

Exhibit 10

PRIVATE OWNER WAGONS

(VOLUME 1)



**LISTS ALL PRIVATELY OWNED WAGONS
AUTHORISED TO RUN ON BRITISH RAIL
OF TOPS TYPES PAA-PHA & PJA-PXX**

Metro

PRIVATE OWNER WAGONS

(VOLUME 1)

**TOPS TYPES PAA-PHA
& PJA-PXX**

Andrew Marshall

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SECTION 1 - NOTES & INTRODUCTION

This book is designed to give details of all Privately Owned wagons (but not including tank wagons or those given 12 figure RIV numbers) registered to run on British Rail (BR).

NUMBERING SYSTEM

All Privately Owned vehicles registered to run on BR have numbers allocated under the BR Total Operations Processing System (TOPS), which was introduced in 1972. Before the introduction of TOPS there was no standard numbering system of Private Owner wagons, with over twenty companies having a wagon numbered 1, 01 or 001. After the introduction of TOPS all the Private Owner wagons were numbered into the series 1000 to 99999. Each owning company was given a one to four letter prefix code which is carried before the number. Details of company prefix letters can be found listed inside the front cover.

Until recently the number range 30000 to 89999 was reserved for tanker wagons. However, due to shortages of number sequences in the non tank series, several batches of recently built wagons have been numbered into the erstwhile tanker series.

Many of the wagons allocated TOPS numbers were withdrawn before they were applied and hundreds more have been withdrawn since. As once used numbers are not currently reissued, all new vehicles have to be slotted into the gaps which still remain available. No doubt in the future some numbers will eventually be reissued as the supply of unissued numbers becomes exhausted.

BRAKES

Most modern Privately Owned wagons are air braked and have been built to replace older BR owned vacuum braked or unfitted wagons. Many of the new wagons were built with through vacuum brake pipes to allow operation in vacuum braked trains. However, with the introduction of more air braked services and the Speedlink network of services, most of these through vacuum pipes have now been removed. The type of brake equipment currently fitted to each wagon is given in the heading to each group of wagons by reference to the third letter of the TOPS code given on the far left of the heading. A list of relevant TOPS brake type codes appears on the inside back cover.

DESIGN CODES

This is a six character code used by BR to describe precisely each type of vehicle. The first two characters are letters to describe the use of the of the wagon and are also the first two letters of the three letter TOPS code carried on the wagon. A list of relevant codes to this book is given on the inside back cover. The following three characters indicate a reference number of the specific design to which the wagon has been built. These start at 001 as the first issued code and work upwards. The final character is a letter indicating detail differences between wagons built to an otherwise common design. These letters start at A as the first issued code and work upwards.

WEIGHTS

All are given in metric tonnes. The maximum axle load permitted on BR is 25.5 tonnes, so the maximum gross weight for a two axle wagon is 51 tonnes and for a four axle bogie wagon 102 tonnes.

Tare Weight:- this is the weight of an empty wagon given to the nearest 10 kg.

Gross Laden Weight (GLW):- This is the maximum permitted weight of a wagon and its cargo, to keep it within the axle load limit or within the limit of its suspension.

The carrying capacity of any wagon is the Gross Laden Weight minus the Tare weight.

MAXIMUM SPEED

Is given in Miles Per Hour (mph), this regulates the type of train into which a vehicle can be formed. No train is permitted to run any faster than the maximum speed restriction of the slowest wagon in the train. Due to the characteristics of the type of suspension fitted, some wagons are allowed to run at faster speeds when loaded, whilst others are permitted to run faster when empty.

Class 4 trains are permitted to run at between 61 and 75 mph.
Class 6 trains are permitted to run at between 46 and 60 mph.
Class 7 trains are permitted to run at between 36 and 45 mph.
Class 8 trains are permitted to run at up to 35 mph.
Class 9 trains are permitted to run at up to 25 mph if running with loco brakes only, or at up to 35 mph if the train is partially brake equipped.

LENGTH

Is given in Millimeters (mm) and also Feet and Inches, the dimensions given being the overall length over buffers/couplings.

BOGIE AND SUSPENSION TYPES

The type of running gear fitted to each type of wagon is given in the heading for each group of wagon.

ACKNOWLEDGEMENTS

As information on privately owned vehicles is not available from BR sources, the author would like to thank the many wagon owners, builders, hirers and enthusiasts who have provided information to assist in the compilation of this volume.

In particular my thanks to the following companies for providing much of the information and drawings used in this book:.

Standard Railway Wagon, Heywood.
Procor UK Ltd, Wakefield.
Powell Duffryn, Cardiff.
Tiphook Rail PLC, London.
Caib UK Ltd, Woking.

Any further information and constructive comment is welcomed and should be sent to the author at the publishers address shown on the title page.

SECTION 2 - WAGON DETAILS

2100 ENGINEERS WAGON PXV

Design Code: PX034A.
Builder: BR, Lancing, 1954.
Tare Weight: 22.40 t. Gross Laden Weight: 64.9 t.
Maximum Speed: 60 mph. Length: 16890 mm. (56 ft. 5 in.)
Bogie Type: Secondary Coil.
Notes: Transferred to private ownership in 1984. Used on permanent way duties at Immingham Docks.

ABP 2100 (B927624)

3000-3007 BOGIE SCRAP PXA

Design Code: PX030C, *PX030B.
Builder: Procor, Wakefield, 1974-75.
Tare Weight: 33.00 t. Gross Laden Weight: 102.00 t.
Maximum Speed: 60 mph. Length: 16764 mm. (55 ft.)
Bogie Type: Gloucester Clasp Mk. II
Notes: On Hire to Sheerness Steel. Work between Sheerness & various scrapyards.

BIS 7825	BIS 7829	BIS 7833	BIS 7836	BIS 7839	BIS 7842
BIS 7826	BIS 7830	BIS 7834	BIS 7837	BIS 7840	BIS 7843
BIS 7827	BIS 7831	BIS 7835	BIS 7838	BIS 7841	BIS 7844
BIS 7828	BIS 7832				

7950-7960

2 AXLE SAND

PAA

Design Code: PG018B.

Builder: W.H. Davis, Langwith Junction, 1981-82.

Tare Weight: 13.55 t.

Gross Laden Weight: 51.00 t.

Maximum Speed: 60 mph.

Length: 7920 mm. (26 ft.)

Suspension: Gloucester Floating Axle.

Notes: Work between Holmethorpe and Warrington.

BIS 7950	BIS 7952	BIS 7954	BIS 7956	BIS 7958	BIS 7960
BIS 7951	BIS 7953	BIS 7955	BIS 7957	BIS 7959	

7961-7970

2 AXLE SAND

PAA

Design Code: PA012A.

Builder: W.H. Davis, Langwith Junction, 1981-82.

Tare Weight: 13.55 t.

Gross Laden Weight: 51.00 t.

Maximum Speed: 60 mph.

Length: 7920 mm. (26 ft.)

Suspension: Gloucester Floating Axle.

Notes: Work between Middleton Towers and Cudworth.

BIS 7961	BIS 7963	BIS 7965	BIS 7967	BIS 7969	BIS 7970
BIS 7962	BIS 7964	BIS 7966	BIS 7968		

7971-7984

2 AXLE SAND

PAA

Design Code: PA012B.

Builder: Standard Wagon, Heywood, 1981.

Tare Weight: 13.55 t.

Gross Laden Weight: 51.00 t.

Maximum Speed: 60 mph.

Length: 7920 mm. (26 ft.)

Suspension: Gloucester Pedestal.

Notes: Work between Middleton Towers and Cudworth.

BIS 7971	BIS 7974	BIS 7977	BIS 7979	BIS 7981	BIS 7983
BIS 7972	BIS 7975	BIS 7978	BIS 7980	BIS 7982	BIS 7984
BIS 7973	BIS 7976				

7985-7989

2 AXLE SAND

PGA

Design Code: PG018B.

Builder: Standard Wagon, Heywood, 1981.

Tare Weight: 13.55 t.

Gross Laden Weight: 51.00 t.

Maximum Speed: 60 mph.

Length: 7920 mm. (26 ft.)

Suspension: Gloucester Pedestal.

Notes: Work between Holmethorpe and Warrington.

BIS 7985	BIS 7986	BIS 7987	BIS 7988	BIS 7989
----------	----------	----------	----------	----------

8000-8049

2 AXLE LIME

PAB

Design Code: PA005B.

Builder: Standard Wagon, Heywood, 1971.

Tare Weight: 13.20 t.

Gross Laden Weight: 46.00 t.

Maximum Speed: 60 mph.

Length: 9144 mm. (30 ft.)

Suspension: FAT 4 UIC Double Link.

Notes: On hire to Steetley. Work between Thrislington and Hartlepool. 32 vehicles are currently stored.

PR 8000	PR 8004	PR 8008	PR 8012	PR 8016	PR 8020
PR 8001	PR 8005	PR 8009	PR 8013	PR 8017	PR 8021
PR 8002	PR 8006	PR 8010	PR 8014	PR 8018	PR 8022
PR 8003	PR 8007	PR 8011	PR 8015	PR 8019	PR 8023

PR 8024	PR 8029	PR 8034	PR 8038	PR 8042	PR 8046
PR 8025	PR 8030	PR 8035	PR 8039	PR 8043	PR 8047
PR 8026	PR 8031	PR 8036	PR 8040	PR 8044	PR 8048
PR 8027	PR 8032	PR 8037	PR 8041	PR 8045	PR 8049
PR 8028	PR 8033				

8050-8118

2 AXLE LIME

PAA

Design Code: PA005A.

Builder: Standard Wagon, Heywood, 1972-73.

Tare Weight: 12.70 t.

Gross Laden Weight: 46.00 t.

Maximum Speed: 60 mph.

Length: 9144 mm. (30 ft.)

Suspension: BSC Friction Pedestal.

Notes: On hire to British Steel Teesside. Work between Shap Quarry and Lackenby.

BRT 8050	BRT 8062	BRT 8074	BRT 8086	BRT 8097	BRT 8108
BRT 8051	BRT 8063	BRT 8075	BRT 8087	BRT 8098	BRT 8109
BRT 8052	BRT 8064	BRT 8076	BRT 8088	BRT 8099	BRT 8110
BRT 8053	BRT 8065	BRT 8077	BRT 8089	BRT 8100	BRT 8111
BRT 8054	BRT 8066	BRT 8078	BRT 8090	BRT 8101	BRT 8112
BRT 8055	BRT 8067	BRT 8079	BRT 8091	BRT 8102	BRT 8113
BRT 8056	BRT 8068	BRT 8080	BRT 8092	BRT 8103	BRT 8114
BRT 8057	BRT 8069	BRT 8081	BRT 8093	BRT 8104	BRT 8115
BRT 8058	BRT 8070	BRT 8082	BRT 8094	BRT 8105	BRT 8116
BRT 8059	BRT 8071	BRT 8083	BRT 8095	BRT 8106	BRT 8117
BRT 8060	BRT 8072	BRT 8084	BRT 8096	BRT 8107	BRT 8118
BRT 8061	BRT 8073	BRT 8085			

8150-8199

2 AXLE LIME

PAA

Design Code: PA008A, *PA008B.

Builder: BREL, Ashford, 1975.

Tare Weight: 13.70 t.

Gross Laden Weight: 51.00 t.

Maximum Speed: 60 mph.

Length: 9448 mm. (31 ft.)

Suspension: BSC Friction Pedestal.

Notes: Work between Hardendale and Ravenscraig.

BSGL 8150	BSGL 8159	BSGL 8168	BSGL 8176	BSGL 8184	BSGL 8192
BSGL 8151	BSGL 8160	BSGL 8169	BSGL 8177	BSGL 8185	BSGL 8193
BSGL 8152	BSGL 8161*	BSGL 8170	BSGL 8178	BSGL 8186	BSGL 8194
BSGL 8153	BSGL 8162	BSGL 8171	BSGL 8179	BSGL 8187	BSGL 8195
BSGL 8154	BSGL 8163	BSGL 8172	BSGL 8180	BSGL 8188	BSGL 8196
BSGL 8155	BSGL 8164	BSGL 8173	BSGL 8181	BSGL 8189	BSGL 8197
BSGL 8156	BSGL 8165	BSGL 8174	BSGL 8182	BSGL 8190	BSGL 8198
BSGL 8157	BSGL 8166	BSGL 8175	BSGL 8183	BSGL 8191	BSGL 8199
BSGL 8158	BSGL 8167				

8204-8253

2 AXLE AGGREGATE

PGA

Design Code: PG002D.

Builder: Standard Wagon, Heywood, 1971.

Tare Weight: 12.60 t.

Gross Laden Weight: 46.00 t.

Maximum Speed: 60 mph.

Length: 9144 mm. (30 ft.)

Suspension: FAT Double Link, Taperleaf.

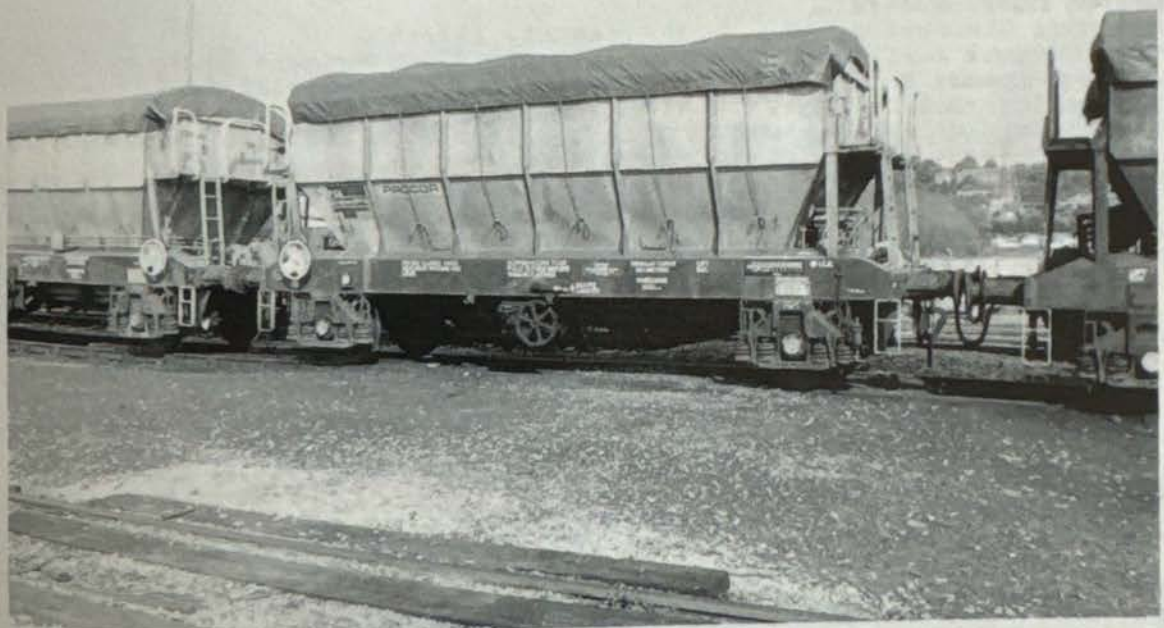
Notes: On hire to Peakstone or Stirling Group (PR 8212, 8242 & 8245). Work between Peak Forest and Salford (Peakstone) or Newton Abbot and Mossend (Stirling).

PR 8204	PR 8213	PR 8223	PR 8229	PR 8235	PR 8245
PR 8208	PR 8214	PR 8224	PR 8230	PR 8239	PR 8246
PR 8209	PR 8218	PR 8226	PR 8232	PR 8240	PR 8251
PR 8210	PR 8219	PR 8227	PR 8234	PR 8242	PR 8253
PR 8212	PR 8220	PR 8228			



PAB PR 8019 (Des. Code PA005B) at Storrs Hill, Wakefield 19.02.89.

(A. Marshall)



PGA PR 8282 (Des. Code PG007B) at ICI Runcorn 07.09.88.

(A. Marshall)

8256-8300**2 AXLE AGGREGATE/SALT****PGA**

Design Code: PG007B.

Builder: Procor, Wakefield, 1975.

Tare Weight: 13.60 t.

Gross Laden Weight: 51.00 t.

Maximum Speed: 60 mph.

Length: 8839 mm. (29 ft.)

Suspension: Eyebolt.

Notes: On hire to ARC, Roche and Tilcon. Used on various duties to and from Tytherington (ARC), various duties to and from Dalry (Roche) and between Grassington, Leeds and Hull (Tilcon).

PR 8256	PR 8264	PR 8272	PR 8280	PR 8287	PR 8294
PR 8257	PR 8265	PR 8273	PR 8281	PR 8288	PR 8295
PR 8258	PR 8266	PR 8274	PR 8282	PR 8289	PR 8296
PR 8259	PR 8267	PR 8275	PR 8283	PR 8290	PR 8297
PR 8260	PR 8268	PR 8276	PR 8284	PR 8291	PR 8298
PR 8261	PR 8269	PR 8277	PR 8285	PR 8292	PR 8299
PR 8262	PR 8270	PR 8278	PR 8286	PR 8293	PR 8300
PR 8263	PR 8271	PR 8279			

8302-8490**2 AXLE CEMENT****PCV**

Design Code: PC001A.

Builder: Gloucester R C & W, Gloucester, 1961-62.

Tare Weight: 8.35 t.

Gross Laden Weight: 35.95 t.

Maximum Speed: 45 mph.

Length: 8534 mm. (28 ft.)

Suspension: Eyebolt.

Notes: Used on various workings to and from Hope and Oxwellmains.

APCM 8302	APCM 8350	APCM 8371	APCM 8393	APCM 8428	APCM 8460
APCM 8306	APCM 8351	APCM 8376	APCM 8399	APCM 8429	APCM 8461
APCM 8310	APCM 8353	APCM 8379	APCM 8405	APCM 8431	APCM 8462
APCM 8312	APCM 8354	APCM 8380	APCM 8408	APCM 8432	APCM 8467
APCM 8315	APCM 8355	APCM 8384	APCM 8412	APCM 8443	APCM 8469
APCM 8320	APCM 8356	APCM 8386	APCM 8416	APCM 8444	APCM 8475
APCM 8335	APCM 8358	APCM 8389	APCM 8423	APCM 8445	APCM 8486
APCM 8342	APCM 8359	APCM 8391	APCM 8425	APCM 8455	APCM 8490
APCM 8349	APCM 8369	APCM 8392			

8500-8594**2 AXLE CEMENT****PCV**

Design Code: PC003A.

Builder: Gloucester R C & W, Gloucester, 1963-65.

Tare Weight: 8.65 t.

Gross Laden Weight: 35.95 t.

Maximum Speed: 45 mph.

Length: 8534 mm. (28 ft.)

Suspension: Double Link.

Notes: Used on various workings to and from Hope and Oxwellmains.

APCM 8500	APCM 8513	APCM 8528	APCM 8545	APCM 8560	APCM 8579
APCM 8501	APCM 8516	APCM 8530	APCM 8546	APCM 8561	APCM 8581
APCM 8502	APCM 8517	APCM 8531	APCM 8548	APCM 8565	APCM 8582
APCM 8503	APCM 8518	APCM 8533	APCM 8549	APCM 8567	APCM 8583
APCM 8504	APCM 8519	APCM 8534	APCM 8550	APCM 8569	APCM 8584
APCM 8505	APCM 8520	APCM 8537	APCM 8551	APCM 8570	APCM 8586
APCM 8506	APCM 8521	APCM 8538	APCM 8553	APCM 8571	APCM 8587
APCM 8507	APCM 8522	APCM 8539	APCM 8554	APCM 8572	APCM 8590
APCM 8508	APCM 8523	APCM 8541	APCM 8555	APCM 8574	APCM 8591
APCM 8509	APCM 8524	APCM 8542	APCM 8556	APCM 8575	APCM 8592
APCM 8510	APCM 8525	APCM 8543	APCM 8557	APCM 8577	APCM 8593
APCM 8511	APCM 8526	APCM 8544	APCM 8558	APCM 8578	APCM 8594
APCM 8512					

8629-8808**2 AXLE CEMENT****PCV**

Design Code: PC002A.

Builder: Butterley Wagon Co., Butterley, 1960-63.

*Metropolitan Cammell, Birmingham, 1960-63.

Tare Weight: 13.40 t.

Gross Laden Weight: 36.00 t.

Maximum Speed: 50 mph.

Length: 6070 mm. (19 ft. 11 in.)

Suspension: Shoe.

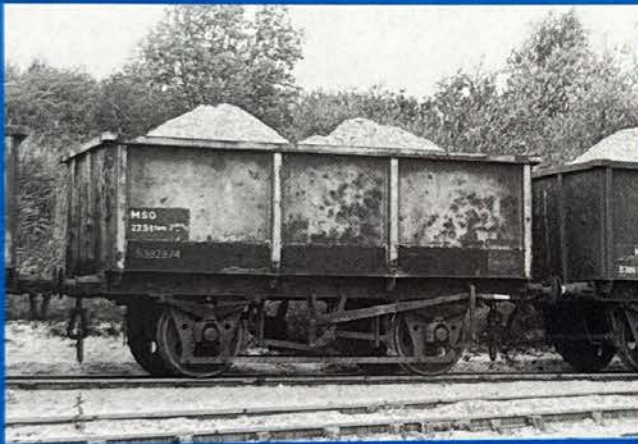
Notes: Used internally at APCM Hope.

Exhibit 11

WORKING WAGONS

**A Pictorial Review of Freight Stock
on the B.R. System.**

Volume 3. 1980 -1984



by

David Larkin

WORKING WAGONS

A pictorial review of freight stock
on the B.R. system.

by

David Larkin

Volume 3. 1980 to 1984



Santona Publications
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Working Wagons

Volume 3. 1980 - 1984

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WORKING WAGONS

Volume 3. 1980 - 1984

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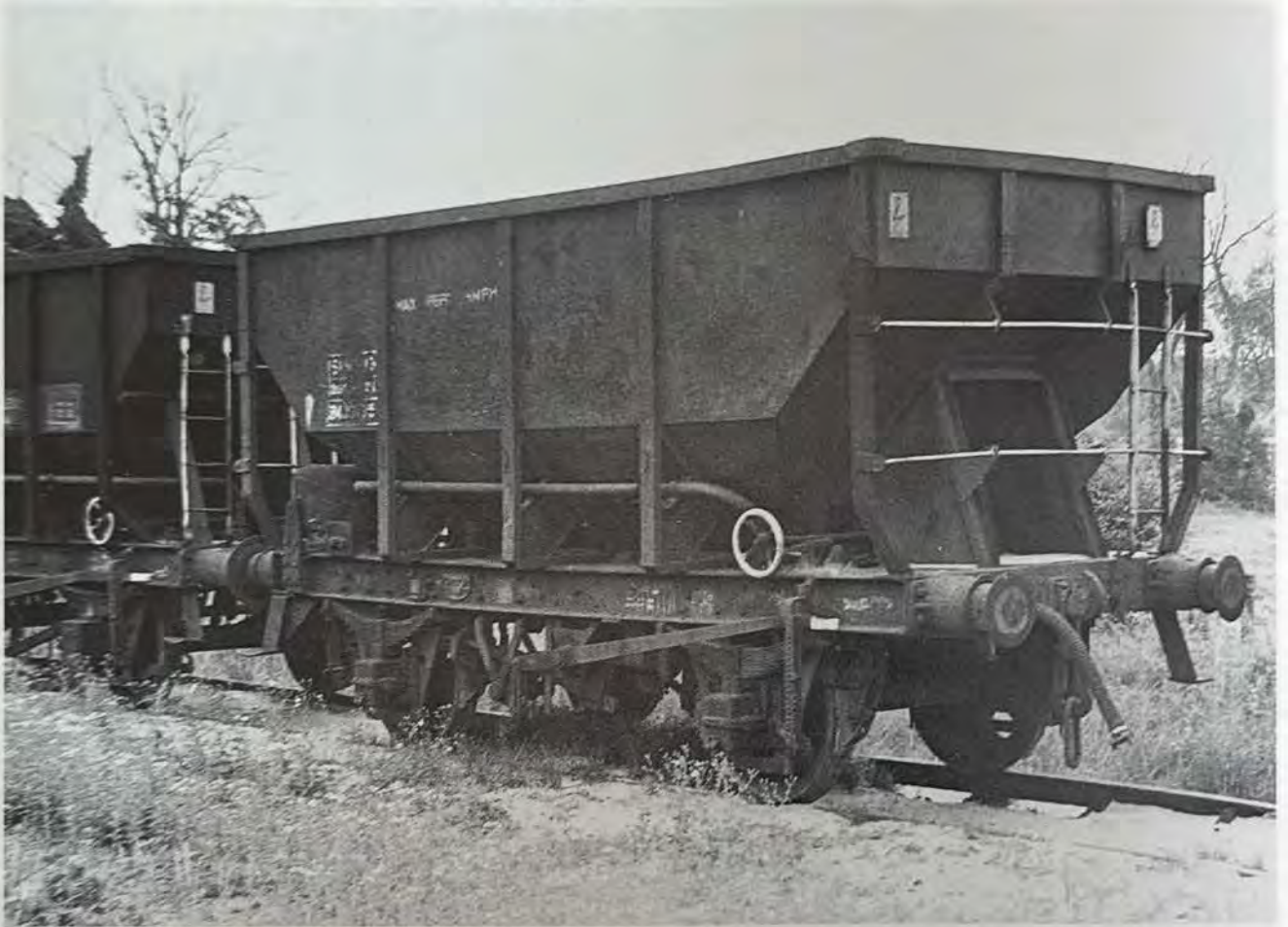
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Section 5. B.R. 25.5T Hoppers



B438775 (Taken at Middleton Towers, Summer 1980)

The 25.5T iron hopper fleet was rather complex in its variations. The one seen here (and B439758, opposite lower) was built as an unfitted vehicle and converted to vacuum braking for sand traffic in 1971. This example is in service from Middleton Towers and, unlike the iron ore tipplers seen in section 3, they probably had a long journey ahead. Livery is Freight Brown with black underframe and white lettering. The code is SAND VB. (Ref: W8624/DL)

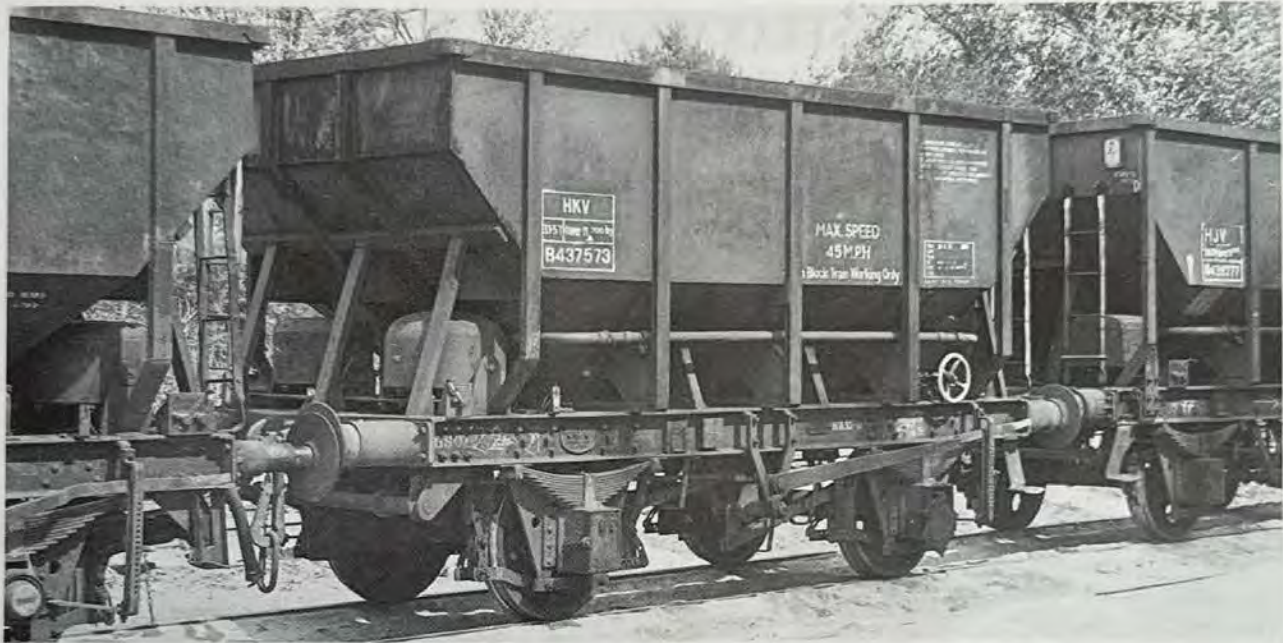
The 25.5T iron ore hopper wagons had been designed in the mid-1950s and remained fairly numerous at the start of the review period. First featured in Vol. 2, section 11, we return for a final look at the type before withdrawal, for, by 7/83, there were no HJOs, 235 HJVs and 580 HKVs.

The HJV fleet comprised several different variants. One of these, as illustrated above, had been converted as late as 1971. These vehicles were on sand traffic and Nos. were; B438000/5/19/53/5/62/95, B438149/56/61/8, B438230/99, B438320/7/44/78, B438413/37/60/2/77/96, B438507/8/96, B438637/49/71/3, B438721/9/31/43/75/87/93/6, B438800/3/4/12/29/31/5/74/5, B438910/57/61/74/80/7/95, B439010/8/28/47, B439102/29/36/63/6/98, B439225/54/69/77, B439322/52/3/8/61/2/4, B439416/35/48/54/63/73/4.

B437573 (opposite upper) was one of a batch built in 1957/58 with vacuum brakes for iron ore traffic and rated at 33.5T, thus becoming T.O.P.S. code HKV. These vehicles were Diagram 1/167 and numbers were B437500 to B437899.

Despite all the conversions, unfitted examples of the 25.5T iron ore hopper could still be seen (as opposite centre).

Finally B439758 (opposite lower) is an example of an unrecorded batch of vehicles converted for limestone traffic, others being B439717/59/81. Judging by the livery, these vehicles were converted post-1964 and may have been intended to replace some of the Diagram 1/165 vehicles numbered B439500 to B439699 (see Vol. 2, page 31). These had been up-rated to 33.5T for iron ore traffic of which six were in limestone traffic.



Above. B437573 (Taken at Middleton Towers, Summer 1980)

The Diagram 1/167 vehicles had originally been used on iron ore traffic but had been transferred to sand traffic, either because of steel works closure or replacement by modern P.O. tippler wagons (see section 26). Livery is Freight Brown with black underframe and white lettering. (Ref: W8607/DL)



Centre. B438044 (Taken at Stoke-on-Trent, Autumn 1980)

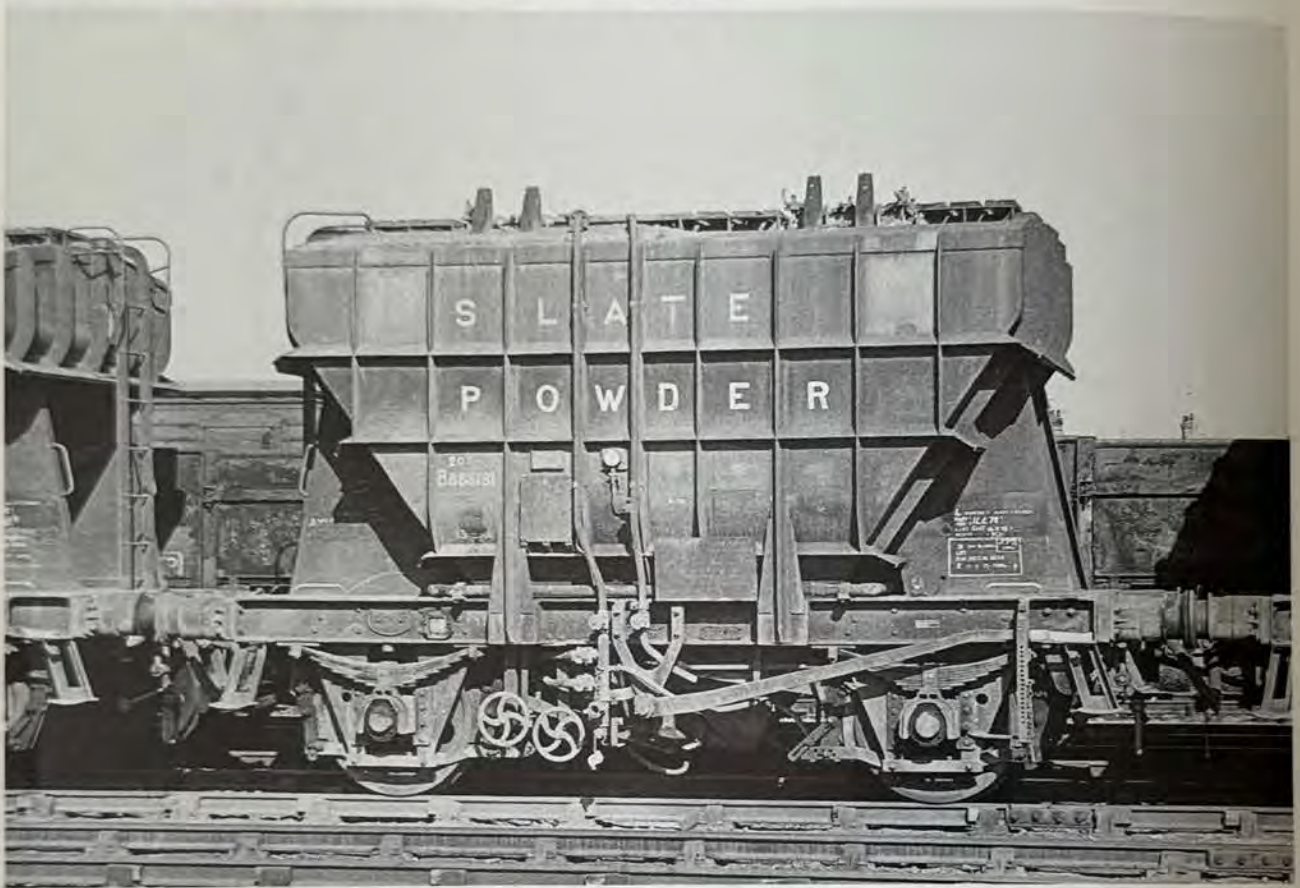
One of the first to be built, this 25.5T iron hopper is in original condition. These unfitted vehicles were operating out of Oakmoor sand quarry. Livery is Grey with black underframe and white lettering on black panels. Apart from the speed restriction and pool number, it remains in 1960s livery. (Ref: W8620/DL)



Right. B439758 (Taken at Dewsnap Yard, Spring 1981)

The B.R. office dealing with rolling stock matters was pretty good at recording conversions in the 1960s, provided that they were informed. This limestone hopper does not appear in any records but, as detailed in the text, was not a one-off. Livery is Freight Brown with black underframe and white lettering. The sheet is grey and, judging by this and the location, it was still in limestone traffic. (Ref: W9332/DL)

Section 6. B.R. PRESFLO Wagons



B888181 (Taken at Peterborough, Summer 1980)

Some Presflos when first built were used on salt traffic but eventually ended their lives in fly ash traffic in the Peterborough area. However, being vacuum braked, they would not have worked with the genuine fly ash wagons of the CSA class which were air braked only. Nevertheless, there were enough of these vehicles to form a block train or two on their own. Livery was still I.C.I. Blue-Green and the location of the two I.C.I. symbols was in the light areas on the upper sides. Underframe was black and lettering white. Most carried the CPV T.O.P.S. code but unusually, this example doesn't. (Ref: W8344/DL)

Another group of vehicles for early withdrawal in the review period were the B.R. Presflo wagons. There were, however, 786 CPVs still in service in 7/83 and also 8 CPWs with ferry fittings for the old Fullers Earth traffic dating back to the 1950s.

In Vol. 2, page 32, an example plated RUGBY CEMENT was illustrated. Another, B873800, (opposite centre) is shown here and it gives a good view of the top and the vacuum cylinders.

Even the A.P.C.M. Co., despite their large fleet of company owned modern vehicles, continued to use some, as indicated by B873042 (opposite lower).

An interesting group of vehicles, not covered in this series so far, were the salt Presflo wagons. The I.C.I. company

adopted this wagon type for its salt traffic and initially, vehicles selected at random were used. The first was B888002 (opposite upper) and this differed from the others, in that despite the lettering, it did not revert to cement traffic. Later vehicles in the range B888181 to B888200 were specially allocated to salt traffic and carried the special livery, as B888181 (above).

Later, the others passed into slate powder traffic from Wadebridge, at least by 1970 and possibly earlier. Nos. B888003/17/22/5/38/51/84/91, B888111/8/21/8/9/48/50/51/60/2/3/4 were used initially in this traffic before they too reverted to cement traffic.

By the review period, however, all these vehicles were to be found in fly ash traffic in the Peterborough area.

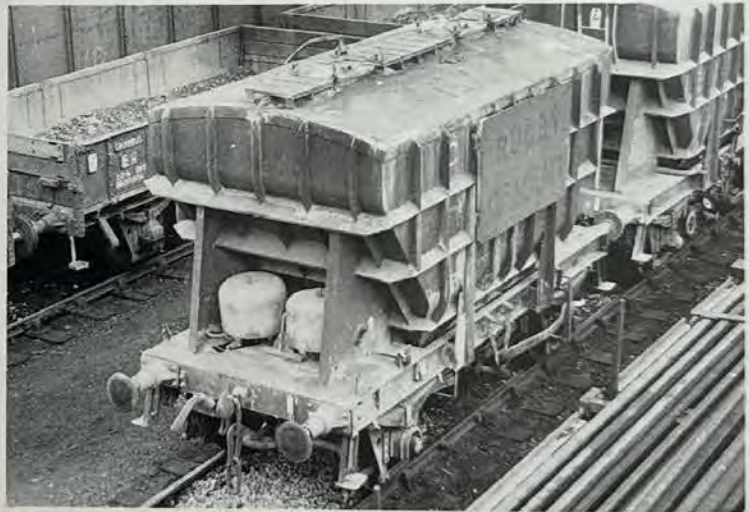
B888002 (Taken at Peterborough, Summer 1980)

As well as the vehicles opposite, there were other salt carrying vehicles around and, as they had differences in loading and discharge, they too ended up in the fly ash fleet. As far as is known, B888002 is the only one to have shaker pockets, the features on the lower side. Livery is Freight Brown with black underframe and white lettering. (Ref: W8335A/DL)



B873800 (Taken at Tonbridge, Spring 1980)

Buffers and the position and number of the vacuum brake cylinders differed from batch to batch. B873800 is one of the later vehicles, built in 1964. Livery is Freight Brown under the usual cement dust with black underframe and white lettering. Nameplate is black on orange and a clean example will be found in Vol. 2, page 32. (Ref: W8328/DL)

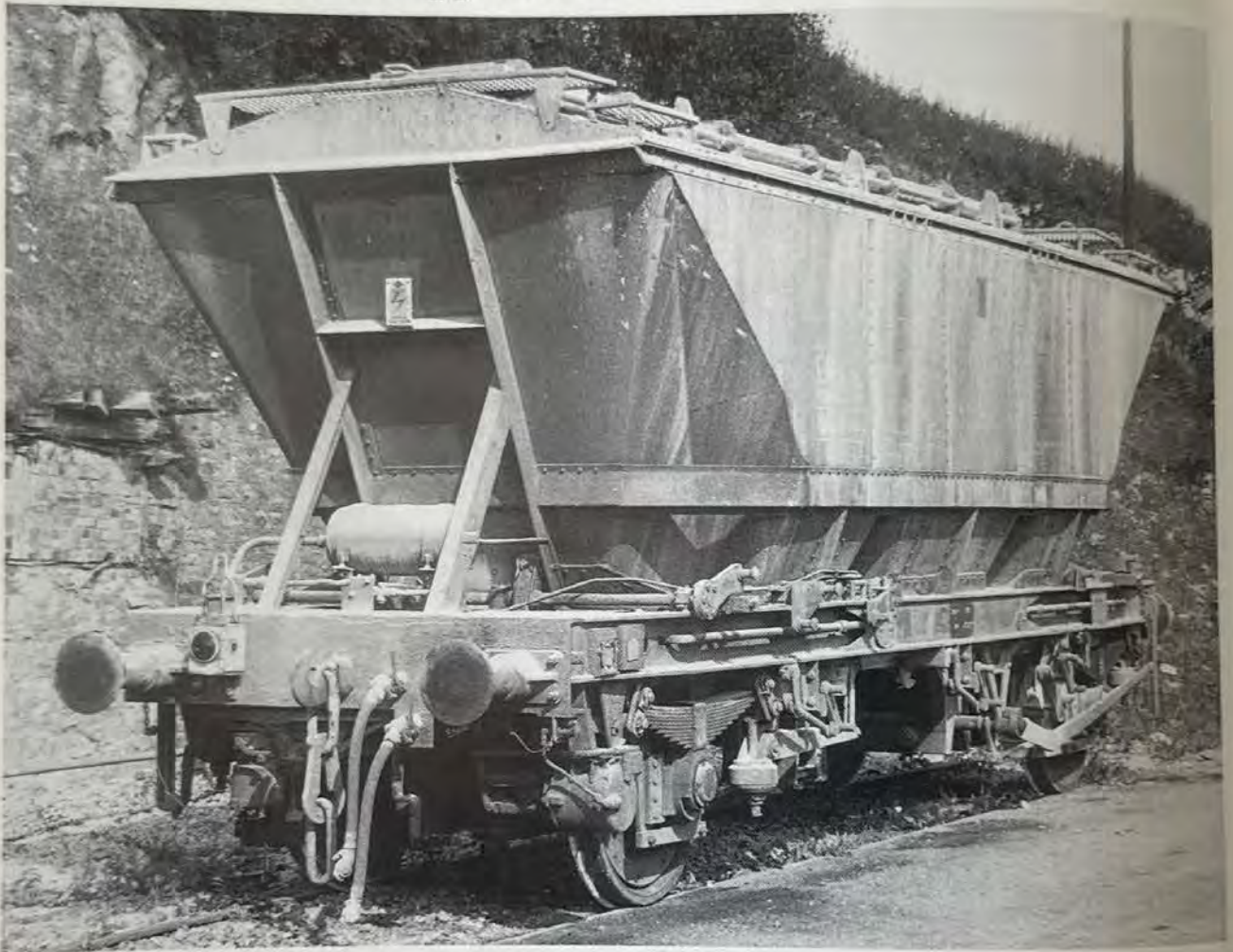


B873042 (Taken at Hoo Junction, Summer 1980)

B873042 was built in 1960 but appears to have the same characteristics as the one above. Although the A.P.C.M. allocated vehicles had originally carried plates, (see Vol. 1, page 31), the few still used during the review period did not. Livery is as above but, instead of a plate, there was a yellow W. This indicated 'Walcrete', a brand of cement manufactured by A.P.C.M. (Ref: W8318/DL)



Section 23. HAA Hoppers and Variants



250049 (Taken at Peak Forest, Summer 1982)

The home of the CBA hoppers was the Peak District of Derbyshire and this example is seen awaiting minor repairs. Compare this view with the one in Vol. 2, page 85, the opposite end of the vehicle is shown. In lime traffic the vehicles got very stained, as seen here. Livery is silver with Freight Brown bracing and black underworks. (Ref: W11495/DL)

The HAA merry-go-round coal hopper was one of the oldest air braked designs and a programme of body panel replacement began in the late 1970s. The rebodied vehicles could be identified by a row of bolts along the upper sides which were not found on original wagons. Less easy to spot was the lack of internal lateral braces at the top of the inside of the hopper. The original vehicles can be found in Vol. 2, pages 84 and 85.

The oldest vehicles were generally the first to be rebodied and 350054 (opposite upper) is one from the first batch built in 1965.

In addition to these, new vehicles began to appear at the start of the review period in 1980. These were numbered

365000 to 366129 and obviously had the row of bolts (mentioned above) from new. 365129 (opposite centre) is one of these.

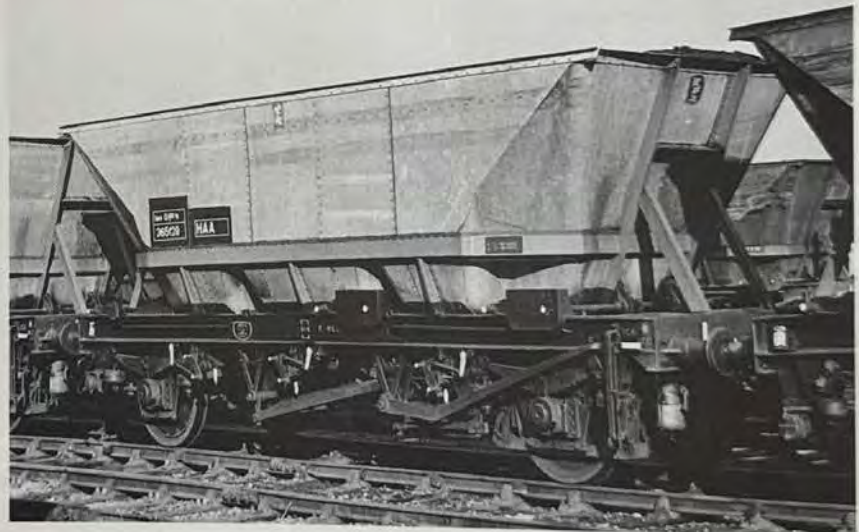
The HAA code was retained for all the above vehicles but a new variant for 60 mph running, the HDA, appeared in 1982. This group of vehicles can be identified by the cylinder on top of the buffer beam at one end of the vehicle, a feature seen on the right of 368106 (opposite lower). The HDA class was numbered 368000 to 368459.

The CBA class (above) was the only other variant around at the time of the review period. The CDA clay wagons and the other variations will be dealt with in Volume 4 of this series.

350054 (Taken at Hartlepool, Autumn 1981)
HAA vehicles were always very dirty, due in part to the rubber tired wheels which run along the bodysides in order to propel the vehicles through the loading plant. Thus, a shiny new vehicle always stood out in a train. Here two vehicles freshly out-shopped from BREL Shildon await their first load. The hopper sides are silver with the bracing in Flame Red, underworks are black and the lettering, white on black. (Ref: W8941/DL)



365129 (Taken at Worksop, Winter 1980)
Only the number range separates the rebodied stock from the new HAA fleet. As there was no space for a large batch at the end of the 35XXXX range, the new series commenced at 365000 and this is a fairly early vehicle from that batch. Livery is as above but the grime associated with the load is already apparent. (Ref: W8963/DL)



368106 (Taken at Hoo Junction, 1/8/82)
The HDA variant was introduced for higher speed running on longer workings. At least, when first delivered, the HDAs ran in train consists with HAAs, as seen here. Later they could be seen working in block formations made up of HDAs only. Livery is as above. (Ref: W11611/DL)



Section 27. Private Owner 4 wheeled Hoppers



PR8209 (Taken at Northwich, 14/2/82)

This design was one of the earliest to appear, being built by Standard Wagon Ltd. in 1971. Thus it was fitted with early pattern springs. Initially used by BP Chemicals on salt traffic, they had curved ends and ladders to suit, allowing staff to sheet the load. Livery is light grey with usual symbols. (Ref: W10521/DL)

Many of the four wheeled open hopper designs built for private owners were very distinctive in shape.

PR8209 (above) is one of a batch built by Standard Wagon Ltd. for salt traffic. The batch was PR8201 to PR8255, the T.O.P.S. code PGA and design code PG002D. Such traffic is very hard on wagons dedicated to it and the survivors were out of use some 10 years later. They would be refurbished, given modern springs and would pass into aggregate traffic.

BSTE18005 (opposite upper) was built by the same manufacturer but some four years later, in 1975. Designed to carry limestone from Redmire quarry to Lackenby steel works, Tees-side, there was obviously no perceived need for staff to climb on the wagons, as no ladders are fitted. The batch was numbered BSTE18000 to BSTE18114 with T.O.P.S. code PGA and design code PG010A. Surplus

vehicles passed to wagon hirers in due course and were fitted with ladders, (see Vol. 4 of this series).

TAMC14861 (opposite centre) is contemporary with, but slightly older than, the aggregate hoppers found in Vol. 2, pages 54 and 55. Builder in this case was Procor Ltd. in 1979/80 and the batch was numbered TAMC14840 to TAMC14870. Design code was PG016G. As a lighter design, they have shields inside the ladders to protect the air brake equipment.

Finally, RLS6307 (opposite lower) has been included here, although its categorisation is difficult, since it is not a true 'hopper'. A box body with roller roof was fitted onto a chassis recovered from the ex-A.P.C.M. van fleet (see Vol. 1, page 33). The batch of vehicles were coded PRA, design code PR001A, and numbered RLS6303 to RLS6316. They carried china clay from Cornwall to Scotland.

BSTE18005 (Taken at Tees Yard, Spr. 1981)

This design of limestone hopper was built with a specific traffic on a specific route in mind, namely Redmire Quarry to Teesside. Consequently they were not fitted with ladders as they were not deemed necessary for the job. They were also built for automatic discharge. Livery was light grey overall with red symbol and black lettering. (Ref: W10606/DL)



TAMC14861 (Taken at Brixton, Spr. 1980)

The condition of aggregate hoppers was usually pretty rough after only a short time in service. Tarmac, however, did seem to keep their wagons in fairly smart condition. Livery is white with green band and black or white lettering. The underworks are black. (Ref: W10963/DL)



RLS6307 (Taken at Tiverton Junction, 19/3/83)

These rebuilds were a very curious design. They reused a 1960s chassis with original springing but were given air brakes, T.O.P.S. code being PRA. In the event not all were fully converted, and some had the basic box without ladders and roof (see Vol. 4). Livery was unusual also, the body being pale green with red roller roof. Underworks were black. (Ref: W12948/DL)



Section 28. Private Owner 4 wheeled Covhops



BIS7831 (Taken at Castleton, 13/11/83)

Seen on delivery from Standard Wagon Ltd., Heywood, BIS7831 is one of the second type of PAA operated by British Industrial Sand from the Kings Lynn area. Livery is white with orange symbol and stripe and black name. Underworks are also black. (Ref: W13508/DL)

The stock working out of Middleton Towers which was examined in Sections 3, 5 and 7 was all elderly and, more to the point, not air braked. They were replaced by modern stock such as BIS7831 (above). This vehicle was part of the batch built in 1983 by Standard Wagon Ltd. Numbers were BIS7825 to BIS7844, T.O.P.S. code PAA and design code PA012A. The others were numbered between BIS7950 to BIS7989 and most were built by W. H. Davis Ltd.

TRL12800 (opposite upper) is one of a small batch of china clay covhops which worked between Cornwall and Central Scotland. This was another Standard Wagon Ltd. design, built in 1982 to design code PA010A. The batch was numbered TRL12800 to TRL12807.

During the early 1980s, Britain's nationalised steel works were closing and stock ordered to replace older B.R. stock had a remarkably short life. BSRV12569 (opposite centre) is one of the batch BSRV12500 to BSRV12599 which were jointly built by Procor, Wakefield and BREL Shildon in 1979.

Being able to carry loads not affected by water, the roof could be left open and they were coded PGA rather than PAA. The example shown was one of a long line of stored wagons in 1984 and they were rebuilt in the same year as POA scrap wagons (see section 24).

Standard Wagon Ltd. were the builders of STET18715 (opposite lower) which was one of the batch STET18700 to STET18729. Built in 1981, these vehicles carried lime and thus always ran with the roof closed. T.O.P.S. code was PAA and design code was PA011A. This class were very similar to the BIS and BSRV wagons but the side plates for shunting purposes gave them a different look.

Of these covhop types, the Tullis Russell ones were to a special design because of tight curves at their destination and also because of the load, china clay. The others all have a strong family resemblance and it is rather surprising that the BSRV wagons did not apparently see any further main line use.

TRL12800 (Taken at Tiverton Junction, 19/3/83)

Operating between Cornwall and Markinch, Fife, these hoppers would have used the West Coast Main Line, usually in ones and twos. Livery is blue with blue name on white panel and black and maroon TRL symbol on yellow panel. Underworks was black. They soon got very stained with china clay, however, and often looked rather scruffy. (Ref: W12947/DL)



BSRV12569 (Taken at Castleton, 14/8/84)

These hoppers were dual purpose, designed to carry iron ore pellets from Glasgow Docks and limestone from Hardendale Quarries, Shap, to the now closed steel works at Ravenscraig. They were little used on these duties, apparently. Livery was light grey with black lettering and underworks. (Ref: W13334/DL).



STET18715 (Taken at Dewsnap Yard, Spring 1981)

Seen soon after delivery by the builders, this design was rather more rounded at the top than the others. The traffic was lime from Ferryhill, Co. Durham to Hartlepool and livery was off-white with black underworks. The nameplate was black on white. The large side plates very soon became soiled with horizontal black marks from the rubber wheels used to propel the vehicle through the loading plant. (Ref: W10602/DL)



Section 29. Private Owner Bogie Covhops (1)



RLS11803 (Taken at Standard Wagon, Heywood, 22/5/82)

As well as vehicles to carry powdered cement, some companies also required wagons to carry cement clinker. Clyde Cement operated from the Clitheroe, Lancs. works to Coatbridge, Scotland. Livery is light grey with blue and turquoise stripes and black CLYDE CEMENT. Solebar and bogies were also black. (Ref: W11549/DL)

The 1980s saw many new bogie covhop designs in operation, although some were rather short lived.

Clyde Cement was a new name which flourished briefly between Lancashire and Scotland. RLS11800 to RLS11814 were bogie clinker hoppers built in 1982 by Standard Wagon, where RLS11803 (above) is seen. Classified PBA, they had been de-roofed by 1990 and were re-classified PHA with a new design code of PH011A.

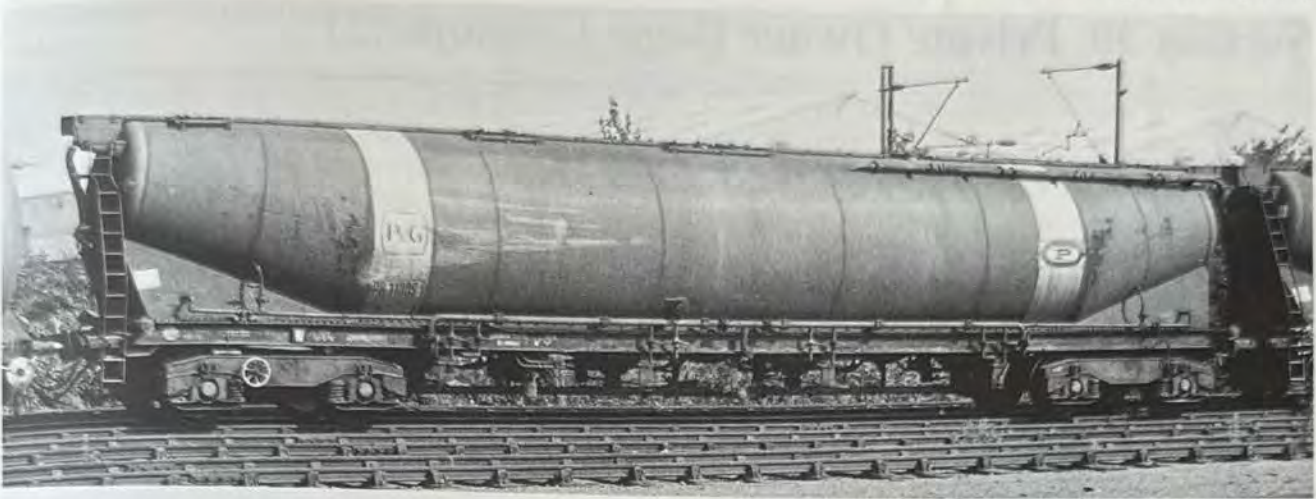
PR11309 (opposite upper) was built in 1972 by Charles Roberts Ltd. for tripolyphosphate traffic between Whitehaven and West Thurrock. They were still in this traffic during the review period but would soon pass on to other duties with a new livery. The batch was numbered PR11300 to PR11312, T.O.P.S. code was PBA and design code PB002A.

Rather more restricted in geographical territory were the potash wagons operating between Boulby Mine and Tees Docks with export traffic. STS11434 (opposite centre) was built in 1974 by Charles Roberts Ltd. as part of the batch STS11401 to STS11434. T.O.P.S. code was PBA and design code PB001B.

To replace older traditional stock on china clay traffic between Cornwall and the Potteries, French-built bogie hoppers, such as TRL11617, were delivered in 1982. The batch was TRL11600 to TRL11634, T.O.P.S. code, once again PBA and design code PB003A.

All the above hoppers were built for specific duties but, with the exception of the potash hoppers, could be seen running in ones and twos on SPEEDLINK services rather than in block trains.

Private Owner Bogie Covhops (1)



Above. **PR11309** (Taken at West Thurrock, Autumn 1980)

The bogie triphosphate hoppers hired by Proctor and Gamble represented one of the earlier bogie Covhop designs. At the time they were photographed they were due to be replaced by other vehicles on this traffic, only to re-emerge in the next review period (see Vol. 4). Livery was a very pale green, lettering was in black with black underframe.

(Ref: W10598/DL)

Centre. **STS11434** (Taken at Tees Yard, Spring 1981)

Probably having recently been overhauled at BREL Shildon, two potash covhops await return to Boulby mines. Livery is dark green with white name and side symbols, including the STS name. The second vehicle also has an orange stripe along the solebar.

(Ref: W10605/DL)



Right. **TRL11617** (Taken at Tiverton Junction, 19/3/83)

Seen recessed awaiting a path north, this SPEEDLINK train included three of these very distinctive wagons, as well as some of the PRAs seen on the previous page. Livery is white with blue stripe and main name. TIGER is in the usual black and yellow. Bogies and solebar are black, although the latter is well weathered with clay.

(Ref: W12944/DL)



Exhibit 12

PRIVATE-OWNER WAGONS in Colour

For the Modeller and Historian



David Ratcliffe

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7950
11

PRIVATE-OWNER WAGONS

in Colour

For the Modeller and Historian



David Ratcliffe

Ian Allan
PUBLISHING

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Previous page: Following its purchase of ICI's quarrying interests Buxton Lime Industries obtained a Section 8 grant towards a fleet of twenty 67.5-tonne-capacity air-braked hoppers. Although to a Powell Duffryn design they were built abroad by Tatrasroj Poprad of Slovakia, a trend that would continue in future years, BLI 19200-19 took over the Tunstead-Hindlow traffic in 1995. They have also been used to carry limestone to the flue-gas desulphurisation plant at Ratcliffe-on-Soar Power Station and to a Tarmac stone terminal at Pendleton, in west Manchester. The Hindlow trains must reverse at Buxton and BLI 19212, coded JGA, was seen in the overgrown Up Reversing Sidings on 25 July 1998.

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Left: The 35-ton 15ft-wheelbase vacuum-braked tanks played an important part in the story of the private-owner wagon and numerous examples were built not only by Charles Roberts but also Metro-Cammell and Powell Duffryn. When larger tanks were introduced Esso sold some of its Class B 35-tonners to the Central Electricity Generating Board. Renumbered as CEGB 48500-49 they were then used to carry fuel oil from Lindsey refinery to the power stations at Drakelow, Meaford and Willington. However, by February 1988 many were to be found in store at Castle Donington including CEGB 48548, a Powell Duffryn-built example, previously ESSO 43931.

INTRODUCTION

In this book I have considered some of the non-ferry registered privately owned (PO) wagons that came to play such an important role on Britain's rail network in the last quarter of the 20th century, with particular reference to the various commodities they carried and the traffic flows that they operated.

The heyday of the private-owner wagon had appeared to be over when, at the beginning of World War 2, the control of all wagons capable of general use passed to the Ministry of War Transport in an attempt to improve utilisation and eliminate the unnecessary movement of empty vehicles. The majority of those taken over were the traditional five- and seven-plank opens used to carry coal and coke, and as hostilities dragged on their colourful liveries gradually weathered and faded. Those that survived the rigours of wartime conditions passed into British Railways ownership at Nationalisation in 1948 to eke out their few remaining years anonymously in common use, renumbered in the 'Pxxxxxx' series.

The PO wagons to escape wartime pooling and subsequent nationalisation included types such as tippers, which required special unloading facilities, and tanks, built to handle specific commodities, such as oil or acids. However, during the war years there had been few opportunities to repair existing stock, let alone purchase replacements, and so most remaining fleets were composed of elderly vehicles, many built before the 1923 Grouping, and which were rapidly approaching the end of their useful lives. Furthermore, in the early 1950s, as the railway system slowly recovered and BR began developing new and innovative wagon types, the private ownership of all but tank wagons was discouraged.

Fortunately in 1957 came the first of a number of changes which were to lead to the private owners' renaissance when a new, 35-ton-glw (gross laden weight) tank wagon design was developed as a result of collaboration between Esso Petroleum, British Railways and the long-established wagon builder Charles Roberts. Three prototype wagons were built: Class A and Class B tanks, both for Esso, and a creosote tank for BR, all incorporating many of the developments which BR had begun adopting as standard for its own fleet under the 1955 Modernisation Plan. The tanks not only had an increased capacity over earlier types but, more importantly, were fitted with roller-bearing axleboxes and automatic vacuum



brakes, which, combined with their 15ft wheelbase, enabled high-speed operation in block-train formations. The design was an immediate success and quickly went into production not just for Esso but also for several other petroleum and chemical companies.

In 1962 the axle-load limit was raised, first to 20 tons allowing a glw of 40 tons, and, shortly thereafter, to 22½ tons with concomitant minor increases to the loading-gauge. However, the size of tank needed to accommodate such loadings made it necessary to adopt a new 'monobloc' design whereby the chassis cross-members dropped below solebar height, and in place of the anchor or saddle mountings, as used on earlier vehicles, the barrel was secured to the underframe by means of wing plates riveted to the top of the solebar.

This continuous mounting gave extra rigidity and reduced barrel stresses while riveting allowed the tank to be removed from the chassis if necessary. The first monobloc tanks had 10-plate bearing springs, but in 1963 BR decided to introduce the *Union Internationale des Chemins de Fer* (UIC) double-link suspension. At the time this suspension was considered the only one capable of 60mph running at a 22½-ton axle load and accordingly, the growing numbers of 45-ton monobloc tank wagons were so fitted, albeit with 13-plate bearing springs to handle the higher load.

For many years the potential superiority of bogie wagons had been recognised for high-speed operation but it was not until BR raised its permitted axle loading again to 25 tons per axle in 1966 that the higher cost, when compared with a two-axle vehicle, could be justified. Consequently it became possible to design a bogie Class A tank capable of carrying 20,500gal compared with the 17,280gal capacity of two 45-ton

Above: Aggregate companies were amongst the most successful in obtaining grant aid towards new freight facilities and equipment, and also introduced many colourful and attractive liveries to the freight scene. One of the author's favourites was that adopted by Bardon Hill Quarries Ltd as seen in this view of BHQ 17110 taken at Bardon Hill on 17 September 1993. This was one of 21 90-tonne-glw bogie hoppers, BHQ 17101-21, TOPS code PHA, purchased from W. H. Davis in 1986 to replace the ageing fleet of BR 27-ton MSV wagons on the thrice-weekly working to Thorney Mill (West Drayton).

Class A four-wheelers, and it was not long before the oil companies were investing heavily in these new, 100-ton wagons.

The improved economics of rail transport made possible by larger wagons and faster transits were further enhanced by the negotiation of long-term contracts with BR. In return for a highly competitive rate the oil companies agreed to place a minimum level of traffic on rail each year, but this proved to be no burden as demand for petroleum products soared by well over 100% in less than a decade. With hindsight one might question the value of such deals to BR, for while the tonnage of petroleum products carried by rail rose from 4.8 million in 1961 to over 15 million in 1968, revenue per ton was halved. However, when placed within a wider context the development of a nationwide network of about 300 rail-fed oil terminals, supported by more than 400 block trains running every week, changed the perception of railfreight and helped encourage other companies, particularly in the construction industry, to invest in their own wagons.

By the early 1970s British Rail policy had come full circle and from then on it would



Left: While the TOPS system proved to be a godsend to both private wagon owners and BR in improving the operation of the freight network, there were the odd anomalies. When they were first rolled out the decision to differentiate 51-tonne-glw tank wagons had not been made and as a result several fleets were lettered 'TT' before the 'TU' coding was decided upon. Over time as the wagons went through works this was changed but some carried the 'TT' coding all their lives and 51-tonners TRL 70726 and TRL 70717 were recorded at Immingham Reception Sidings in March 1991 still coded TTA. Built by Standard Wagon in 1977 to carry caustic soda from the ICI works at Runcorn they were, by this date, in Atochem caustic soda traffic from Immingham Dock Tank Farm.

only provide wagons for general-merchandise traffic and for the other nationalised industries and government departments. Other customers would now be expected to provide their own vehicles, not only for new traffics, but also to replace life-expired railway-owned wagons used to carry existing flows. Naturally this about turn was not welcomed by everyone and some freight was lost to road, although in many instances these were short-distance workings for which an investment in new rolling stock could not be justified.

A further boost to the PO wagon came with the Transport Act 1974, which provided for direct Government support in the form of Section 8 Grant aid where the use of rail would result in significant benefit to the environment. A maximum grant of 60% of the approved capital cost of new freight facilities and wagons was available and successful applicants could claim Corporation Tax relief on their share of the costs. Grants ranging from as little as £9,000 to over £2 million were awarded, and in the 10 years following its introduction it was estimated that the scheme was responsible for an additional 35 million tonnes of rail-borne freight.

Although many companies purchased their own wagons another option was to lease vehicles from one of the major hire companies such as Algeco (the Belgian subsidiary of German firm VTG), BRTE (British Railway Traffic & Electric, subsequently part of Procor), E. G. Steele & Co Ltd, Raillease (a subsidiary of the Standard Wagon Co), STS (Storage & Transport Systems) or Tank Rentals Ltd (a Charles Roberts subsidiary, later spun-off as Tiger Railcar Leasing). Apart from the smaller initial financial outlay involved in

leasing, another advantage was that the hire companies made all the arrangements for the maintenance of their wagons. Indeed, following various takeovers and mergers Procor acquired Charles Roberts, while STS owned Marcroft Engineering, a wagon-repair company with shops at Coalville, Radstock and Burry Port. Furthermore, when the terms of a lease extended beyond that of the vehicle's full 15-year depreciation the rental was reduced to a peppercorn figure, sometimes as low as £1 per wagon per annum.

The interests of the private-wagon industry were represented by the Private Wagon Federation, an umbrella organisation of six autonomous bodies — the Association of Private Railway Wagon Operators, the Association of British Railway Carriage & Wagon Manufacturers, the Wagon Repairing Association, the Wagon Hirers' Association, the Oil Industry Association and the Chemical Industry Association. Members of the Association of British Railway Carriage & Wagon Manufacturers, which included all the established builders, were required to design and manufacture vehicles in compliance with regulations issued by British Rail, while members of the Wagon Repairing Association undertook to carry out maintenance, repair and modification along similar lines. The most important companies involved in the maintenance of private-owner wagons were C. C. Crump & Co at Connah's Quay, Railcar Services Ltd, which had its major works at Horbury, Stoke and Swansea, the aforementioned Marcroft Engineering, Powell Duffryn at Cardiff, and E. G. Steele & Co at Hamilton. The Central Wagon Co at Wigan and South Staffs Wagon at Tipton also undertook a limited amount of repair work, as did W. H. Davis at Shirebrook.

By 1984 there were approximately 15,000 PO wagons in use — roughly 20% of the total freight stock. However, in terms of tonnes per mile they accounted for around 40%. When coal and coke were excluded from the reckoning then two-thirds of all tonne-mileage was in private-owner wagons, and by the end of the decade PO stock accounted for more than 50% of all freight tonnage.

Changes in operating methods also made wagon ownership a more attractive proposition. The introduction of fully fitted block workings resulted in considerably improved utilisation and from the early 1970s company trains for the aggregate of chemical industries had begun appearing in the Working Timetables alongside the established petroleum services. Smaller wagonload flows were not overlooked. In 1972 the British Railways Board introduced its 'Air-braked Network' of high speed, exclusively air-braked, overnight trunk services, which was to be expanded and rebranded as 'Speedlink' in 1977.

In contrast to the old-fashioned wagonload freight system, which had suffered from problems of low speed, frequent remarshalling and unreliable service, the Speedlink network was based on a number of carefully monitored trains linking no more than a dozen or so main yards where they exchanged traffic. There was no marshalling in the traditional sense *en route*, trains stopping only to exchange pre-formed sections, so that a wagon would only be shunted twice, once in its originating area and again at its destination. Such was the success of Speedlink that many customers, including household names like Campbell's Soups, now considered Railfreight as an attractive

proposition for small-volume flows. Indeed, some operators found it worthwhile to place a single vehicle on rail.

Another development of considerable benefit to the wagon operator was the adoption by BR of a real-time computer system to regulate its entire operations. Developed from a system pioneered by the Southern Pacific Railroad in the USA, it was gradually introduced in Britain from 1971, spreading to include the entire network by 1975. Known by its acronym TOPS, the Total Operations Processing System recorded each event affecting a vehicle as it happened, allowing for the constant monitoring of an individual wagon's movements and availability.

In order to provide information in a straightforward and uniform manner compatible with the needs of a computerised system of control every freight location was allocated a five-digit numerical identity, while a new set of wagon codes was devised to replace the antiquated telegraphic codes formerly in use. The new TOPS codes were based on a four-letter code in which each letter conveyed information, and which, when taken together, provided a detailed description of the vehicle. The first letter defined the broad wagon type to which the individual vehicle belonged while the second letter defined more exactly the wagon type in question (see Table 1). The third letter indicated the brake type of the wagon, referring to the fitting of through pipes where appropriate, as well as to the provision of full automatic brakes (see Table 2). The fourth letter referred to sub-divisions within each type.

To assist rail staff the first three letters of the TOPS code were included on a wagon's information panel, normally to be found painted on the side of the vehicle. The panel would also carry details as to the tare weight of the wagon, expressed in kilograms, and its capacity as measured in metric tonnes. The bottom line of the panel carried the wagon's unique TOPS number. This consisted of a four- or five-digit number (i.e. a figure between 1000 and 99999), prefixed by an abbreviated form of the owner's name, consisting of up to four letters.

Before the introduction of TOPS each wagon owner had allocated their own numbering policy with the result that some numbers, particularly those below 100, were repeated over and over again. Therefore, all existing wagons had to be renumbered to comply with the new system, which in part accounted for the time taken over its introduction, while all new stock built after 1975 was allocated a previously unused number. A wagon's TOPS number was also

carried on small plastic plates fixed to the solebar.

The opportunity was taken to group together different wagon types within certain number ranges, with most open wagons given numbers below 10,000 while tank wagons of less than 45 tons found themselves numbered between 40xxx and 48xxx and bogie tanks occupied the 7xxx and 8xxx ranges. However, over time as certain number blocks became full this was not always possible to sustain. To ensure the integrity of the system each number was unique and until the late 1990s there were no cases of a number being reused, let alone duplicated. Initially, the only alteration to a wagon number would occur in the case of major rebuilding, when a fresh four- or five-digit number would be allocated, or in the case of a change of ownership which would normally be reflected simply by a change of prefix. A number of wagons acquired by both Shell and British Petroleum also saw a change to their TOPS numbers so as to conform to the number coding used by those companies.

Initially, non-ferry PO wagons were coded in the 'P' and 'T' groups, but as new types were introduced it became increasingly difficult to reflect the various differences. This was particularly true with regard to British-registered international ferry wagons, all of which had been lumped under the 'PI' coding. However, by 1991 the withdrawal of BR's vacuum-braked steel carriers had freed up the 'J' and 'K' groups and so a wholesale recoding exercise was undertaken. Since rail privatisation the distinction between formerly railway-owned and PO stock has become somewhat blurred. For example, one batch of bogie tanks introduced by EWS and given six-digit numbers (traditionally allocated to railway-owned stock) were classified 'TEA' (a private-owner coding), while the renumbering of PO stock after a change of ownership has become more commonplace.

Of course, the introduction of TOPS not only made life easier for wagon owners; it was also a great boon to the lucky enthusiast, with access to the system and tracking down the whereabouts of specific fleets became relatively straightforward. Furthermore, TOPS could also provide details of a wagon's lading, originating point and destination and so over time the diligent researcher could build up a comprehensive picture of freight flows throughout the country.

My own serious interest in rail freight began in the spring of 1982 while waiting on Edge Hill station with my fiancée for a delayed multiple-unit to Manchester. As the

time passed we watched as a Class 40 shunted back and forth with a long line of mixed stock including several oddly shaped wagons lettered 'PRESTWIN' and 'TRIPOLY' that had clearly seen better days. Although I had been a rail fan in the broadest sense for as long as I could remember, having grown up with a view of the old LNWR Eccles Junction-Springs Branch line from my bedroom window, and within earshot of Patricroft shed, I was no wagon expert, so when Ruth innocently asked me to explain these markings I was stumped.

The following week, with help from the Head of Chemistry at the college where Ruth and I both taught, I discovered that sodium tripolyphosphate was a constituent of washing powder. Then, later that month, on a visit to the Sherratt & Hughes bookshop in St Anne's Square, Manchester, I chanced upon David Larkin's Bradford Barton volumes *BR Standard Wagons* and *Private Owner Freight Wagons*. Not only did David explain what a Prestwin was, but his books also opened my eyes to the immense variety of rolling stock and to the diverse commodities they carried.

I was hooked, and later that year, when Ruth and I were on holiday in Scotland, I purchased my first decent camera and began to record the freight scene, the beginnings of a collection that at the last count numbered well over 20,000 prints and slides. It was a good time to begin, coinciding as it did not only with the arrival of increasing numbers of private-owner wagons, but also reasonably affordable colour film.

Producing this book — hopefully the first in a short series covering different aspects of the wagon fleet — would not have been possible without the considerable help afforded me by numerous organisations and individuals. In particular, I should like to thank fellow Railfreight Archive members Trevor Mann, David Monk-Steel, Mark Saunders and Hywel Thomas, for permission to include photos from their own extensive collections, and also to acknowledge the contribution of the late Colin Wright, whose enthusiasm kept me going at the end of many a long day's 'wagoning'. I should also like to thank all those railway staff that I have met, the length and breadth of the country, for their kindness in granting me access to their yards and goods depots. Sadly, a road accident many years ago means that Ruth is no longer with me to share in the fruits of my labours, and it is to her memory that this book is dedicated.

David Ratcliffe
Swinton
January 2009

Table 1: Private-owner wagons (TOPS code groups 'J', 'K', 'P' and 'T')

Code	Description	Pre-1991 code
JA	Bogie Covhop	PB
JB	Bogie Covhop	PB
JC	Bogie Presflo	PD
JD	Bogie Bolster D	PX
JE	Bogie hopper	PH
JF	Bogie hopper, aluminium/prototype	PH
JG	Bogie aggregate hopper	PH
JH	Bogie limestone hopper	PH
JI	Bogie Covhop, <i>RIV</i>	PI
JJ	Bogie steel	PX
JK	Bogie Lowliner	PF
JL	Bogie two-tier car carrier	PL
JO	Bogie open with cargo winches	PN
JP	Bogie open, pallet	PN
JQ	Bogie side tippler	PT
JR	Bogie open, general/aggregate	PI/PX
JS	Bogie coil	PX
JT	Bogie ironstone tippler outer	PT
JT	Bogie in-line tippler	PT
JU	Bogie ironstone tippler inner	PT
JV	Bogie Carflat	PF
JW	Bogie Palvan	PW
JX	Bogie open, steel scrap	PX
JY	Bogie open	PH
KA	Two-axle special flat	PF
KB	Match/barrier	PX
KC	Escort/weedkilling train coach	PP
KD	Two-axle flask/Trailer-Train	PX
KE	Bogie container flat	PF
KF	Bogie flat/Warflat	PF
KG	Two-axle container flat, <i>RIV</i>	PI
KH	Two-axle Presflo, <i>RIV</i>	PI
KI	Bogie steel coil, <i>RIV</i>	PI
KJ	Self-discharge train transfer vehicle	PX
KK	Two-axle Covhop, <i>RIV</i>	PI
KL	Two-axle open high side, <i>RIV</i>	PI
KM	Match/barrier/hot core	PX
KN	Dummy flask	PX
KP	Two-axle hopper, <i>RIV</i>	PI
KR	Ramp	PX
KT	Mobile tank training vehicle	PX
KV	Large van, <i>RIV</i>	PI
KW	Warwell/Weltrol	PF/PX
KX	Bogie flask/Flatrol	PX
KY	Bogie flask, <i>RIV</i>	PI
PA	Two-axle Covhop, china clay/dolime/sand	PA
PB	Two-axle Covhop, grain/lime	PA
PC	Two-axle Presflo	PC
PD	Two-axle Cemflo	PC
PE	Two-axle Tip-Air	PE
PF	Two-axle container flat	PF
PG	Two-axle hopper	PG

Code	Description	Pre-1991 code
PH	Self-discharge train hopper	PG
PJ	Cartie	PJ
PK	Three-axle Comtie	PK
PM	Two-axle mineral, no doors	PM
PN	Two-axle open, aggregate/blocks/coal	PO
PO	Two-axle open, steel scrap	PO
PQ	Three-axle Autic	PQ
PR	Two-axle china clay, curtain roof	PR
PS	Two-axle ironstone tippler	PS
PT	Two-axle Palvan	PV
PU	Two-axle van/Palvan	PV
PV	Two-axle Palvan, curtain sides	PV
PX	Two-axle coil/single bolster/tube	PX
TA	Bogie tank, 40-69 tonnes glw	TA
TB	Bogie tank, 70-79 tonnes glw	TB
TC	Bogie tank, 80-89 tonnes glw	TC
TD	Bogie tank, 90-99 tonnes glw	TD
TE	Bogie tank, over 100 tonnes glw	TE
TI	Tank, <i>RIV</i>	TI
TM	Three-axle tank, 25 tonnes glw	TM
TR	Two-axle tank, 20-29 tonnes glw	TR
TS	Two-axle tank, 30-39 tonnes glw	TS
TT	Two-axle tank, 40-49 tonnes glw	TT
TU	Two-axle tank, over 50 tonnes glw	TU

Notes:

- a) In 1998 the PD and PM codes were reallocated to two-axle van, MoD, and two-axle Palvan, MoD, respectively.
- b) *RIV* refers to the *Reglamento Internazionale Vagoni* and covers ferry wagons.

Table 2: TOPS brake type codes

(used as a suffix to the two-letter codes listed in Table 1)

A	Air-braked
B	Air-braked with through vacuum pipe
F	Vacuum-braked with Accelerate Freight Inshot (AFI)
G	Vacuum-braked with AFI and through air pipe
H	Dual air and vacuum-braked with vacuum AFI
O	Unfitted (no automatic brake)
P	Unfitted with through vacuum pipe
Q	Unfitted with through air pipe
R	Unfitted with through air and vacuum pipes
V	Vacuum-braked
W	Vacuum-braked with through air pipe
X	Dual air and vacuum-braked



3. BOGIE IRON-ORE AND LIMESTONE HOPPERS

Left: In 1953 John Summers & Sons expanded its premises at Shotton in North Wales into a fully integrated steelworks, and instead of using pig iron from its Shelton Works at Etruria it began receiving imported iron ore from Bidston Dock, Birkenhead. That year Charles Roberts completed a batch of 75 46-ton-capacity bogie hopper wagons, and as output increased an additional 48 were constructed in 1958; initially numbered 60-182, on TOPS they became BSSH 13060-182. All were unfitted, so the block trains, whether loaded or empty, were restricted to 35mph between Bidston and Shotton. Furthermore, the severe gradients on the 12½-mile route from the docks to the steelworks limited loaded trains to 11 PHOs plus a brake van and, following the final steam working in November 1967, the workings were entrusted to pairs of BR Type 2 (Class 24) diesel locomotives from Birkenhead Mollington Street. On the odd occasion a Type 4 would substitute, as on a very wet April Fools' Day in 1979, when a Class 47 was photographed rounding the curve at Bidston West Junction with a short formation loaded with Brazilian ore.



Left: Steel production at Shotton ceased in 1980 and the hoppers were then used to move the remaining stockpile of iron ore to Llanwern Steelworks before 103 were sold to ICI. Most were salvaged for spare parts, in particular their plate-back bogies, which ICI wanted, to replace the diamond-frame bogies fitted to many of its similar limestone hoppers. However, 13 of the Shotton wagons were vacuum-braked and after renumbering as ICIM 19152-64 were allocated to the Roadstone pool working from ICI's Tunstead Quarry, near Peak Forest, to the Quick Mix stone terminals at Dean Lane, Manchester, and the Tilcon terminals at Miles Platting and Stockport. In 1987 ICI ceased quarrying at its Hindlow site, south of Buxton, but retained two kilns producing agricultural and industrial lime. To enable production to continue two trains of limestone a day began running from Tunstead and as the demand for roadstone had declined the former Shotton hoppers were transferred to this movement. ICIM 19162 (formerly BSSH 13065) is seen with a load for Hindlow at Great Rocks in March 1991.

Right: ICI's own fleet of 44-ton-capacity bogie hoppers, built in seven batches by Charles Roberts between 1936 and 1953, carried limestone 365 days a year from Tunstead to Northwich for the soda-ash plants set up by Brunner Mond at Lostock and Winnington. Numbered ICIM 19000-151 on TOPS, they were almost six inches taller than the Shotton hoppers and were vacuum-braked from new, although end ladders were fitted only to those in Roadstone traffic and at one end only. In 1992 all the ICI Mond hoppers were re-prefixed 'BLI' to reflect their new ownership by Buxton Lime Industries. In 1998 they were replaced by air-braked stock, but a number were retained at Northwich for the internal movement of coke and limestone, among them BLI 19106 JGV, still going strong at 50 years old, as seen at Oakleigh Sidings, Northwich, on 12 April 1998.





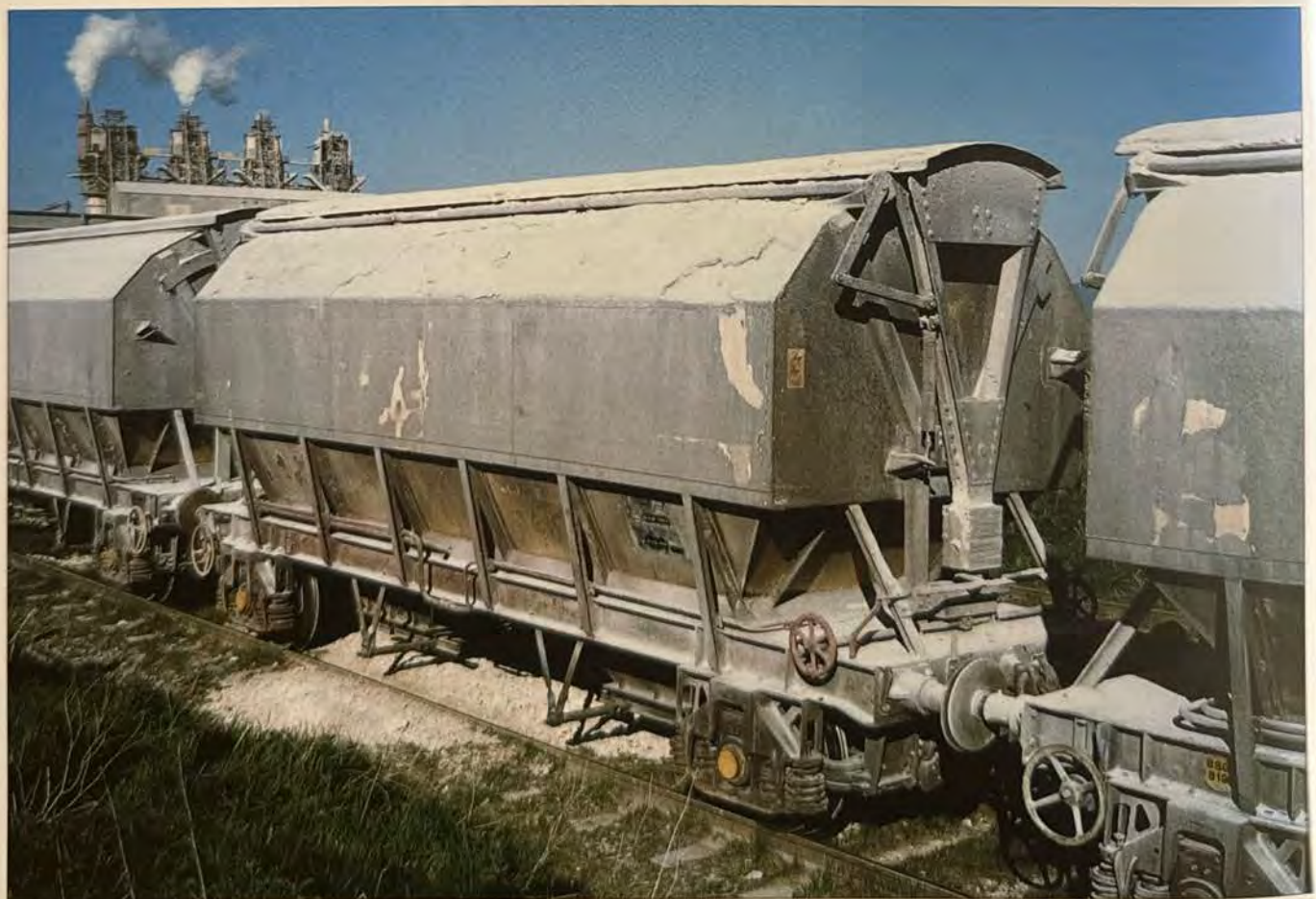
6. LIME AND DOLIME

Left: Lime is used as a flux in steel making, and in 1972 British Steel leased sixty-nine 46-tonne-glw covered hoppers from BRTE to supply its steelworks in the North East. Initially BRTE 8050-8118 were loaded at Tilcon's Rylstone Quarry, to form a daily block train of 26 PAAs running to either Consett or Lackenby as required, but after the closure of Consett they began working from Hardendale to Lackenby. Built by Standard Wagon at Heywood, the BRTE Covhops carried 33 tonnes of lime, and BRT 8115 was spotted in typically work-stained condition at Hardendale in May 1992.

Below: Hardendale Quarry was also the originating point for lime traffic to Ravenscraig, for which a batch of fifty 37-tonne capacity, 51-tonne-glw Covhops was built at BREL's Ashford Works in 1974. Owned by British Steel Glasgow, BSGL 8050-99 were considerably longer than the BRTE wagons, having a 20ft 3in wheelbase compared with 16ft. In place of three hinged roof-hatches they were fitted with a one-piece roof cover which allowed for quicker loading and at the same time reduced the risk of water contamination. When they were ordered it had been planned that these wagons would also supply the Clydebridge steelworks at Rutherglen, but

this was subsequently selected for closure. In 1993 these PAAs, commonly known as the 'White Ladies' after their dusty appearance, replaced the BRTE Covhops in the Lackenby circuit and in 2004 they were purchased by EWS.

BSGL 8199 stands at Hardendale in May 1993 while in the background only two of the four gas-fired kilns appear to be in action. In the 1980s, two trains of butane arrived each week from Stanlow oil refinery to power the kilns but by the date of this visit only outgoing lime and limestone were still on rail.



Right: Until 1983 the steelworks at Scunthorpe had received lime from Steetley Quarry, at Hindlow, but when that flow ceased the fifty 46-tonne-glw Covhops built for the traffic at Heywood in 1970, PR 8000-49, were transferred to other workings. Twenty-five of the PABs were modified with new top hatches and leased by British Aluminium to transport imported alumina from Invergordon, and from 1984 Blyth, to the smelter at Fort William, while of the remainder 15 went to Steetley's Thrislington Quarry at Ferryhill, the rest staying at Hindlow. An early morning visit to Ashbury's finds one of the shunters struggling with the brake lever on PR 8008 during a spot of loose shunting at the West Sidings on 10 July 1985. PR 8008 was one of three empty PABs *en route* to Hindlow to collect another load of glassworks limestone for the P. D. Stirling distribution depot at Mossend.



Left: PR 8008 was subsequently transferred to Thrislington and in May 1991 the author encountered it again awaiting repair outside the Steetley Magnesia Works at Hartlepool Cemetery Point. Here lime and dolime (calcined dolomite, a magnesium-rich form of calcium carbonate), brought by rail from Thrislington, were used in the extraction of magnesium from seawater. The factory had been built in 1937 with governmental assistance as the country prepared for war.

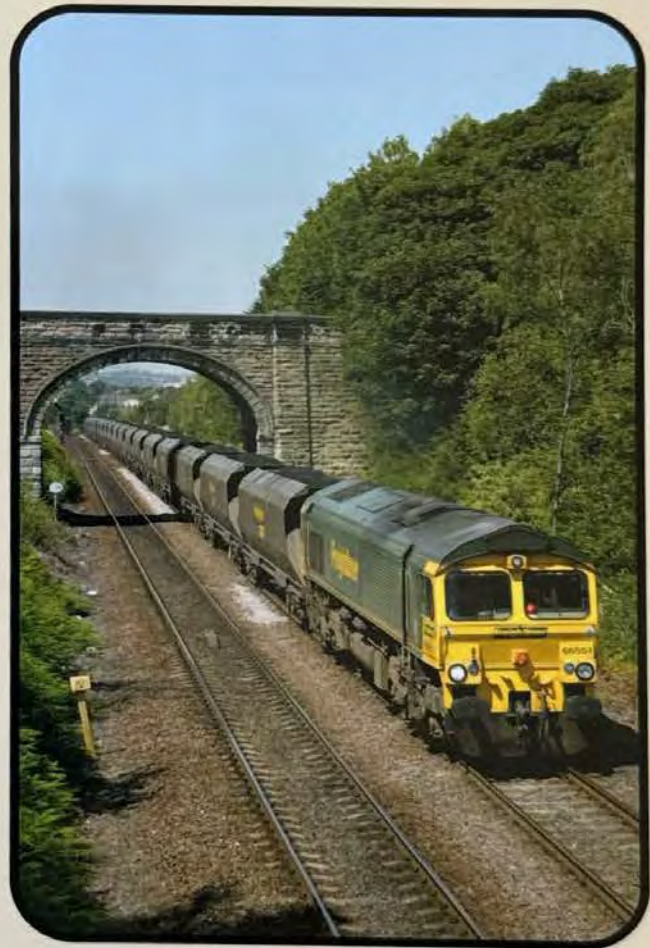
Right: Since the 1950s both minerals had been carried in BR 20-ton Covhops, but in 1981, Steetley was awarded a Section 8 grant to purchase new wagons. Thirty distinctive 51-tonne-glw covered hoppers, fitted with air-operated top covers, were built by Standard Wagon for the dolime traffic and numbered STET 18700-29. These PAAs were also long vehicles at 25ft 7in over headstocks with a 19ft wheelbase and carried 36 tonnes. The large side panels were fitted to facilitate shunting by Hymid Wagon Controllers at Thrislington. The type rarely strayed from the North East as all routine maintenance was handled at Thornaby and this view of STET 18703 was taken at Tees Yard in February 1992, shortly after a visit to the adjacent wagon shop.



Exhibit 13

WAGON RECOGNITION

Martin Buck & Mark Rawlinson



Volume 1
Carkinds - B to W



Compilation & Design : Martin Buck

Research : Mark Rawlinson

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Cover design : Martin Buck

HFA 2-Axle 'MGR' Style Lime Hopper with Canopy

Number range

353573 - 359292

(Numbers within HAA 350 series)

Notes

This is a standard/unmodified HAA with an aerodynamic canopy.

Specific flows

Limestone :

Shap Quarry to Redcar.



HFA
No. 356957

Built : (see text)
Location : Tees Yard

(Martin Buck)

HGA 2-Axle Ballast Hopper

Number range

390503 - 390670

Notes

These hoppers were converted from PGA stone hoppers by British Rail for engineers traffic, gaining the 'fishkind' **Gunnell** and TOPS code ZFA. On conversion, the wagon height was lowered and the length extended by adding triangular pieces to each end.

All these wagons are similar to each other, but due to being based on a wide range of older PGA hoppers there are lots of differences - height of body, smooth, part ribbed or fully ribbed bodies, for example, not to mention liveries!

During compilation, these wagons were replaced on stone flows originating out of Moreton on Lugg, Marks Tey and Stud Farm by new EWS HOA hoppers, but held as back up for infrastructure work in conjunction with the 2012 London Olympics.

Flows

Sand from Angerstein Wharf



HGA
No. 390575

Converted : 1993 - 1994 by Marcroft
Location : Swindon

(Martin Buck)

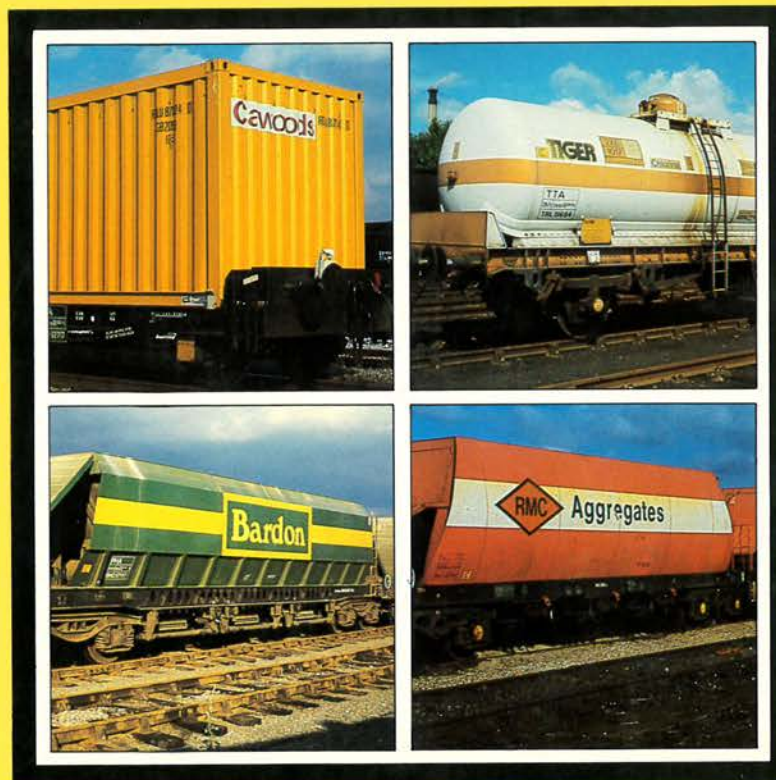


HGA
No. 390626

Converted : 1993 - 1994 by Marcroft
Location : Swindon Transfer Sidings (Martin Buck)

Exhibit 14

Modern **PRIVATE OWNER** **WAGONS** **on British Rail**



David Ratcliffe

Modern PRIVATE OWNER WAGONS on British Rail

David Ratcliffe



Patrick Stephens Limited

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Front cover illustrations (Clockwise, from top left) CAWD 92717, a 41 ton two-axle container wagon loaded with a purpose-built coal container (*A. Prime*); a liquid chlorine tank leased to ICI Mond by Tiger Rail; one of a small fleet of 88 ton hoppers owned by Hall Aggregates to carry sea-dredged gravel (*A. Prime*); a 90 ton aggregate hopper used to carry 'hardstone' from Bardon Hill Quarry.

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Chapter 5

Open Hopper Wagons

While a number of covered hopper designs date from before the Second World War, the emergence of the privately-owned open hopper is a more recent phenomenon, resulting largely from the building boom of the 1970s. A number of large fleets have now been built and the type has become one of the most common on British Rail.

Salt hoppers, two-axle

In 1971, Standard Wagon introduced the first fleet of bulk salt hoppers, initially for hire to BP Chemicals. The shape of these 46t glw wagons was most distinctive, featuring a steeply-angled body and an unusually long 26 ft 7 in underframe, with a 16 ft wheelbase. Four small vertical ribs sup-

Table 13: *Open hopper wagons, two-axle*

Type	Number series	TOPS code	Builder	Date	Owner/Operator
Salt	PR 8201-8255	PGA	Standard Wagon	1971	Procor/various
Salt	PR 8256-8300	PGA	Charles Roberts	1974	Procor/various
Salt	PR 8901-8918	PGA	Charles Roberts	1974	Procor/various
Aggregate	AR 14201-14264	PGA	Charles Roberts	1972-4	Amey Roadstone
Aggregate	PR 14000-14151	PGA	Various	1972	Procor/Foster Yeoman
Aggregate	PR 14688-14704	PGA	Standard Wagon	1972	Procor/Amey Roadstone
Aggregate	PR 14706-14749	PGA	Procor	1978	Procor/Amey Roadstone
Aggregate	PR 14176-14197	PGA	Procor	1979	Procor/Foster Yeoman
Aggregate	PR 14265-14388	PGA	Procor	1979-80	Procor/various
Aggregate	PR 14434-14466	PGA	Procor	1981	Procor/Foster Yeoman
Aggregate	BRT 14600-14654	PGA	Standard Wagon	1974	BRTE/various
Aggregate	TAMC 14655-14687	PGA	Standard Wagon	1974	Tarmac Roadstone
Aggregate	TAMC 14840-14870	PGA	Procor	1979	Tarmac Roadstone
Aggregate	TAMC 14900-14921	PGA	Standard Wagon	1979	Tarmac Roadstone
Aggregate	RLS 14705	PGA	Standard Wagon	1977	Railcase/Tarmac Roadstone
Aggregate	TBR 14500-14522	PGA	Procor	1980	Tilbury Roadstone
Aggregate	REDA 14750-14839	PGA	Various	1978-84	Redland Aggregates
Aggregate	TCS 14400-14432	PGA	BREL Shildon	1973	Tilling Construction
Gypsum	APCM 19551-19589	PGA	BREL Shildon	1970	Assoc Portland Cement
Limestone	BSTE 18000-18114	PGA	Standard Wagon	1975	British Steel, Teesside
Minerals	SRW 18500-18529	PGA	Standard Wagon	1982	Standard Wagon/various
Demonstrator	DAVS 14433	PGA	W.H. Davis	1976	W.H. Davis & Sons
Demonstrator	DAVS 19999	PGO	W.H. Davis	1981	W.H. Davis & Sons
Self-discharge	REDA 16000-16203(r)	PGA	Standard Wagon	1988	Redland Aggregates



Above This re-sprung salt hopper PR 8230 was recorded at Tees Yard in September 1987. Livery is rusty yellow with the 'Procor' symbol in blue and white, white lettering on black patches and black underframe.

Below The end-ladder design, deep, flat-sided solebar and tarpaulin cover are all evident in this view of PR 8296, taken at Warrington in July 1987. The wagon had recently been repainted with grey body, white lettering and black underframe, but it was unlikely to remain in this condition for long given the abrasive and staining nature of its load of salt.



ported the sloping part of the sides with two larger supports at each end which also carried the sharply-curved ladders and small inspection platform. The original FAT 4 UIC suspension was subsequently replaced by various types in order to permit 60 mph operation, while two wagons were experimentally built with shorter bodies. In 1980, a number received hood supports for use in aluminium oxide traffic between Hull and Stafford, but by 1987 all the survivors were carrying salt from the Cleveland potash mine at Boulby.

The second fleet of salt hoppers, built by Charles Roberts, was a 51 t glw design which quickly displaced the earlier vehicles from the BP traffic between Cheshire and South Wales. Wagons of this type occupy two separate blocks in the number series but are otherwise identical, and, though only 24 ft 9 in long, carry over 37 t. The large hopper body is strengthened by five vertical ribs on each side which extend from the solebar to the top of the side, while footsteps at each corner give access to short ladders mounted longitudinally on the end. These in turn lead to an inspection platform running across the full width of the end which also provides additional support for the hopper body. To protect the salt from weather contamination, five metal hoops can be fixed across the top to support a tarpaulin cover. Two sets of mechanically-operated hopper doors are located between the wheels, the operating handle and ratchet mechanism being located in the centre of the unusually deep, flat-sided solebar, which slopes down at each end to a conventional headstock. BSC Friction Pedestal suspension at an 18 ft 2 in wheelbase was fitted from new. Wagons still carrying salt have been hired to ICI since 1981, but a reduction in this traffic has seen a growing number reallocated to the movement of aggregates.

Aggregate hoppers, two-axle

The 51 t salt hoppers were a variant of an existing design which had been introduced some two years previously for aggregates traffic. The building boom of the 1970s saw the construction industry having to look to remote quarries to satisfy the huge demand for crushed stone, particularly in the South-east, and only rail could provide the bulk transport required. As part of the long-term contracts signed at that time, British Rail insisted on the provision of company-owned, or leased, modern air-braked wagons for any substantial movements, and though demand has since slackened, the advantages of rail transport have seen many companies continuing to invest in their own wagon fleets.

Most two-axle hoppers derive from the initial Charles Roberts design, built in 1972 for hire to Foster Yeoman. These vehicles have part-sloping sides and ends supported by small ribs, with the deep, flat-sided solebars and ladder arrangement as on the salts. After a few years in service, they were fitted with shaped metal plates, fixed beneath the inspection platforms, to protect the brake cylinders from damage when being loaded with stone. PR 14025-14095 were built by Standard Wagon, the major difference being the locating of the brake cylinders beneath the headstocks, obviating the need for protective plates. Unlike Foster Yeoman, Amey Roadstone, another major quarrying company, initially chose to purchase its own wagons, but, after a batch of 64 vehicles had been acquired, it also decided to lease, and indeed in 1986 the original batch were sold back to Procor for re-hire to Amey Roadstone.

Further construction of this design commenced in 1978, some four more batches being built by Procor up to 1981. Major modifications involved the use of straight-channel solebars, with Gloucester Floating-



BRT 14611 is one of the 51 t aggregate hoppers leased to Peakstone of Buxton. Note the straight-channel solebar, preferred by the builders Standard Wagon, and the attractive livery which comprises mustard body and underframe, with black 'Peakstone' lettering and symbol, 'BRT' symbol in red, black and white, and other lettering white, some on black patches.

axle suspension from PR 14320, although the 16 ft wheelbase was retained. The body shape was slightly altered and strengthened by 'T'-angle struts, while conventional side-mounted ladders were fitted, capacity remaining at some 38 t.

In 1982, PR 14329 was the subject of an interesting experiment, its standard hopper body being replaced by a prototype self-discharging type divided internally into two compartments, the floor of each being formed by separate, externally powered, conveyor belts. The load was discharged through a single central opening in the underframe, but various trials proved unsuccessful and the idea was abandoned.

Foster Yeoman's fleet is painted light grey with black lettering, solebars and underframe, the first batch originally having dark grey solebars. The company name is usually carried in white on a blue panel along the flat part of the side, and the wagons operate from the company's quarry

at Merehead, near Cranmore, to various distribution depots in the South and South-east. Initially, the Amey Roadstone vehicles were yellow with black solebars and underframe, but in 1983 they were repainted pale mustard with grey solebars and underframe, the 'ARC' initials being picked out in grey with all other lettering in white. These wagons operate from quarries at Whatley, near Frome, and Tytherington, near Bristol, to depots in the Midlands and the South.

Following the success of these initial operations, a number of other companies decided to invest in their own wagon fleets. In the North-west, the Staveley Lime Company introduced block-train workings from its quarry at Dove Holes, near Buxton, to depots in Salford and Liverpool, using 27 hoppers, BRT 14600-14626, which were hired from BRTE. The remainder of this batch were initially hired to Amey Roadstone and more recently have seen use



TAMC 14905 is another 51 t aggregate hopper built by Standard Wagon, but in this case owned and operated by Tarmac Roadstone. These vehicles, which have a more 'chunky' appearance than earlier hoppers, normally run in block-train formations, although this example was recorded at Warrington in August 1987 when en route to works for routine maintenance.

carrying rock salt from Boulby.

Tarmac Roadstone also owns quarries in the Buxton area, its first batch of Standard-built hoppers being originally allocated to workings from Topley Pike to depots in Widnes and Salford. Built in 1974 with deep, flat-sided solebars, these wagons carried an attractive brown and white livery and were eventually transferred to Cliffe Hill quarry, Leicestershire, in 1979. Their replacements at Topley Pike were also built by Standard Wagon, but TAMC 14900-14921 were to a completely new design. The hopper ends have a more pronounced slope while the side slope is considerably reduced, with conventional side-mounted ladders providing access to a small inspection platform. Length is only 21 ft 7 in with a 15 ft wheelbase, though capacity remains at over 38 t, the underframe being fitted with straight-channel solebars and pneumatically-operated hopper doors. RLS 14705, the prototype for this design,

also operates out of Topley Pike, its major differences being a single set of hopper doors and a more primitive ladder arrangement. This batch carries a yellow livery, but for its third fleet, also built in 1979, Tarmac returned to the brown and white colour scheme previously used in 1974. This final batch follow Procor's standard design for the late 1970s with straight-channel solebars and conventional side-mounted ladders, the majority running from Frome to depots in the South-east.

The Tilbury Roadstone fleet is also to the same basic design, though somewhat higher with a pronounced slope to the sides and a deeper lip along the top. There is also a noticeable skirt between the lower part of the hopper and the solebar, but the underframe is identical with Gloucester suspension units. In 1986, this fleet was sold to Redland, the black 'Tilbury Roadstone' name being replaced by 'Redland' in red on the white panel which covers the flat part



REDA 16200, a 'Self-Discharge Hopper Train' 'outer' wagon. Note the conveyor belt which is extended beyond the headstock when unloading. This train is particularly suitable for short-term traffic flows as it can be unloaded without the need for any on-site facilities other than a rail siding. Body and solebars are pale green; the 'Redland' name is red, while other lettering and suspension units are black. Heywood, April 1988.

of the side. The remainder of the body is red, and the solebars and underframe are black; these wagons operate to various depots in East Anglia.

Redland has also purchased a large fleet of its own, the bulk being constructed between 1978 and 1980 by Standard Wagon to a design that combines the standard 22 ft 3 in long, 16 ft wheelbase underframe with a hopper body similar to that fitted to the Tarmac hoppers, TAMC 149xx. In 1986, a number were fitted with pneumatic doors operated via the train's air brake reservoir pipe in order to speed discharge. REDA 14781-14786 were built by Procor in 1984 to the same design as the final batch of Tarmac's, and all operate from Redland's quarry at Mountsorrel to depots in the London area and in East Anglia. The initial

body livery of white with red and blue stripes has been gradually replaced by pale green with red lettering; solebars and underframes remain black. In 1988, Redland introduced its revolutionary 'Self Discharge Hopper Train'. Built by Standard Wagon, each of the four prototype trains comprises ten 51 t glw two-axle hoppers, semi-permanently coupled, and fitted with a continuous conveyor belt at solebar level on to which the hoppers discharge.

Only one batch of modern aggregate hoppers has been built by BREL, the 33 51 t glw Tilcon hoppers which operate from Tilling Construction's quarry at Rylstone, near Skipton, to depots in Hull and Leeds. They are higher than other aggregate hoppers, with steeply-angled sides and ends, the sides being supported by five

angled buttresses and the ends by protective plates fitted over the brake cylinders. Their clamshell-type hopper doors are pneumatically-operated and the 22 ft 8 in long underframe carries BSC Friction Pedestal suspension. The hopper body is painted Wedgwood blue with the word Tilcon picked out in white on a maroon panel, and the double 'T' motif in white on a black panel. Solebars are maroon, with the suspension units and brake gear black.

Other open hoppers, two-axle

In addition to the Tilcon hoppers, BREL's Shildon works also built a batch of 46 t glw hoppers for carrying gypsum, a mineral used in the manufacture of certain types of cement. Introduced in 1970, they are a smaller version of the familiar railway-owned 'Merry-go-Round' coal hopper, but are only 29 ft long, with two sets of hopper doors fitted with automatic discharge gear

to allow for unloading on the move. As gypsum is a much denser commodity than coal, capacity is still 33 t, and the wagons normally run between the British Gypsum mine at Mountfield, Sussex, and the Blue Circle Cement factory in Northfleet, Kent.

Also fitted with automatic discharge gear are the large fleet of limestone hoppers owned by British Steel, Teesside. Built in 1975, they serve the massive steelworks complex at Redcar and, unlike other wagons of this type, are fitted with BSC primary coil suspension set on a 16 ft 6 in wheelbase. The body design is also unusual in having a very high lip along the top of the sides and ends and no inspection platforms. Capacity is 37 t, the fleet normally running in block-train formations between Redmire and Redcar. When, in 1982, a number of this fleet became redundant, they were resold to Standard Wagon and renumbered in the SRW 185xx series after having been modified for general mineral

APCM 19557, a gypsum hopper, recorded when stopped for repair at Hoo Junction in April 1980. The bodywork is galvanized steel with black lettering and underframe. The central panel is picked out in yellow with a blue circle (R. Silsbury).





As detailed in the text, a number of the British Steel Teesside hoppers have been rebuilt for general aggregate traffic. One such vehicle, SRW 18509, was recorded at Warrington in September 1987 sparkling in its new overall white livery with 'Railease' in blue and other lettering in white on black patches.



The automatic door-operating mechanism can be clearly seen in this view of BSTE 18058, taken at Tees Yard in September 1987. Note the lack of prefix letters on the vehicle's data panel, a feature common to this fleet. Originally painted a pale green, these wagons were being repainted in the grey and black livery illustrated here, with blue and white British Steel symbol.

traffic by the fitting of inspection platforms, modified door gear and cut-down sides. Subsequently, the majority of the modified vehicles were hired by British Rail to carry sand from Holmethorpe, near Redhill, to Crosfield's chemical plant in Warrington.

Finally, mention must be made of the two wagons built by W.H. Davis of Shirebrook as speculative ventures in the hopes of attracting future orders. DAVS 14433 was a conventional 51 t glw, 38 t capacity aggregate hopper fitted with

Gloucester Floating-axle suspension and most of the features common to this type. It initially appeared in a green and yellow livery before being repainted red with black lettering. The second vehicle, DAVS 19999, was a 36 t glw, 27½ t capacity sand hopper, built on a redundant 16 ft wheelbase underframe taken from an ex-pallet van. Both wagons appeared at various exhibitions and open days but were never used in traffic and had been withdrawn by 1987.



The unique 51 t aggregate hopper built by W.H. Davis, DAVS 14433, photographed when stored out of use at Shirebrook in November 1985. By this date it was painted red with black 'Davis' symbol and underframe.

Table 14: *Open hopper wagons, bogie*

Type	Number series	TOPS code	Builder	Date	Owner/Operator
Limestone	ICIM 19000-19164	PHV	Charles Roberts	1936-58	ICI Mond
Iron ore	BSSH 13060-13182	PHO	Charles Roberts	1952-8	British Steel, Shotton
Ballast	GLE 15000-15005	PHO	Metropolitan C & W	1928-36	Grant, Lyon & Eagre
Ballast	TWT 15100-15102	PHA	Metropolitan C & W	1936	Tyne & Wear Transport
Aggregate	MPHY17701-17712	PHA	Charles Roberts	1968-9	Murphy Aggregates
Aggregate	MAR 17713-17722	PHA	W.H. Davis	1983	Marcon
Aggregates	ELC 17501-17520	PHA	Charles Roberts	1970	Equipment Leasing/Brett
Aggregates	BHQ 17101-17121	PHA	W.H. Davis	1986	Bardon Hill Quarries
Aggregates	RHR 17301-17327	PHA	W.H. Davis	1987	RH Roadstone
Aggregates	HALL13700-13712	PHA	Standard Wagon	1984	Hall Aggregates
Aggregates	RMC 17201-17224	PHA	Standard Wagon	1986	Ready Mixed Concrete
Aggregates	PR 17801-17837	PHA	Procor	1984	Procor/Foster Yeoman
Aggregates	FR 17001-17011	PHA	Installation MC	1971-2	Francis Parker

Limestone, iron ore and ballast hoppers, bogie

ICI Mond's fleet of bogie limestone hoppers are amongst the oldest privately-owned wagons still in regular use on British

Rail, a number having been built as early as 1936. Construction continued intermittently until 1953, all to the same design, with a 35 t capacity body divided into two compartments and supported by six



Above ICIM 19129, one of the Charles Roberts-built limestone bogie hoppers, photographed at Northwich in August 1987. Apart from the addition of roller bearings, this wagon remains in virtually its original condition, although it has recently been repainted pale grey with the number panel in white on a black ground. Note the raised 'ICI' letters on the side; an earlier version of the livery had these painted orange.

Below TWT 15101, one of the rebuilt ex-Southern Railway 'Walrus' ballast hoppers, awaits loading at North Shields on the Tyne & Wear Metro in August 1987. This vehicle carries overall black livery with white lettering. The yellow patch near the top of the second panel should carry the blue and black 'Metro' symbol.



substantial ribs along each side and two angled struts at each end. Gloucester plateback bogies, standard on the post-war build, have gradually been fitted to the entire fleet, replacing the diamond-frame bogies found under the earlier wagons. As they were intended to operate along the severely graded lines between Tunstead and Northwich, vacuum brakes were provided from new, the single brake cylinder being a prominent feature on one end. The original livery comprised pale green bodywork with white lettering, and black solebar and bogies.

In the 1950s, British Steel, Shotton, bought a number of similar, but unfitted, hoppers from Charles Roberts, to transport imported iron ore from Bidston Dock, Merseyside, to the steelworks at Shotton, near Wrexham. When steelmaking ceased there in 1983, ICI purchased the bulk of this fleet, some 13 being refurbished and vacuum-braked for future use in limestone traffic. They were repainted in the later ICI livery of light grey and renumbered ICIM 19152-19164.

Grant, Lyon & Eagre, a Scunthorpe-based civil engineering firm, owned six former Southern Railway 'Walrus' bogie ballast hoppers, purchased from British Rail in the 1960s for use on railway-related construction projects. All six were built by the Metropolitan Carriage & Wagon Company; GLE 15000-15002 were from the original 1928 batch, while GLE 15003-15005 were from the slightly modified batch built in 1936 to Southern Railway diagram 1774, rated at 61½ rather than 60½ t glw. All were unfitted, carried 40 t, and remained virtually in their original condition in private ownership, complete with diamond-frame bogies centred at 23 ft. All six were withdrawn in 1982 following completion of work on the Midland City Line electrification scheme

between Bedford and Moorgate. Livery was all-over black with white lettering.

Tyne & Wear Transport also own three ex-Southern Railway ballast hoppers from the 1936 batch. However, following purchase in 1977 they were air-braked and fitted with Gloucester FBT 5 bogies, before being despatched to Newcastle in 1978. To conform to axle-load restrictions on the Metro, they are rated at 50 t glw, 28 t capacity, and are fitted with raised mesh screens at each end in order to protect the operator from the overhead live wires when climbing up to check whether the hopper is fully discharged.

Aggregate hoppers, bogie

Murphy Aggregates introduced a dozen modern bogie hoppers in 1968 to carry sea-dredged gravel from their depot at Angerstein Wharf, on the Thames, to various terminals in the South-east. These 102 t glw wagons are 50 ft 7 in long, with Gloucester cast steel bogies centred at 37 ft 10 in, and carry 75 t. The specially-shaped body has a long, rectangular top opening and three sets of discharge doors situated towards the centre of the floor. The bogies are carried on short stub-frames to allow lorry-mounted conveyors to be driven underneath when unloading. A further batch of ten similar hoppers was built for Marcon in 1983, the main difference being the fitting of Gloucester GPS bogies and a nose cowl on the end to protect the brake gear. At the same time, the earlier wagons were transferred to Marcon (the ready-mixed concrete arm of Murphy Aggregates), and recoded 'MAR'. Since 1984, Marcon has shifted its entire operation to the Brett Aggregates depot at Cliffe in Kent.

Also operating from Cliffe with sea-dredged gravel is a fleet of 102 t glw hoppers owned by Equipment Leasing and hired to

Brett. While similar in design to the Murphy hoppers, they are only 41 ft 7 in long and present a more robust appearance. They have full length solebars, Gloucester Mk 4 cast steel bogies, and run as a block-train to terminals at Purley and Salfords in South London.

W.H. Davis, having built the Marcon hoppers in 1983, further developed this particular design with two batches of 90 t glw vehicles which appeared in 1986 and 1987 intended for stone traffic. The first batch, owned by Bardon Hill Quarries, are fitted with French Y25C bogies and carry 68½ t. They have full-length solebars with prominent end-plates to support the hopper body and protect the brake gear. Inspection ladders are fitted at diagonally opposite corners and they run as a block-train following a complicated programme which takes them to quarries at Westbury, Croft and Bardon Hill, as well as to stone terminals at

West Drayton, Theale and Brentford, in the course of a week.

The second batch, owned by R.H. Roadstone, a subsidiary of Tarmac, have Gloucester GPS bogies fitted to short stub-frames and four sets of discharge doors. The hopper body is similar to the Bardon Hill wagons and is finished in a greenish-grey livery with black lettering, solebar and running gear. Intended to carry limestone and sand, this fleet operates from loading terminals in Somerset and Essex to depots in the south of England.

Standard Wagon has built two batches of an 88 t glw 66 t capacity bogie hopper design for Ready Mixed Concrete. Both batches have a curved 'hog's-back'-shaped hopper body carried on French Y25C bogies centred at 31 ft 9½ in, the underframes featuring flat-sided solebars, with inspection ladders and small brake gear protection plates at each end. All carry an

The distinctive shape of RMC 17218, an 88 t bogie hopper belonging to Ready Mixed Concrete, can be seen in this view, recorded at Peak Forest in May 1987. The bodywork is orange with a broad white panel along the top of each side, with black lettering and underframe.



orange and white livery, though there are detailed differences between the two batches. The first are lettered up for Hall Aggregates, an RMC subsidiary, and carry sea-dredged gravel from Newhaven to terminals at Tolworth and Crawley, while the second batch are based at the Dove Holes quarry, Peak Forest, and carry limestone to Washwood Heath and Salford, as well as the occasional load of granite from Penmaenmawr on the North Wales coast.

Procor's fleet of 102 t glw hoppers is unique in being constructed from wide extruded aluminium sections produced by Alusuisse to a design developed jointly with Procor and Foster Yeoman. The body shape is also unusual as its cladding slopes towards the headstocks, and the sides end in a strip which is higher than the headstocks. The four sets of discharge doors are prominent between the Gloucester GPS bogies

which are centred at 37 ft 3 $\frac{3}{4}$ in, and the lightweight design allows a carrying capacity of over 81 t. In 1986, the Instanter couplings and buffers were removed from these wagons, being replaced by automatic buckeyes in order to allow the operation of longer, heavier trains. All 37 vehicles operated between Merehead quarry and the Foster Yeoman terminal at Theale in Berkshire. Body livery is unpainted aluminium, with the Yeoman symbol picked out in blue.

Another batch of unique vehicles are the 11 side-discharge hoppers owned by Francis Parker Limited, now part of the Tarmac group. These 91 t glw wagons were built by Installation Manufacturing Contractors of Hartlepool in 1971 and have 5 ft 11 in wheelbase bogies supplied by Franco Belge fitted at 24 ft 4 in centres, the overall length being 41 ft and the capacity 67 t. The

PR 17818, an aluminium-bodied bogie hopper built by Procor in 1974, was photographed when on display at the Eastleigh Open Day, October 1986. Bodywork is finished in natural alloy with the 'Yeoman' name and symbol in blue and white, other lettering white on black patches. Headstocks and solebars are blue while the bogies and discharge doors are black with white markings (P. Fidczuk).





The first of the bogie gravel hoppers, FR 17001, was recorded at Fratton in May 1979 when newly painted in yellow ochre livery with white lettering and black running gear. The wagon was returning to Chichester after a visit to Eastleigh for tyre turning (R. Silsbury).

lower half of the hopper sides comprise two top-hinged doors, the operating cranks for which are located on the wagon ends. This small fleet operates as a block-train on the short five-mile haul from gravel workings at Lavant to a processing terminal at Drayton, the use of rail being one of the planning conditions laid down owing to the inadequate road system around

Chichester. Initial livery was grey with white lettering, with the name 'Francis' in green on a large white patch over the two centre fixed side-panels. In 1979 the wagons were repainted yellow ochre, a shade which blends well with the gravel stains, the lettering remaining white and the bogies black.