



**North Staffordshire Railway  
London Midland and Scottish Railway  
British Railways**

**Diagram 20 goods break van  
1908-1950s**

**Prototype information**

The 20 ton break van was probably conceived as a consequence of a Board of Trade accident investigation highlighting the lack of braking power for heavy coal trains on the North Staffordshire. The diagram 20 was a logical development of the diagram 11 10 ton van. Indeed several features of the later 10 ton vehicles are evident, including the double side windows, the veranda and of course the outside brake handle.

A number of these 20 ton break vans were built by several builders including Cravens in 1908. It is possible that a number were also built at Stoke. Few photographs exist and the only known running numbers are 70 and 4027. The North Staffordshire did not use a consecutive numbering system and allocated the lowest free numbers to new wagons. Numbers were therefore reused.

**References**

North Staffordshire Album p96  
North Staffordshire Wagons pp39-47

**Interested in the Knotty?**

Contact the North Staffordshire Railway Study Group  
Hon Membership Secretary  
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Staffordshire ST8 7EJ

[www.nsrsg.org.uk](http://www.nsrsg.org.uk)

**Acknowledgments**

51L would like to thank Ron Dickinson for building the test etches and assisting with these instructions. We are indebted to various members of the North Staffordshire Study Group for their assistance, in particular David Jolley and John Sherratt.

**Required to complete**

This kit requires eight open spoke wagon (12mm) wheels with waisted bearings, paint and transfers. At the present time authentic NSR transfers are available from Dragon Models, sheet 4019, and the HMRS. We suggest the use of HMRS transfer sheet 17 for the NSR and sheet 20 for the LMS period.

**Contents**

Body/chassis frets (2-part)	End stanchions x2	0.5mm brass wire 2 x 12"
Spring fret	Oil axleboxes x4	0.7mm brass wire 2 x 5cm
Roof fret	Buffers x4	1.0mm brass rod 1 x 2cm
Heavy duty springs x4	Glazing	Fine copper wire 1 x 10cm
Brake column casting		

## Assembly

Please read these instructions with care before starting to build your model. Examine the etched fret in conjunction with the annotated photocopy to identify all components. The main parts are identified with a red letter, and the cross-bracing parts with a red number. The green numbers show where the cross-bracing goes on the sides. **Please note that the numbers are etched onto the parts, but the letters are not.** These instructions represent a guide to assembly as, with any model, there are many ways to assemble the kit.

We suggest wet fine silicon carbide paper (1200 grit) may be useful to clean up any flash marks and etching cusp. Assembly is best carried out using solder for etched components or low melt solder (70°C melting range) for white metal. Many modellers have found a resistance soldering iron preferable for the assembly of etched overlays and we recommend its use. When using a normal iron the use of a series of solders of different melting range may be of benefit. It is strongly recommended that components (many of which are overlays) should be tinned prior to removal from the fret. However care is required to ensure that fold lines are not filled whilst tinning.

Superglue has also been used with considerable success by several modellers when assembling etched overlays. An epoxy resin such as Araldite can also be used but this would be rather time-consuming and messy! To obtain the best results a combination of several techniques will be necessary.

Bends are given by a half-etched line, which is always on the **inside** of the bend. Where rivets need to be raised these are shown on the back of the part, which should be pushed with a blunt scribe on a firm surface taking care not to avoid distortion.

## The body

The body is made up from the ends and sides, with the end fitting inside the sides. Start with the veranda end. Remove end **A**, inner overlay **B** and outer overlay **C** and form the rivets on **C**. Attach the two overlays to **A**. Repeat for the plain end using end **D**, outer overlay **E**, and packing pieces **F** (top) and **G** (bottom) between them. Again form rivets on **E** first. **F** and **G** correctly space the end stanchions away from the end; the odd-looking gap between **D** and **E** will be hidden once the sides are added.

The sides are prepared from four layers. We suggest the cross bracing is fitted after the main side parts are assembled but prior to the final overlay. **Note:** the sides are handed and include the buffer beam ends.

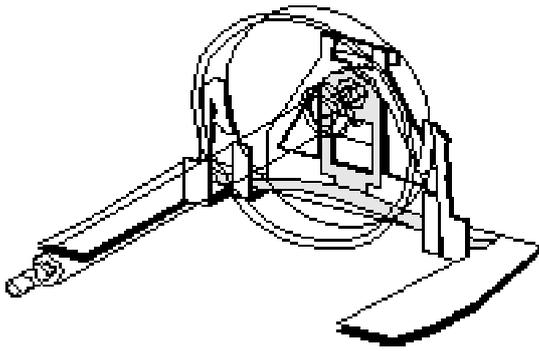
To form the first side remove one set of side **J** and overlay **K** and bracing **1a**, **1b**, **9a**, **9b** and 2 off **10**. Using the locating holes assemble parts **1a**, **1b**, **9a** and **9b** onto **J**, in that order. The notches provide a location for subsequent bracing parts, so ensure you fit them the right way up. Attach two times **10** followed by the cross bracing using two sets of parts **2** to **8**. Where possible use the locating holes for guidance, and note that **6** crosses over **5**. Finally, attach the overlay **K**. Repeat for the second side.

You should now have complete two sides and ends so check how well they fit together. The two ends and sides should now be attached to floor plate **L**. This fits inside the body parts with the half-etched lines on the bottom (facing the track), and with the starred end at the veranda end of the van. Attach the interior end **I** in place. Attach the end stanchions in place. These can be assembled from parts **Ma** and **Mb** (fold up **Ma** then add **Mb**) or alternatively use the cast stanchions supplied. The cast parts will require filing to fit the recess; any material removed should be from the top.

## The underframe

Fold down the spring locating lugs on the floor and reinforce with solder at the fold line. Attach the solebar/W iron assemblies **N**, using the inner locating slots in the floor plate. The solebar overlays **O** should be attached to the solebars **P** ensuring the locating lugs are upper most. Bend up the footboards and attach the solebars to the floor using the outer locating slots. Attach the inner headstocks **H**, followed by the buffers, ensuring the bolts are at the 1, 5, 7 and 11 o'clock positions.

The van is to be fitted with a sprung suspension system using a stainless steel spring. The spring supports a bearing which will slide in the W-iron gap. Solder a **waisted bearing** in each hole. The stainless steel springs provided should then be folded so that the leaf part is at 90 degrees to the part supporting the bearing, as shown.



The leaf part ends may be bent into a shallow curve so that it works against the floor. Alternatively bearing blocks may be attached to the floor approximately 1mm in depth. The van buffer beam centre to rail height can be altered to 14mm by adjustment of the shallow curve at the spring ends or by addition of more or less bearing block thickness. It is suggested that the brake shoes are prepared and attached to the floor after the springing is completed.

Fit the cast white metal springs in place. These fit behind the solebar outer layers **P**, and may need thinning to fit. Ensure free running and when satisfied fix the axlebox castings to the W-irons so the bearing is free to move within the axlebox slot. Again, the casting may need thinning at the top to ensure some movement. Provided waisted bearings are used it should prove unnecessary to open out the axle box bearing hole. Lastly attach the axle guard tie rods **Q** and coupling hooks **U** (or your own choice of three-link couplings, perhaps after painting.)

Form the brake shoes by attaching individual shoe overlays **R** to the brake shoe bars **S**. It is suggested that the shoe overlays are attached to the bars before removing them from the fret. Attach the bars to the underframe using the half-etched markings for guidance. Add brake cross-shafts from the supplied 0.5mm diameter wire, opening out the shoe holes if required.

Prepare the vees **V** by bending up the etch. Thread a 0.7mm diameter wire cross-shaft through the hole in one vee, the holes at the larger ends of the brake lever links **W** and **X**, and through the other vee, thus trapping **W** and **X** in place. Solder the cross-shaft in place, but do not fix **W** and **X** yet. Attach this assembly to the floor as indicated at the veranda end of the van. Ensure that the vees are as close to the end as possible.

### Detailing

Cut 0.5mm diameter wire to length to form the vertical handrails at the veranda end of the van on both the ends and sides. The ends of the wire will have to be bent to 90° and fitted into the pre-etched holes. To form the horizontal handrails, bend 0.5mm diameter wire at 90° at one end to insert into the end stanchion at the plain end. A loop of the fine copper wire should be wrapped around the handrail wire in two places, inserted into the holes in the framing, and secured on the inside of the body. At the veranda end the horizontal handrail joins the vertical handrail adjacent to the guard's door forming a T-joint. (From the limited evidence available it is possible that the handrail was inserted in the stanchion at both ends on at least some vans.) Attach the footboards **T** at the veranda end.

Form the brake column from 0.7mm diameter wire and by cutting off and drilling the handle top of the supplied casting. The column is supported in two "bearings", one at the buffer beam adjacent to the floor and the other at the cross bracing. These can be formed from a loop of the fine copper wire or parts **Y**. Just above the buffer beam bearing a threaded knuckle joint was present; two levers **Z** connect from here to lever **W** on the cross-shaft. Screwing the brake column causes movement of the knuckle joint which in turn moves **Z** and **W**, causing the brake cross-shaft to revolve. The brake column itself does not move up and down, only round and round. Consult the drawing for further guidance. The knuckle joint can be represented by scrap material or solder. Attach the two levers **Z** to either side of the knuckle joint and to either side of **W**, using a 0.5mm diameter wire pin. When satisfied, solder **W** and **X** to the brake cross-shaft with an approximately 90° angle between them. Brake push rods may be added to **X** from 0.5mm diameter wire.

## Roof

Discard the roof incorporated on the main fret, and use the supplied separate roof. Form it to the shape of the ends, and add the chimney from the supplied 1.0mm diameter brass rod, soldering it to the inside of the roof. Check the fit of the roof to the body ensuring that it covers the end stanchions to just beyond the veranda end. The overhang should be visible but not large (!); trim the roof if required. After painting, fix glazing in the sides in the recesses provided and to the inside of the ends. We suggest the use of PVA or Clearfix as this will dry clear if used sparingly. Once glazed, fix the roof in position.

## Painting, lettering and numbering

North Staffordshire goods stock was painted "red oxide". The colour has been variously described as a purplish red oxide and a dark red brown not unlike the Caledonian Railway wagon colour by others. The exact colour is open to some discussion, but it changed little during the Company's existence. It is probably similar to a red oxide such as Precision Paint P980 or Revell matt 37, with a little something to change it to a purplish red oxide or at least a redder colour.

Lettering was originally applied to the sides on the second plank down with **N.S.R.** on the left hand panel and the Knot on the right hand panel. The number was on the second plank up on the central panel, with the tare weight on the curb rail at the left hand side.

Post-1912, the N and S were placed on the second and third plank down, the N in the left panel and the S in the right. The Knot was to be found on the second plank down in the middle panel, being the width of the plank. Its shape varied to fill the plank width and it should have square ends. The number was given only on the solebar plate.

For the LMS period NSR goods stock was renumbered in the series 192000-199999, but no information on the numbers used is available at the present time. We are unable to state where the LMS should be placed but suggest adjacent to the upper windows equally spaced.

The most recent version of these assembly instructions will be available on the 51L web site [www.51l.co.uk](http://www.51l.co.uk). For further help or information please email: [andrew@modelsignals.com](mailto:andrew@modelsignals.com)

## Wizard Models

Wizard Models stocks a wide range of components and other necessities for the modeller in OO, EM and 18.83mm.

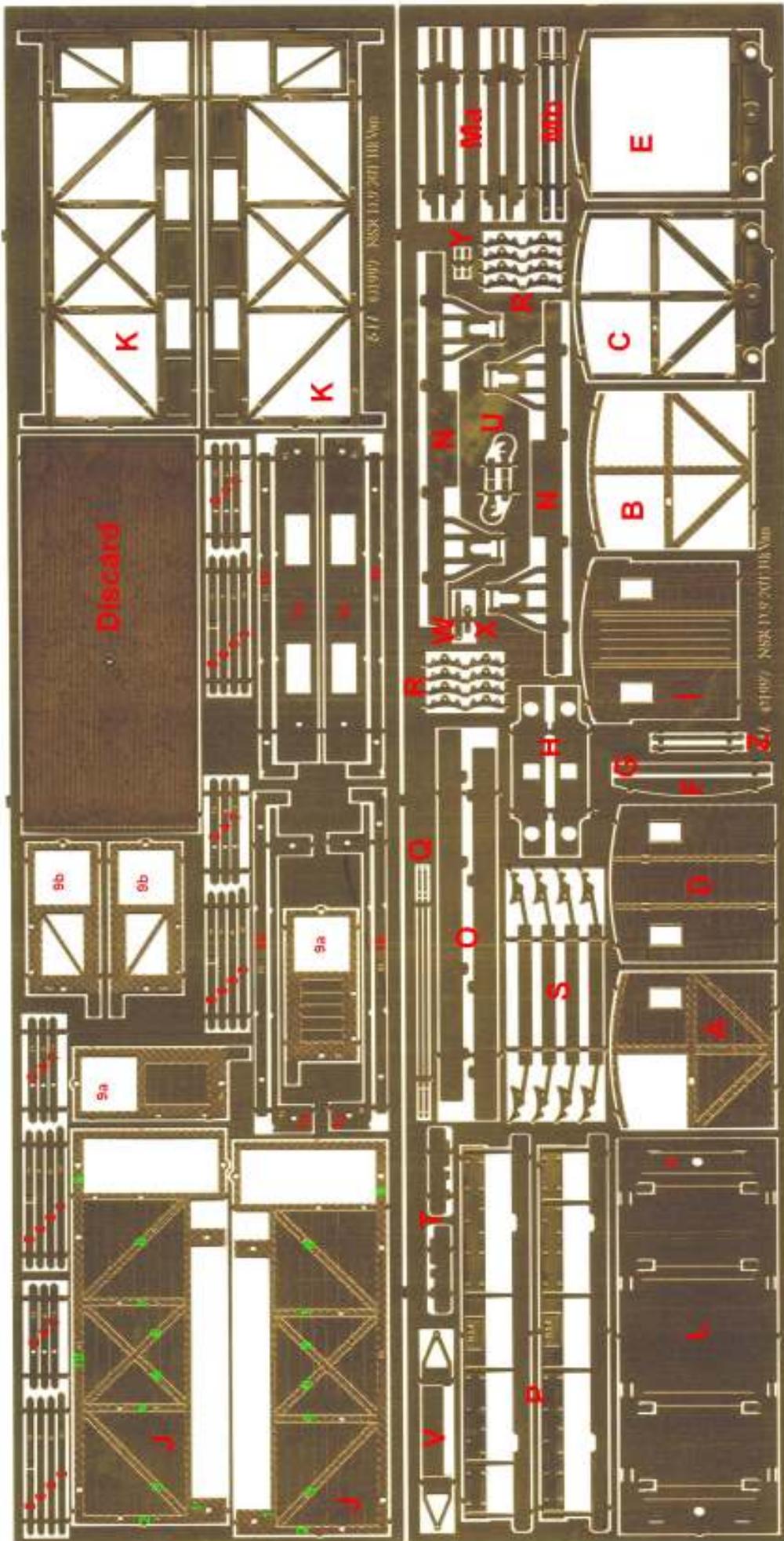
Wizard Models  
PO Box 70  
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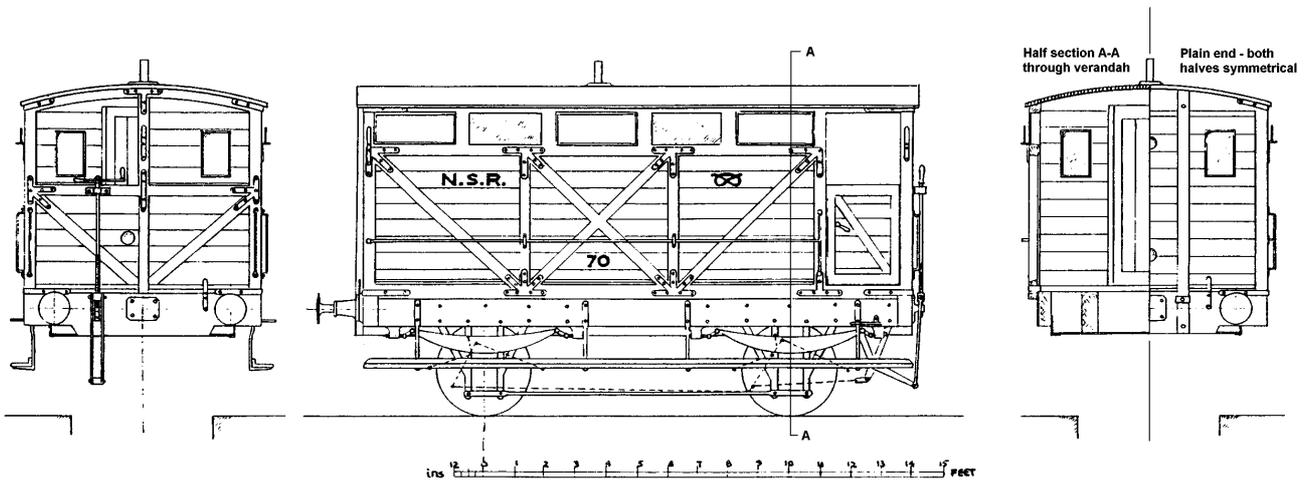
Email: [andrew@modelsignals.com](mailto:andrew@modelsignals.com)

Shop online at [www.wizardmodels.co.uk](http://www.wizardmodels.co.uk)

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Reproduced approximately to 4mm scale

R. D. POCHIN 1974