Class 465/466 Enhancement Pack Volume 2

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How to Install

1) Locate where you have downloaded your pack. Extract it by right-clicking the .zip file and clicking 'Extract All'.
2) Go to the location where you have extracted the files from the .zip file.
3) Now find the .exe file called ‘Class 465-466 Enhancement Pack Vol 2’. Double-click this file.
4) Follow the steps and by the end of the process, the main part of this pack will have installed.
5) If you intend to use any of the included scenarios, make sure you have the requirements installed, as listed on the product page.
6) To ensure the cab environment sounds as intended in this pack, please make sure that ‘EFX’ is ticked within your in-game Audio settings.

Liveries

Class 465/0 & 465/1 (BREL/ABB/Hitachi)

South Eastern 1:

with new destination display - *APEP 465 SE1(2) (Hit)*

with original destination display - *APEP 465 SE1(2) (Hit/OD)*

South Eastern 3 - *APEP 465 SE3*

South Eastern 4:

with original door alarms - *APEP 465 SE4*

with new/PRM door alarms - *APEP 465 SE4 (PRM)*

Class 465/2 & /9 (Metro-Cammell)

South Eastern 1 - *APEP 465/2 SE1(2)* & *APEP 465/9 SE1(2)*

South Eastern 2 - *APEP 465/9 SE2*

South Eastern 3 - *APEP 465/2 SE3 & APEP 465/9 SE3*

South Eastern 4:

with original door alarms - *APEP 465/2 SE4* & *APEP 465/9 SE4*

with new/PRM door alarms - *APEP 465/2 SE4 (PRM)* & *APEP 465/9 SE4 (PRM)*

Class 466 (Metro-Cammell)

South Eastern 1 - *APEP 466 SE1(2)*

South Eastern 3 - *APEP 466 SE3*

South Eastern 4:

with original door alarms - *APEP 466 SE4*

with new/PRM door alarms - *APEP 466 SE4 (PRM)*

Keyboard Controls

Non-standard keyboard controls are listed below:

Numpad Plus -	Brake hold button
L -	Cab light ON/OFF
E -	Deadman's pedal (DVD reset)
F7 -	Destination display DOWN
F8 -	Destination display UP
Shift+F7 -	Destination display (via) DOWN
Shift+F8 -	Destination display (via) UP
R -	Door close button
U -	Door release buttons (left)
O -	Door release buttons (right)
Y -	Driver reminder appliance (DRA) ON/OFF
C -	Driver to guard bell
Ctrl+D -	Driver vigilance device (DVD) ON/OFF
H -	Headlight switch CLOCKWISE
Shift+H -	Headlight switch ANTI-CLOCKWISE
I -	Instrument lights switch ON/OFF
Shift+W -	Master key IN/OUT
Shift+M -	Motor factor UP
Ctrl+M -	Motor factor DOWN
Ctrl+R -	Passenger door operation toggle DOO/GO
M -	Saloon lights ON/OFF
. -	Speed set control CLOCKWISE
, -	Speed set control ANTI-CLOCKWISE
K -	Tail lights switch ON/OFF
Ctrl+Numpad Enter -	Visual aids ON/OFF
V -	Wiper switch CLOCKWISE
Shift+V -	Wiper switch ANTI-CLOCKWISE

Features

Variations

Many of the detail differences between the BREL/ABB & Metro-Cammell units have been simulated in this pack.

Visual

BREL/ABB specific anti-climb steps

Newly modelled window surrounds. BREL/ABB on the right and Metro-Cammell on the left. Also, pressure ventilator grilles on BREL/ABB variant.

Revised Hitachi BREL/ABB DMSO underframe

BREL/ABB TSO/TSOL underframe

Audio

The following sounds have BREL/ABB & Metro-Cammell specific versions:

- Traction motors
- Dynamic brake/traction motor cooling fan
- Clunk when applying/disengaging power on Metro-Cammell variant only
- External and internal DMSO 'run' sounds
- Brakes
- Doors
- Compressor
- Auxiliary converter
- Pressure ventilator on BREL/ABB variant only

Driver Only Operation (DOO)

Full door control is featured in this pack to simulate 'DOO'. Please see below for what the relevant procedure is and how to change the type of operation whilst in-game:

Driver Only Operation (DOO)

1) Open the doors by pressing **T+U** (left-hand side) or **T+O** (right-hand side). Alternatively, you can click the corresponding red buttons in the cab.
2) If at a platform, wait for the 'Platform Duties Complete' message to appear in the top-right corner and press **R** to close the doors. If not at a platform, press **R** whenever you wish.
3) Once the door interlock light illuminates, you may depart.

Guard Operation (GO)

1) Open the doors by pressing **T.**
2) Doors will be closed by the guard once passengers have finished boarding/alighting.
3) Once the door interlock light illuminates, the guard will give you two bells which you must acknowledge by also giving two bells. This can be carried out by pressing **C** twice.

How to Change Operation

This can be changed in-game by pressing **Ctrl+R** which will produce a visual message in the top-right hand corner of the screen to let you know which option you have selected.

Adhesion

Adhesion between a train's wheels and the rails plays a big part in allowing a train to accelerate or brake. Too little of it and the train will slip or slide. There are a myriad of factors that control the level of adhesion and we have attempted to simulate the most important of these to give a varied and realistic driving experience:

Season

Adhesion is generally good in dry conditions during summer and spring. Slightly decreased adhesion during winter to take account of the increased amount of moisture and possible ice on the rails due to cooler temperatures. Much decreased adhesion during autumn due to leaf mulch.

Weather

Adhesion decreases in wet weather, especially so when rain first starts falling before it has had a chance to clean the railhead. If rain is light, it will take longer for the railhead to be cleaned whereas heavy rain will clean it quicker, resulting in adhesion recovering sooner.

When using the drizzle weather pattern in our Sky & Weather Enhancement Pack, adhesion is particularly poor as the rain hasn't enough force to clean the railhead but still makes it sufficiently wet to worsen adhesion.

Time of Day

Adhesion will decrease somewhat after dusk as the air cools and dew is more likely to form on the railhead. This persists throughout the night until around an hour after sunrise when higher temperatures or the sun dry it out. In our simulation, this factor is reduced during summer to account for warmer temperatures, which on average result in less dew.

Tunnels

When adhesion is poor due to external factors such as weather or season, adhesion will generally improve upon entering a tunnel, which is not as susceptible to these factors. When adhesion is good during dry weather and outside of autumn, adhesion may decrease a little upon entering a tunnel due to their damp nature.

Wheelslip

Wheelslip protection aids the driver when powering or braking during times of poor adhesion.

When wheelslip is encountered during acceleration, a two-stage process takes place:

1) The motors can be heard rising rapidly in pitch and power cuts violently to control the slip.
2) Once grip is regained, power is reapplied at the notch selected on the power brake controller.

As a driver, you must assess which power notch is most suitable for the conditions and balance the occurrence of wheelslip with the maximum possible rate of acceleration.

Wheelslide

When wheelslide is encountered during braking, a multi-stage process takes place:

1) If the dynamic brake is active, the unit automatically switches to use the air brake only.
2) Brake pressure is automatically reduced to try and control the slide.
3) Sand is automatically applied if in step 2, step 3 or emergency brake.
4) Once the slide stops, brake pressure is returned to the notch selected on the power brake controller. If wheelslide reoccurs, the process starts again.

As a driver, you must resist the temptation to reduce the brake yourself as the wheelslip protection will offer the best braking performance.

Gradients

By default in Train Simulator Classic, only gradients of 1 in 185 or steeper have a gravitational effect on a train and this is only suitably realistic on gradients of approximately 1 in 125 of steeper. This means on gradients shallower than 1 in 125, the train does not experience the gravitational forces upon it than it should.

With this information in hand, we have managed to get rid of this limitation by making the train invisibly power or brake itself to simulate the effect that gravity has where Train Simulator Classic by default doesn't do so. This is all invisible to you as the player so you won't suddenly find the power or brake handles moving without your say so, but it does mean you have to drive to the gradients of the route a lot more than before, just like a real driver, especially on mainline routes where gradients rarely reach the severity where Train Simulator Classic has them behave realistically. You will also now find that if trying to recreate real timetabled runs, your timings will much more closely match reality.

Speed Set

The speed set speed selector control is located below the AWS sunflower. The first position on the switch is 3 mph, the next is 5 mph, and the settings then increase in 5 mph intervals up to 75 mph. The speed selected is indicated by the white pointer on the outer edge of the speedometer

When in speed set mode with a power notch selected, the speed set system will automatically control the train speed to hold a speed approximately 2mph below the target speed selected. If the speed drops too far below the target speed, the unit will automatically apply traction power in order to get back to the selected speed. If the target speed starts to be exceeded, such as when the train is on a falling gradient, the speed set will automatically apply the dynamic brake in order to control the speed.

The only form of braking available whilst using speed set is dynamic braking, so the speed set will not brake the train if the dynamic brake is isolated.

It is recommended that you only use speed set to hold your speed or change your speed by small increments such as 5 or 10 mph. Acceleration rate is reduced when using speed set so using it to accelerate to a certain speed will take longer compared to when it is inactive.

Accelerometer, Decelerometer & Clock

Acceleration and deceleration meters have been modelled next to the speedometer as per reality. As well as those, a clock has been added which also displays the unit's lifetime mileage (since last reset by a fitter) if you press the 'Select' button below it. This is a random figure automatically set at the start of a scenario.

Player Changeable Destination Display

The destination display can be changed during a scenario by pressing either the F7 or F8 keys. Please see below for a list of the available destinations and their relevant 3 letter code if you wish to use them via the unit's number on an AI service:

ZZZ - Blank	**FAV - Faversham**	**PDW - Paddock Wood**
ADC - Addiscombe	**GLM - Gillingham**	**PLU - Plumstead**
AFK - Ashford International	**GRV - Gravesend**	**RAM - Ramsgate**
BAR - Barnehurst	**GRP - Grove Park**	**RTR - Rochester**
BKJ - Beckenham Jn	**HGS - Hastings**	**SEV - Sevenoaks**
BFR - Blackfriars	**HYS - Hayes**	**SSS - Sheerness**
BMN - Bromley North	**HGM - Higham**	**SID - Sidcup**
BMS - Bromley South	**HGR - Hither Green**	**SIT - Sittingbourne**
CST - Cannon St	**KTH - Kent House**	**SGR - Slade Green**
CBE - Canterbury East	**LBG - London Bridge**	**SOO - Strood**
CBW - Canterbury West	**MDE - Maidstone East**	**SAY - Swanley**
CHX - Charing X	**MDW - Maidstone West**	**TON - Tonbridge**
CTK - City Thameslink	**MAR - Margate**	**TBW - Tunbridge Wells**
CRY - Crayford	**NBC - New Beckenham**	**VIC - Victoria**
DFD - Dartford	**NWX - New Cross**	**LTA - Listen to Announcements**
DVP - Dover Priory	**ORE - Ore**	**NIS - Sorry, Not in Service**
ELE - Elmers End	**ORP - Orpington**	**SPE - Special**

Via

There are additional 'via' options for the second line of the destination display. These can be controlled by pressing **Shift+F7** or **Shift+F8.** Please see below for a list of the options and their relevant code if you wish to use them on an AI service by adding **;D2=x** to the DMSOA's vehicle number. Options in italics are not available on the new destination display:

1 - via Beckenham Jn	**10 - via Bromley South**	**19 - via W A Lewisham**
2 - via Bexleyheath	**11 - via Canterbury E**	**20 - and Ashford Intl**
3 - via Catford	**12 - via Canterbury W**	**21 - and Canterbury E**
4 - via Greenwich	**13 - via Catford Bridge**	**22 - and Canterbury W**
5 - via Herne Hill	**14 - via Chatham**	**23 - and Dover Priory**
6 - via Lewisham	**15 - via Lewisham W A**	**24 - and Margate**
7 - via Sidcup	**16 - via Orpington**	**25 - and Ramsgate**
8 - via Maidstone East	**17 - via Otford**	
9 - via Blackheath W A	**18 - via W A Blackheath**	

Variable Traction Motor Volume

In reality, some traction motors are louder than others. To simulate this, we have implemented a random 'Motor Factor' to each motor bogie which ranges from 1 to 6; 1 being the quietest and 6 being the loudest. 'Motor Factor' can also be changed on the player train's leading motor bogie by pressing **Shift+M** or **Ctrl+M**. Please note that this only applies to the Class 465/0 & /1 sub-classes, which in reality, have the most noticeable difference.

Automatic Unit Numbering

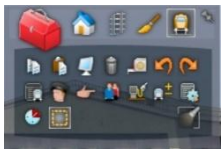
When placing a unit in the scenario editor or using one in Quick Drive, all vehicles will automatically be given correct unit and coach numbers, instead of you having to select each vehicle and changing their number manually so they match. The unit number is controlled via the DMSOA vehicle if you wish to change it.

AI Horns

To blow an AI train's horn in a scenario, you must edit the speed limit properties of the section of the track at which you would like the AI train to sound its horn. Please see below for instructions:

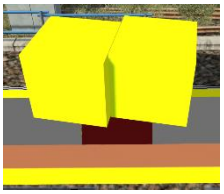
1) In the scenario editor, go to the location at which you would like the AI train's horn to sound, and press **Spacebar** 3 times. The track will now display a certain colour which represent its speed limit.

2) Go to the top-left-hand fly-out and click the 'Select' icon.



3) Hover your mouse over the piece of track where you like the AI horn to sound. A yellow border will appear around the track when it is selected.

4) Click and drag the yellow box in either direction until the measurement reading at the bottom of the screen says at least '1.0 metres'.



5) Go to the right-hand fly-out and change the two 'Speed Limit' values to '900'.

6) Click outside of any menus and the section of track you selected will now say 'Unspecified'. Any AI train which passes over this section of track will now blow its horn.

The manner in which the AI train blows its horn is randomly calculated each time, meaning no horn is ever the same. You may hear a single tone (any post-2007 liveries only), a two tone, a three tone, or now and then, even the infamous 'Ilkley Moor' sequence.

If you wish to be more specific in how and when the horn is sounded, please see the table below for values other than '900' which can be inputted in the speed limit field for different behaviour:

Speed Limit Value	Notes
900	Random number of tones
901	1 tone (low)
902	1 tone (high)
903	2 tone (low/high)
904	2 tone (high/low)
905	3 tone (low/high/low)
906	3 tone (high/low/high)
907	'Ilkley Moor' sequence
921	Same as 900 but 1 in 20 (5%) chance of horn sounding
922	Same as 900 but 1 in 16 (6.3%) chance of horn sounding
923	Same as 900 but 1 in 12 (8.3%) chance of horn sounding
924	Same as 900 but 1 in 8 (12.5%) chance of horn sounding
925	Same as 900 but 1 in 6 (16.6%) chance of horn sounding
926	Same as 900 but 1 in 4 (25%) chance of horn sounding
927	Same as 900 but 1 in 3 (33.3%) chance of horn sounding
928	Same as 900 but 1 in 2 (50%) chance of horn sounding
929	Same as 900 but 1 in 1.33 (75%) chance of horn sounding
930	Same as 900 but intended for use at platform ends*
931	Same as 921 but intended for use at platform ends*
932	Same as 922 but intended for use at platform ends*
933	Same as 923 but intended for use at platform ends*
934	Same as 924 but intended for use at platform ends*
935	Same as 925 but intended for use at platform ends*
936	Same as 926 but intended for use at platform ends*
937	Same as 927 but intended for use at platform ends*
938	Same as 928 but intended for use at platform ends*
939	Same as 929 but intended for use at platform ends*
940	Whistle boards**
950	Tunnels***

* **Platform ends** - Horn will sound only if train is travelling over 50mph, which at platforms of 12 car length of less, ensures that stopping trains do not sound their horn. Also, the point at which the train sounds its horn randomly varies from 1m to however fast the train is travelling. For example, if a train is passing at 125mph, the maximum possible distance it will sound its horn away from the trigger point is 125m. This simulates the propensity for drivers to sound their horn earlier if they are travelling at speed.

** **Whistle boards** - Intended for use at whistle boards. Pre-2007, trains sounded at least two tones at all times of day. From April 2007, following increasing concerns about noise, drivers were instructed to use only a single low tone and only between the hours of 07:00 & 23:00. This was later changed to between 06:00 & 23:59 in 2016.

To simulate this, any pre-2007 liveries will exhibit pre-2007 behaviour (at least two tones/no time restriction) and any post-2007 liveries will exhibit a hybrid of post-2007 & 2016 behaviour (single low tone/between 06:00 & 23:59 only). The point at which the horn sounds varies randomly from 1m to 40m away from the trigger point.

*** **Tunnels** - Historically, trains always blew their horn when entering & exiting tunnels to warn potential track workers of their presence. With increased health & safety regulations reducing the presence of track workers in 'live' tunnels, and to allay complaints of increasing noise pollution due to louder modern horns, this requirement was removed on Saturday 6th November 2004.

To simulate this, any pre-2004 liveries will sound at least two tones. The point at which the horn sounds varies randomly from 1m to 40m away from the trigger point.

Whilst these tools are primarily intended for use by scenario creators, they can also be used by route editors to 'bake' these features into a route. The platform end, whistle board & tunnel values being of particular use in this respect.

Finally, due to the custom speed limits being of such a short distance, they do not affect AI train performance or appear as the current speed limit on the F3/F4 HUD. Also, assuming the route you are using is configured to only show signed speed limits (the majority do this), custom speed limits will not appear in the part of the F3/F4 HUD which shows forthcoming speed limit changes.

Bits and Bobs

This section is dedicated to aspects of this pack that don't warrant a dedicated section but are still of note:

- The class 365 cab from the DTG London - Peterborough route is used due to its better visuals and functionality.
- Higher resolution visuals for many of the various in-cab labels and buttons.
- Speedometer re-textured to signify the class 465/466's lower maximum speed of 75 mph.
- Clickable and functioning master key.
- Newly modelled reverser handle.
- 4-step reverser (off/forward/neutral/reverse).
- TPWS lights illuminate during AWS self-test.
- DVD isolation lights to the top-left of the driver, as well as 'Safety System Isolated' indicator on desk.
- Door interlock light moved from door close button to where it should actually be.
- In-cab unit/vehicle number labels.
- Selected destination displayed on the in-cab top-right computer unit.
- Functioning brake hold button which applies the equivalent of step 1 brake.
- Animated cab light & instrument (dash) light switches.
- Intermittent, slow & fast wiper speeds.
- Visual alarms outside of cab when AWS or DVD are active.
- The visible driver automatically moves to whichever cab you are in.
- Emergency brake pressure applied when reverser is in 'Off'.
- When the sander button is pressed, you must be in a power notch and it will only apply for 10 seconds maximum at a time. If you wish to continue to apply sand after 10 seconds, you must re-press the sander button.
- Due to reliability issues from around 2008 onwards, the dynamic brake was isolated on Metro-Cammell 465s/466s and this is implemented by default on all of these units.
- Driver to guard bell only active when reverser is away from 'Off'.

- 1 second delay between train passing over AWS magnet and AWS warning sound occurring. The F3/F4 HUD will show the warning immediately so you must wait 1 second before trying to cancel it.
- The headlights only provide illumination before sunrise and after sunset. This is to avoid the unrealistic appearance of projected light in broad daylight.
- High quality headlight/marker light & tail light visuals with LED variants.
- White & purple status lights above external destination display. White illuminates when the dynamic brake is active and purple illuminates when a safety system is isolated.
- Correct looking tightlock coupler applied.
- Extra passenger view camera angle.

How to Use in the Scenario Editor

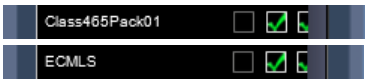
How to place

To place in the scenario editor, please follow the instructions below:

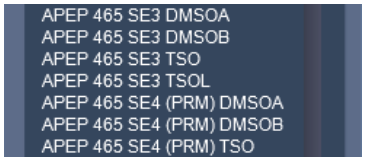
7) In the left-hand rolling stock fly-out, click the object set filter which looks like a blue box with an orange arrow to the right of it.

8) Go to the right-hand fly-out which should have appeared. Select 'RSC' from the drop-down menu.

9) Tick the second & third box beside 'Class465Pack01'& 'ECMLS'.



10) The liveries should now be visible in the left-hand rolling stock fly-out.



Numbering

When placing in the scenario editor, you are able to control a number of features via the number of the unit. Please note that the only number you need to change is the DMSOA's, as other vehicles in the consist will automatically be numbered correctly using this number.

Dynamic brake

The dynamic brake can be isolated by adding **;DB=1**.

Window frames

On BREL/ABB South Eastern 1 livery, silver window frames are available by adding **;SW=1**.

Underframe

On BREL/ABB South Eastern 4 livery, a white underframe is available by adding **;WU=1**.

Example number:

465932;D=VIC;D2=c;DB=1;AC=1

Key:

465932 - Unit number

;D=VIC - Destination

;D2=c - Destination (via)

;DB=1 - Dynamic brake isolated

;AC=1 - Air conditioning roof unit

Setting up the Driver's Cab

Please follow these steps to set up the cab so you are ready to move:

1) Turn the master key in by pressing **Shift+W**.
2) Move the reverser to the 'Neutral' position by pressing **S**.
3) Cancel the DVD self-test alarm by pressing **E**.
4) Cancel the AWS self-test alarm by pressing **Q**.
5) Turn the tail lights off by pressing **K**.
6) Turn the headlights on by pressing **H**.
7) Turn the instrument lights on by pressing **I**.
8) Set your destination by pressing **F7** or **F8**.
9) Turn the Driver Reminder Appliance (DRA) off by pressing **Y**.

You should now be ready to move off.

Scenarios

APC465EP: 2D90 08:22 Beckenham Junction - Victoria
Route = Chatham Main & Medway Valley Lines
Track covered = Beckenham Junction - Victoria
Traction = South Eastern 466038 & 465042
Year = 2014
Duration = 25 minutes

APC465EP: 2K38 18:58 Victoria - Gillingham
Route = Chatham Main & Medway Valley Lines
Track covered = Victoria - Gillingham - Gillingham Depot
Traction = South Eastern 465923
Year = 2012
Duration = 1 hour 20 minutes

APC465EP: 2M76 14:55 Victoria - Orpington
Route = Chatham Main & Medway Valley Lines
Track covered = Victoria - Orpington
Traction = South Eastern 465007 & 465197
Year = 2016
Duration = 40 minutes

Credits

Nicolas Schichan - Advanced scripting
George Hartley - Modelling of the external visual differences
Chris Horsfield - Destination display font
Glenn Doig - Internal wheelslip sound recordings