in part steelwire.

One thing is for certain: A steam engine of this quality and detail produced in plastic and large series for Large Scale we haven't found before.

New up-scale level for the details

Yes, some of the electrical lines are missing, the air tanks under the boiler are

not in the right position (on account of the running gear), and the grab irons at the front of the cab should have an extra bend at the top. The sanding pipes to the drivers are missing and the lights could be more realistic, but at least they sport the small levers for the red indication discs.

However those who criticize these details, fail to grasp what is, in financial respects, "doable" in large series production. This many details were until now unheard of at LGB - more is at present only possible with small series production. Many of the intricacies are only noticed when they're pointed out. The safety tread plating is added where appropriate, otherwise there would be just a smooth surface. The grating on the roof is very detailed, the window can be opened. The cover on the coal bunker can be opened. And as a first on a Lehmann engine: the floor in the cab is textured.

The cab is lit, even if only with a bulb on the back head. The reason for that is the assembly procedure, even if the solution is not convincing. The finely detailed running gear is also lit. Since the engine looks different today, criticism would seem rash. The model follows, as far as we could determine, in both lettering and detailing to the greatest extent the state as of 1993. The prototype has in the meantime undergone several modifications, as is mentioned in the write up that starts on page 14. Lehmann will also offer the current state of the engine at a later date. The very detailed engine is not intended for child's play. The numerous piping is individually added and stands clear of the boiler. Handwheels on the domes, the coal bunker covers and other implements are fine enough that they could be bent or lost if handled without proper care. On our model an added part on the right hand pump dislodged, which by rights should be glued in. Lehmann will rectify accordingly.

We really liked the grating on the roof and the coal bunker, the lettering is very crisp and properly placed.

And despite the fine detail the Harz engine is still "real LGB", to be used for running on a garden railway, not just to stand in a display case.

Tight radii are (no) problem.

LGB means every engine must negotiate R1. This applies even to long engines like the GG1 or the Mikado, which when running on the toylike FRR radius of 600mm look accordingly toylike. But: more than half of LGB's clientele demands it that way and the numerous inquiries at the recent fairs in Leipzig and Cologne "Will it negotiate R1" have shown that some Large Scalers will force the longest engines through R1. The result: brass shavings along the track - the 99 7222-5 literally grinds its way through the 600mm radius curves. LGB therefore recommends, not without reason, at least R2, but even better R3 curves.

Nonetheless the 99 7222-5 had to be made suitable for R1. And this with a more clever design than the one on the Mikado, but with a few side effects which could be detrimental during operations. Again two drive units with a motor were chosen for two axles each. However this time the cylinders don't swing out the same way. The first axle is sprung and fitted with the sound trigger, the drive is provided via the side rods.

The front drive unit is mounted under the boiler and has a certain amount of play, the cylinders are fitted to the unit, as is the pivot mechanism of the leading axle. The second drive unit is mounted below the rear sand dome and together with the trailing axle it can move laterally below the cab in a wide arc. The elongated holes in the drive rods provide the necessary slack to allow this.

This design has the advantage of very little overhang at the front of the 552mm long engine. The coal bunker, which has tapered sidewalls because of curve overhang (like the prototype), sits almost completely beside the track on a R1 radius, R2 will still displace the rear by 80mm! Even a radius of 1000mm means the snowplow swings far out. The appearance of the engine is much improved if the snowplow is removed, a practice which is the rule on the prototype during the summer.

However a compromise will always remain a compromise: much like the Mikado the Harz engine fails to straighten out even when coming out of wear-preventing 1200mm curves. The body

remains a few millimeters aimed to the inside until a curve going the opposite way will move the loosely mounted body in the other direction.

Would Lehmann have specified a minimum radius of 1200mm, this could have been avoided with a different design. However that would have meant considerable shrinkage among the interested buyers.

Our sample, from the earliest production batch, surprised at first with some binding, despite running through R1 S-curves (which we only used for testing). It transpired that one of the axles was out of synch by 1 tooth, most likely a result of the R1 squeeze. Now the engine runs smoothly, despite the fact that the side rods, on the long stretch between first and fifth axle, need to align themselves in a polygon segment.

The engine starts at approximately 7V, as a result of the sound unit. Running light, with smoke and sound the engine draws 1A, with 10 four-axle cars on a 3.5% grade this increases to 2.5A. The engine weighs 5Kg and tested out very well on a garden layout during cold and damp weather; after we removed telegraph posts and other items which would have been within the normal clearance. In curves the Harz engine requires more room than an Aristo Dash-9 which is 200mm longer. For that reason the recommendation: Check the clearances by running the engine slowly around the layout and don't forget to check the pinch point if you have double track with opposing traffic.

If running the engine is fun, the same doesn't necessarily apply to switching moves. Running in analogue mode the 99 7222-5 (regardless if linear or PWM) tends to jack-rabbit starts and the low speeds are hard to regulate. Apart from that the engine stops on a dime as soon as power is lost or removed. Even the highest speed,

which is acceptable, with a long train results in 250mm stopping distance. Luckily without any derailed cars. Just adding fly wheels on the motor shafts - like on the K-Line - would already vastly improve the running quality.

Running in digital mode with LGB's MTS and the usual 14 speed steps doesn't induce enthusiasm. The engine starts with a distinct jerk and increasing the speed shows markedly noticeable steps. Those who have means to compare the smooth performance of a 28 step decoder with Back-EMF will not be satisfied with the CV settings from the factory. Besides the top speed is set much too high and may result in the engine tipping over in curves.

The sound of the OEM manufacturer leaves still room for improvement. The exhaust sequence apparently with open drain cocks increases in distinct steps when run in digital. It doesn't sound realistic. The sound shuts off instantly when one changes direction in analogue mode. If left slightly powered when stopped the pump and simmering of steam continues for as long as one minute. The warning blast of the whistle on start up as well as the brake squealing on stops is hard to trigger in a predictable fashion.

The exhaust beat is only half the cadence of the prototype in both analogue and digital - a concession to the high-speed rocket operators. Apart from that the first exhaust beat will only sound after the engine has moved already. Not state of the art.

Many of the sounds can be selected individually in digital mode (pump, shoveling coal, bell, whistle and station announcement), but again the coal shoveling will drown out the exhaust beat. The volume can only be adjusted as a whole (potentiometer behind the smoke box cover). The bell and whistle are both good recordings and can additionally be triggered with track magnets. For those

who have a DCC system from a different manufacturer and appreciate good sound, it would be worth considering getting the analogue version (€200 less) and retrofitting it with a different sound decoder.

This may be more expensive, considering installation etc, but for those who have the requirements and the means, this will be a better choice. To convert the engine to digital with sound Dietz will charge €350 - or €150 on top of the LGB digital/sound engine price.

The cab and the drive gear are unfortunately always lit - even digital mode doesn't provide the off function for those lights. The three front lights illuminate just prior to the engine moving in analogue mode. A 5V constant lighting circuit, which would be inexpensive to provide even for analogue, would have been more impressive. Besides the on and off is annoying when switching.

Summary: Apart from the criticisms, which needed to be mentioned, we can really recommend the model.

Lehmann produced a very attractive engine which raises the benchmark for Large Scale steam engines.

The 99 722-5 is a well running, strong and exceptionally detailed model and will not only please the dyed in the wool HSB fans - provided one can put up with the conscious compromises Lehmann made.

For ourselves we would buy the 21811 (without sound) and have a different decoder and sound installed to get better running and sound characteristics.

Those who can't live with the excess length of the engine should wait for the newer series engines. They are in the works.

Friedhelm Weidelich / HJ

Dimensions	Prototype	Scale 1:22.5	LGB Model 99 7222-5
Length over buffers 99 7222-5	11 636mm	517.16mm	551.0
Length over buffers 99 7231 -7247	12 500mm	555.56mm	—
Total axle distance	8 700mm	386.67mm	402.0mm
Width	2 550mm	113.33mm	115.0mm
Height	2 650mm	162.22mm	171.0mm
Driver diameter	1 000mm	44.44mm	46.0mm
Lead / trailing axle wheel diameter	550mm	24.44mm	24.7mm

This engine allows for switching without catenary just like on the RhB - and many more things if it is the digital version with sound. As a switcher and MoW engine it is certainly no toy, but one is tempted by the automatic couplers, the prototypical head light configuration and the exemplary sound to play for hour upon hour.

Do you remember how Mika Häkkinen takes the curve at great speed, in the TV commercial for a Swabian luxury car manufacturer, commenting to his female companion "A Diesel"? And then takes off in the fancy coupé.

But not every Diesel is a speed demon - least of all when the type reads Gmf and runs on the Rhaetian Railways (RhB). Gmf 4/4 242 and 243 (built in 1991) did duty on the Vereinatunnel project, hauling the trains with the rock debris. Utility vehicles with little charisma. Since the completion of the tunnel (1999) RhB found other work for the yellow diesels: 243 is at Klosters for switching chores and to power the rescue train for the Vereina, sister engine 242 does the switching at Landquart.

Dietz offers both versions as 1:22.5 models.

The design of the prototype engines had a specific duty sheet: to move heavy loads for considerable distances. The 50 ton (50'000kg) engines have a top speed of 60kmh and a constant power output of 350kW at 20kmh. They are powered by a 592kW Caterpillar engine. The construction is based on a modular system which Gmeinder Locomotivewerks, Mosbach developed for Standard-Diesels running on different track gauges. The two yellow diesels are certainly not the most photographed engines on the RhB, but they don't need to hide, either. Certainly not as 2m models, produced as a small series item by Dietz in cooperation with Kaweba. What could interest the model railroader on this work horse?

GARTENBAHN*profi* was able to test a sample of the first pre-production batch which had three "flaws" compared to the regular production series: the side windows were missing some frame parts indicating the sliders. The wires for the lower headlights will be completely hidden, the brass handrails will be painted black. Other than that the diesel featured everything, ready for the test.

One of Dietz's objectives was construction of a scale locomotive and this has in large parts been achieved. Noticeable deviations are only found in the axle distance of the trucks and the overall axle distance and there is a logical reason: the drive units are made by LGB. Dietz selected the same trucks which are under the proven V51. This saves development costs and one can live with this minor compromise - the appearance is still good.

A new design is the frame which was adapted to the LGB drive units. The plastic sideframes sport real coil springs, however without function. To produce them in plastic would have been more cumbersome. The colour blending of plastic and metal is very well done. The massive type without many extras and piping corresponds to the plain prototype. The modeled brake shoes sit close to the wheel treads - but clean wheels won't rub.

The printing on the side of the cab is crisp and clean, only the builders plate isn't worth a closer look under magnification - LGB did a better job on the cylinders of their Harz engine. The steps to the platforms are solid (not grating), which will please those modelers who dislike engine cleaning after running in the garden. The ladders to the cab have better engraving and look quite realistic. The detailed cab is missing the rearview mirrors and those who look closely will notice the absence of the draft hooks in the modeled guide slots of the end sill. The lights feature all the same construction, even though only the upper light is prototypically correct. But a Plus: the LED illumination allows for correct lighting schemes in any variation. The platform railings are fastened to the floor plate and will deflect about 5mm without breaking, if need be. Not quite as forgiving are the soldered brass handrails - the producer's caution should be heeded.

The body of the engine with the cab is, in contrast to the maintenance friendly prototype, one single part made of tough PVC. The yellow colour is applied in a prototypically flat finish but appears a bit on the dark side in normal daylight. The underside of the roof is silver instead of yellow, the exhaust stack could do with a bit more depth - any soot needs to be applied by the buyer. The window seals of

the cab are correctly painted in black. The only cover which is removable is the one on the engine/generator housing, on the digital version giving access to the Dietz decoder (a specially configured product from Uhlenbrock). The DLE2MS decoder plugs directly into the circuit board, on which one has to change a few DIP switches if a different make of decoder is used or if the Dietz decoder is retro-fitted. The Dietz sound modules connect via the Susi interface.

The vents on the side of the long nose are engraved, only the vent on the front end has the proper see through openings which reveal the five blade fan of the radiator, as well as allowing the sound to exit. At the slightest acceleration (in digital mode at the factory default of step 3) the fan will start to turn. However by that point there will be other distractions: the sound has - compliments to Dietz - a very well balanced acoustic, with minimal static noise. The sound transmits through the front vent: coupler, compressor, horn and the switchman's whistle - everything sounds as if one is standing track side in Landquart. The engine sound is selectable (F3), in digital mode the prime mover sound starts in the first speed step with the engine standing. The seasoned model engineer will not accelerate yet, but waits until the prime mover turns evenly in idle and will then slowly accelerate step by step. The diesel engine and generator sound will increase accordingly. Applying the brakes will automatically trigger the brake squeal, on rapid deceleration to speed step 0 the squeal will end exactly when the engine comes to a stop.

But the digital model has a few more goodies in store: the engine, which sports a clever uncoupler mechanism on both ends, will automatically adjust the acceleration and braking values of the decoder after uncoupling from the load. Running light - according to Dietz - simulates less mass (more rapid response to acceleration and braking. That is notable since the brake squeal of the engine running by itself is more pronounced. Who wouldn't want to put in some voluntary overtime on the shift?

The decoder has been optimally adjusted to the characteristics of the LGB drive units. The model starts without the slightest hesitation and with the typical

