Description of a HU for a steam locomotive in Meiningen Steam Locomotive Works

Appendix: Maintenance of steam locomotives after the Dienstvorschrift DS 991.99

Even before delivery of a temporal and technological classification of the locomotive is made in the manufacturing process. After the injection is a pre-cleaning of the frame and the chassis and the boiler is washed out between. Then the locomotive via a traverser assembly rig is being promoted in the Lokrichthalle. It begins the dismantling of the fuel and coupling rods, the engine and the controller of all steam, water-and air-carrying conduits, the degradation of the cab, coal and water containers. The locomotive is by crane or Hubstand ausgeachst and the boiler encouraged to boilermakers. All parts be purified, some in an automatic Metallwaschmaschinen and selected modules -- e.g. Frames, boilers, wheel sets, bars, cab - blasted the precise findings or Neufarbgebung and then in the individual workshops brought to the work-up.

The clock for the scheduling process is the boiler. He is examined by experts for steam and printing technology and determined the amount of work. For a general inspection of the boiler must be provided in each case, the change of the tubes, the superheater, a plurality of tie rods, reprocessing of the pipe walls, lamps or Langkesselflicken as well as the refurbishment of all belonging to the boiler fittings. The boiler inspector supervises the repair work, together with the welding engineer evaluates the material test reports, X-ray and ultrasound findings of welds made, and decreases after completion, the water pressure test of the boiler.

On the frame cracks are welded to gusset plates, which Achslagerführungen, Wedges and bolts holes corrected and reclaimed the train and Stoßeinrich-flts. After correcting this basic framework is put in balance and vollvermessenen. In addition, the Achsgabelstege must be cultivated in order to avoid bending the frame. The Rahmenmessblatt is working basis for the processing of the axle. At the wheel sets, the measurement and ultrasound examination of cones and axle shafts, the correction of linear and angular deviations at the crank pin and the Umrissbearbeitung or New Pneumatic Tires made. In the Meiningen Steam Locomotive Works may, at a “Germany-bank” wheelsets with a wheel diameter of up to 2000 mm can be processed. The axle boxes are filled with white metal, drilled out, and watch out for the burnished uprights.

In the workshop, the fuel rod and coupling rods are examined to measure cracks and sanded. The rod bearings are filled with bearing metal and after the Messliste for journal diameter at the “Strassmann-boring machine" drilled out. This boring machine is a single-purpose machine dampflokomotivtypische, drilled on the storage rack coupled movement of a locomotive, and the puncture site with precision measurements can be verified. Which is high accu-racy for the faultless running of the camp of crucial importance.

The attachment of the steam cylinder is checked on the frame, cylinder and valve bushings checked - if need be drilled - newly refurbished and sealed cylinder cover, the interior vapor control. As part of the processing engine, the slideways are hardened and ground, the crosshead bearing sliding plates and fitted with new pistons, the steam, after examining the runout with new piston rings. The components of the external control will be measured and processed. Again, on a special machine, the wings are cut.

The investigation of the braking device is in a brake revision Br 3 to replace the pneumatic parts (luftsteuernde valves and indicating instruments) are measured and the mechanical parts (brake beams, rods and Hängeeisen) for a safe condition, straightening, welding, and for ausgebuchst be renewed T.. Feathers and compensation will be determined on the condition-refurbished and the capacity Federprüfmaschinen Arrow Heights. Cab, tanks and charcoal are widely box fitted with new sheet metal or corrosion in advanced and newly built. The pipes are usually worn out and must be renewed.

All fittings of the boiler and the superstructure (boiler safety valve, steam extraction and supply valve), pumps (feed pumps, air pumps, presses, lubrication) and alternator are broken down in the instrument shop, worked on the findings, and functionally tested before being refitted. If the boiler has been approved by the expert, he is clothed in isolation of the cab against the heat radiation, equipped with color and set up the taps. Thereafter, the transport involves Lokmontagestand. Once installed the provided Aschkasten was, the boilers used in the frame and the connection to the firebox and smoke chamber and the shuttle carrier plate holder. It is the assembly of the steam inlet and Ausströmrohre and the blowpipe head.
Now the chimney can be mounted and plumbed to the blowpipe head. A measure that is for the later development of steam or Feueranfachung of great importance.

In the meantime, Aufarbeitungsmeistereien the necessary components and assemblies are completed, so that) the assembly, separated by track (boiler fittings) and substructure (running and engine can start. The surface works include the setting up of the cabin, the tanks and the running board, the construction of pumps and trains and the installation of the upper and Kleinberohrung. In the substructure work, the sliding tracks at a fixed distance be transferred to the cylinder center, the Cross mounted heads, pistons introduced into the cylinder and closed by the front cylinder cover. The pistons are pushed out and marks the dead center positions on the slipways. Before AufAchse the locomotive brake parts are still grown, and the axle compensation.

Among the most important assembly operations AufAchse counts, which can be made depending on the size of the locomotive on the Hubstand or by a crane. This locomotive frame with the boiler will increase the extent that the axes can be rolled under the frame.

The AufAchse requires precision work, because the axles must be millimeter when lowering the frame. After the locomotive is back on its own wheels, verification of Achsstitchmaßes (center to center of axle shaft) and the dimension "z" (center axle to top of frame clipping) and the amount of the buffer state. The superstructure and substructure work will continue thereafter. It will be assembled the remaining parts of the brakes, steering, and various pipelines and finally the dome - and greenhouse grown rods. the investigations of the harmful space (distance between piston and cylinder body cap) are the provisional closure of the assembly work.

Already during the installation is running the final testing of the engine when cold by the competent master and hung out to demonstrate leadership on the execution of identified editing work on the locomotive. The controls are applied to eliminate the deficiencies specified by the operator on the correct fitting and proper interaction of all components and connections, the proper marking (stamping) Safeguards containers and ends with the release of the locomotive to feeding, the locomotive is on the assembly rig The traverser for the first stoking implemented. After about 8 to 10 hours is sufficient steam pressure in the boiler to blow out the valve housing with its own steam. It is a safe procedure to remove the impurities before they are installed the shifter. Thereafter, air and blow out abprobriert feed pumps to the cylinders in order to also remove impurities still there.

Now the cylinder drain valves can be fitted and adjusted the boiler safety valves and sealed by the experts. Setting the KSV is not only a great responsibility but also a very noisy work, and without hearing protection can not be executed. A tightness test is assurance that the steam engine and all vapor power units and cables are working and functional during the ride are not masking. With the establishment of Indiziergeräte you are ready to Indizierfahrt.

Upon successful completion of the inspection, the Indizierfahrt can be commenced. The engine drives the first time again with its own power. There are usually only short drives to achieve the optimum setting of the slider with the distinctive smooth exhaust blows. The index is at maximum steam chest pressure at a speed of 20 km / h. The resulting indicator charts provide information on the distribution of steam through the piston valve and the timing of entry and outflow. In this Leerprobefahrt can not verify all the important criteria for the operation of service. The decisive factor is ultimately the behavior of the engine under load. For this reason, a load test ride on the train is essential. For standard gauge locomotives with driving through the factory's own staff in the direction of Erfurt, Eisenach, or is made, together with the already narrow gauge locomotive fertiggesellten spot with the customer. During this trip may smoothness, the correct operation of the steam engine, the function of all the units and auxiliary equipment, the evolution of steam and the effectiveness of the brakes to be tested. For Unterwegshalten the temperatures of axle and rod bearings by touching the back of the hand or in doubt, be determined by temperature measuring instruments. After returning the test drive message is created and the defect items checked processed.

After completion of all remaining work done by the customer and the color of the label. To the buffer beams Maintenance Level, date and DLW be written. Under the cab, the date of Bremsuntersuchung stated in equipment of the locomotive with a steel firebox with an additional red dot.
Last, the work performed during operation of the locomotive book must be upheld. The book consists of 4 parts operation:

- The strain part of the locomotive
- Investment to operate Issue Paper
- Root folder for the boiler
- Root folder for the Tender

It shall be given certificates of examination and testing, the actual transcript of Messlisten repair, material certificates, documentation of performance tests and their results. After checking all the documents, the compliance professionals of the Federal Railway Authority (EBA) of the acceptance protocol provides for the repaired steam locomotive and confirms the execution of a major investigation.