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## KEY STORIES INSIDE

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In our first TRU since the May Fares Revision, we take our traditional look at what went well and the bits that might have gone better!

### Page 5 [DIGITAL RAILCARDS](#)

We provide details of plans by the Rail Delivery Group to pilot the issue of digital versions of Railcards for customers to use on their mobile devices.

### Page 7 [HEADER](#)

In one of our two special features this month, we take a look at recent problems that have blighted the performance of our MFMs and the actions being taken to address these.

### Pages 9 [BANKCARD ISSUES](#)

We update you on recent progress with the POM PED upgrade programme and provide the background on a couple of recent service failures affecting bankcard acceptance and what we are doing to avoid future issues.

### Page 13 [POUND COIN CHANGES](#)

In the run up to the old design of £1 coin being withdrawn from circulation, we provide an update on the plans to upgrade our equipment to no longer accept the old style of coins.

### ---RUNNING LATE---

A couple of last minute changes to the launch date for FUL, led to a delay in publishing this edition, until the launch was confirmed. Unfortunately, during the intervening period we have had to update the content of a couple of other items, to also bring them up to date.

As a result of the inclusion of a couple of late news items, some of the features we had planned to include in this edition have had to be held over until next month.



Written and compiled by

Ticketing & Revenue  
**T&R**  
Trivia

TICKETING & REVENUE UPDATE Issue 101 June/July 2017



## FASTER UNIVERSAL LOAD LAUNCH

Our lead article in TRU95 in October 2016 focused on plans to launch a project called *Faster Universal Load* (FUL) during 2017.

Following a trial, initially involving a number of LU and TfL staff and since February extending this to include a number of selected customers, we are pleased to announce that FUL finally went live on LU and other rail modes from Tuesday 18 July.

It had originally been planned to launch FUL two weeks earlier on Wednesday 05 July, but some technical issues affecting the PVal on the piers served by Thames River Services, led to a couple of postponements and in consequence we had to postpone the publication of this edition of the TRU until a confirmed launch date had been agreed.

The FUL functionality will be extended to include buses later in the year and this will then allow customers to collect products and refunds when using bus services.

Until this extension, the facility is only available on LU and other rail modes.

The launch of FUL is initially being kept fairly low key, but a major public launch is planned in the autumn.



What you need to know:

- [Initially for refunds and for purchases via Oyster online](#)
- [Not yet available for pick-up on buses](#)
- [Product loaded to all Gates & PVals within 30 minutes](#)
- [Can be collected at any rail station, tram stop or river pier](#)
- [Product available for collection for 4 days, before being cancelled and refunded](#)

Closely linked to the development of FUL is the planned launch of the new TfL ticketing app. Further details of this are included on Page 4 inside.

# IN THE NEWS...

## HOTLISTING INELIGIBLE OYSTER CARDS

Back in March 2017 upon completion of a comprehensive audit, TfL started the process of hot listing a large number of Staff, Staff Nominee, Bus Operator, Bus Operator Nominee, Retired and Contractor passes where the holders are no longer eligible to use their card.

In total 3,193 passes were hot listed over a period of three weeks between Tuesday 28 March and Tuesday 11 April.

Following a further audit, TfL have recently identified a further 10,273 cards of various types, which are no longer valid. The number of each type and dates when each batch will be hot listed over a period of five weeks are shown in the table below.



Date	Cards	Types	Date	Cards	Type
Thu 20 Jul	1000	All Staff	Fri 04 Aug	1000	Bus Operator
Fri 21 Jul	1000		Thu 10 Aug	1000	
Thu 27 Jul	1000	Staff, Staff Nominee	Fri 11 Aug	1000	Bus Operator, Bus Operator Nominee
Fri 28 Jul	1000	Staff Nominee	Thu 17 Aug	1000	Bus Operator Nominee
Thu 03 Aug	1000	Staff Nominee, Bus Operator	Fri 18 Aug	1273	Bus Operator Nominee, Retired

An important reminder for any gateline staff who are presented with any hot listed Staff or Nominee Oyster card is that the procedures are exactly the same as when dealing with any other disabled Oyster card;

- you do not know the reasons for the card being disabled
- you do not know how long the customer has been attempting to use the disabled Oyster card
- the customer must be advised to buy another ticket / use another Oyster card / contactless payment if they wish to travel
- the customer must contact their card issuer if they wish to obtain a replacement.

On no account must the holder be allowed to travel on an Oyster card that has been disabled.

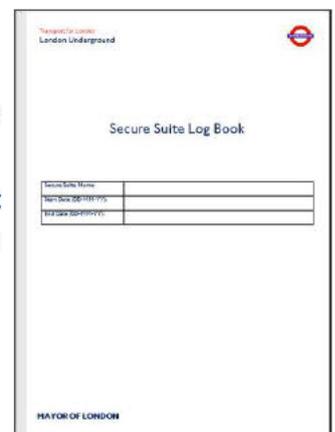
## SECURE SUITE LOGBOOK

After trials of a new design of Log Book for the Secure Suite, the first batch of the new design of books have been printed and are currently being distributed.

The new design will be used to fulfil a number of outstanding orders from different areas, which could not be completed after the last of the old design of Ticket Office Log Book (TOLB) had been exhausted.

The main differences between the previous design and the new Log Book are;

- Portrait instead of landscape design
- Each days entries are displayed in 2 pages to view format
- A number of sections which no longer apply have been removed
- No pages are wasted if the secure suite is not accessed on a particular day, e.g. If station / ticket hall is closed and no pages wasted in months with less than 31 days
- Book no longer covers a calendar month, but has capacity for entries to be made on 100 days.
- The rear of new Log Book contains pages which can be used as an Emergency Safe Contents Register, in the event of a SAF failure, rather than this being supplied as a separate book, which often cannot be located when it is needed.



## MAY FARES REVISION

-WHAT WENT RIGHT

-WHAT WENT WRONG

The May Fares Revision took place as planned on Sunday 21 May 2017 and it is fair to say that the implementation of the changes which extremely smoothly.

### WHAT WENT WELL



On the Sunday morning, there were no reported issues affecting Oyster, Contactless or ITSO validations across the whole of the Oyster network.

Two devices were identified as having failed to upload their new fare tables; an AFM at Tottenham Hale and a single gate on the C2C operated gateline at Barking.

The problems on both devices had been resolved by mid-morning. At the start of traffic on Sunday three other stations had communication issues which prevented the OCC and Cubic from being able to confirm devices at these locations had successfully switched to their new tables. The sites included Farringdon, together with DLR devices at Canary Wharf (DLR) and Stratford (DLR).

### WHAT DIDN'T GO SO WELL!

There were a couple of minor issues highlighted by station staff after the fares revision had taken place.



Staff at both Harrow on the Hill and Wembley Park reported an issue affecting customers with non-Zone 1 Travelcards, who attempted to purchase an extension ticket to various NR destinations, where the destination button was repeated 3 times. A fix for this was deployed on Sunday 04 June.

On Monday 22 May, several stations reported that when customers were topping up on the AFM, the "£" sign was missing from the top-up amounts shown on the screen. This issue was resolved on Tuesday 23 May.

A further issue affected NR TVMs at Wembley Central, where the ability to issue common Single tickets disappeared.



### CHANGES TO AUTO TOP-UP

Following the launch of Faster Universal Load on Tuesday 18 July 2017, as outlined in our lead article on Page 1, a number of changes have been made to rules governing the use of the "Auto top-up" facility.

For a number of years there have been problems with customers using "Auto top-up" not updating their card details when they received a new bankcard.

As a result, when their card next generated a top-up request, the required amount was loaded to their Oyster card, but when the bankcard was processed for payment it was found to no longer be valid and payment was therefore declined. This then led to a time consuming chase to obtain new card details to try and recover the money owed.



The changes which have been recently implemented will automatically generate a reminder message when the bankcard is approaching expiry and subsequent action to be taken if the card details are not updated, as outlined below:

- **When a customer's bankcard is due to expire, if they have not updated their account with their new card details, an instruction will be issued to remove "Auto top-up" from their Oyster card**
  - **If a customer makes a rail or tram journey in the 4 days following expiry of their bankcard, "Auto top-up" will be removed from their card when they touch in/out**
  - **If no journey is made within 4 days of expiry, "Auto top-up" will remain on their Oyster card. However, if a further top-up is added to the card and bankcard details are not updated, their Oyster card will be hot listed and disabled when next used**

If "Auto top-up" has been cancelled, the customer can set it up again in the normal way using the same Oyster card / Oyster Photocard. However, if an Oyster card has been hot listed or disabled, it can never be used again and a new card will be required.

## TICKETING APP TO GO LIVE

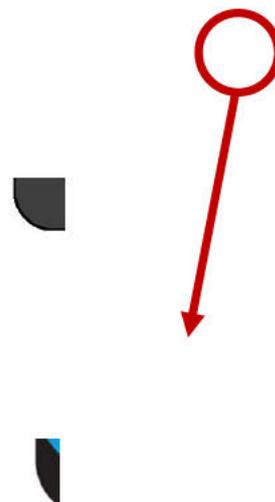
In our lead article this month, we confirmed the launch of Faster Universal Load (FUL) on Tuesday 18 July. Hot on the heels of this will come the public launch of a new TfL Ticketing app in August.

We have previously covered the testing of this new app in TRU 98.

Like FUL, the new app has been trialed by a mixture of staff and customers, allowing tweaks to be made to improve its operation and the look and feel of screens etc.

The key features of the new app are;

- ▶ Available on Android and Apple platforms only
- ▶ Ability to order and pay for PAYG top-ups and products direct from the app
- ▶ Facility to check Oyster card balance and receive low balance notifications
- ▶ Ability to link more than one Oyster card to an account



Once launched, customers will be able to load the app to their mobile device from the appropriate app store. The initial launch will again be fairly low key, building up to a more high profile public launch of the app and FUL in the autumn.

## MIFARE CLASSIC CARD REPLACEMENT

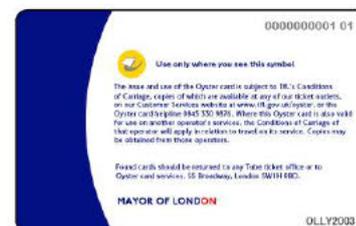
Since 2010, all new Oyster cards issued have been on DesFire format cards, which can be identified by a black square with a white D on it on the back of the card, as shown bottom right. This second generation of cards has better security and functionality than the first generation MiFare "Classic" cards.

Despite not having issued any of the older format cards for seven years, there are still a large volume of these cards in circulation. Some are dormant, tucked away in drawers or bags as spare cards, but many continue to be used by customers on a regular basis.

The forthcoming launch of the new TfL ticketing app will mean that users of these older cards will not be able to add these MiFare cards to their account on the app. TfL are therefore encouraging registered holders to obtain a new Oyster card and to then transfer products to the new card by linking them online.

Staff at stations may be approached by customers who have received this email and should advise the customer to buy a new card and then link the two.

Do not attempt to issue a replacement card from a POM using the pink staff function screens or to use the failed card portal.



Mifare Classic Oyster card



Mifare Desfire Oyster card

### Part 2 – Which leads us on to a couple of questions about Auto Top-up...

Q2) What is the PAYG balance at which Auto Top-up is added?

- |   |                              |   |                              |
|---|------------------------------|---|------------------------------|
| A | When balance falls below £5  | B | When balance falls below £10 |
| C | When balance falls below £15 | D | When balance falls below £20 |

Q3) Which of the two values can customers set for Auto Top-up

- |   |            |   |            |
|---|------------|---|------------|
| A | £5 or £10  | B | £10 or £20 |
| C | £20 or £30 | D | £20 or £40 |



Answers on Page 15



## DIGITAL RAILCARDS

At the end of July, the Rail Delivery Group (RDG formerly ATOC) who represent the interests of the various National Rail Train Operating Companies (TOCs), will be starting a trial of a new digital format of NR Railcard.



The digital format will be offered as an alternative to the current paper or plastic railcards for any customers purchasing or renewing their Railcard online. It will then download the Railcard to the holder's Android or Apple smartphone.

The trial will initially launch with just the "Network" and "16-25" Railcards in July, but will later be expanded to include applicants for "Family & Friends" and "Two Together" Railcards in late summer and finally the "Senior" and "Disabled Person" Railcards in early autumn.

HM Forces Railcards are not included within the scope of the project, but RDG have indicated that Annual Gold Cards may be added at a later date.

Users of the new format of Railcard will be required to show the appropriate railcard image (as illustrated) on their phone when purchasing discounted tickets, having a Railcard discount entitlement set on their Oyster card, or when presenting their ticket or Oyster card for inspection.

All of the Railcard images displayed on the phone screen will include a barcode that can be scanned by NR staff, a photograph of the holder, the expiry date and the 15 digit railcard number at the bottom beneath each barcode (circled above right). Initially for the pilot, this number may be quite small, but LU have asked if this can be made larger when the digital railcards are rolled out later in the summer.

Some other points to note regarding digital railcards:

- Like contactless applications and NR barcoded tickets, the onus is on the customer to produce their railcard for inspection.
- If the customer's phone or battery fails and they are unable to show their railcard, they will be liable to a Penalty Fare.
- If the customer has the NR Railcard discount entitlement set on an Oyster card but is unable to produce the supporting railcard, the discount entitlement must be removed from the Oyster card.



When viewing a customer's railcard it is strongly recommended that you do not hold or take the customer's phone from them.

**LAL MXIDE PU**

Part 3 – We've mixed up the letters in these station names. Can you work them out?

Ticketing & Revenue  
**T&R**  
Trivia

(a) **RAILWAY BONDAGE**

(b) **PUNY ESTATE**

(c) **WE GRADE**

(d) **PIGPEN**

(e) **USES ONE QUART**

Is there a connection?  
– You decide.  
Answers on page 15.

# IN THE NEWS...

## NEW SCANCOIN NOTE SACKS



A number of stations that have recently received deliveries of the white Note Collection Sacks used within the CHD have received an updated design of sack.

The new design of sack has a barcode that can now be read both by the G4S custodian's scanner and by our SAF scanner.

At stations that are using the new sacks, there is no longer a need to over-bag the sack within a grey G4S Transportation Sack when it is collected, or when a cash sack has to be stored in the safe after being removed by a Scancoin engineer.

The new sacks do not have the tear off receipt section, as these are no longer needed.



Stations with the older style cash collection sacks with the tear off receipt portion should continue to use these until they have all been used up and as a result will continue to use the grey Transportation Sacks to over-bag the collection sack.



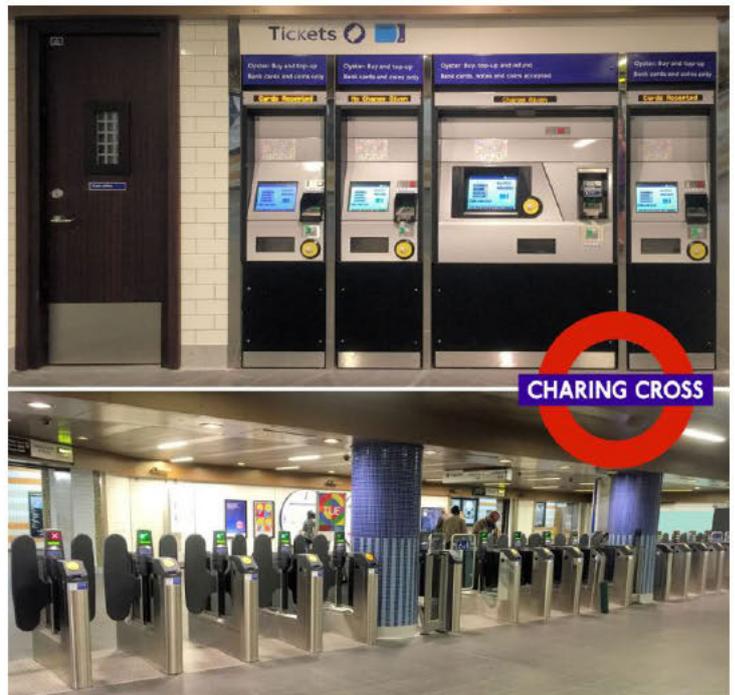
All stations will still need to maintain a small stock of the grey Transportation Sacks, in case it is necessary to create a number of counted bags for notes during a period that the CHD is unavailable.

Collection Sacks for the CHD and G4S Transportation Sacks can both be ordered on your iPad via the Ticketing Consumables order form on Mi-apps.

## REOPENINGS

Two ticket halls which had been temporarily closed for refurbishment works reopened to customers on Monday 26 June.

Charing Cross (Strand) ticket hall had been closed since Monday 26 September 2016 and during this period the ticket hall had been remodelled, POMs have been moved into a new POM Suite and the gateline repositioned with new E2 gates in place of the older and more bulky pneumatic gates.



Lancaster Gate station had been closed to customers since Wednesday 04 January 2017 to allow refurbishment of the stations lifts.

During the closure pneumatic gates here were also removed to allow installation of WAGs and a brand new E2 gateline.

In the week leading up to the re-opening of the station, Cubic had to complete a number of outstanding upgrades to bring the POMs up to date before re-entering service, as these could not be completed due to the other works being undertaken at the station.

## MFM RELIABILITY

Over the last couple of months, one of the hottest topics in our mailboxes has been around issues with MFMs. The main source of these issues being Note jams.

MFM availability and reliability have both dipped recently, due to a number of note handling issues. Both Cubic and the TfL Tech & Data team (formerly Customer Experience) have been working to identify the causes of these issues and to implement solutions to improve reliability.

On devices fitted with Bank Note Recycler (BNR) units, we are currently undertaking a programme to replace and overhaul the Note Bundler, which forms the top section of the BNR unit.

An initial pilot on 4 devices which had previously shown very high failure rates saw a significant reduction in note jams on these devices and a decision was therefore taken to progressively change the bundlers on all of the other MFMs fitted with BNRs.



BANK NOTE RECYCLER

To date Cubic have completed this work on 51 of the 98 BNR devices and we aim to continue at a rate of 6 devices per week over the next few weeks, subject to availability of newly overhauled units.

On the MFMs fitted with the Bank Note Acceptor (BNA) units, we are undertaking a programme of replacing all of the belts on Note Handling Units passing through the Cubic workshops.

On units with replacement belts, Cubic have recently reported seeing a 50% improvement in reliability.

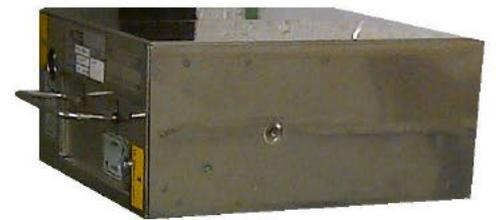
These problems obviously exist across many devices, but initial attention is being focused on some of the worst performing machines, particularly where the local management teams have highlighted repeat failures.

A final issue that has recently come to light involves devices reporting an error 204 on the SCU and device monitoring app.

This error 204 is a blanket description for a Note Handling Unit fault, but when Cubic have interrogated the device for a more detailed fault description, a number of these errors have been indicated as 201 (Note Vault full).



MULTI FARE MACHINE



NOTE VAULT

Since it is incredibly rare to ever get a machine where the note vault is either 80% or completely full, there would appear to be an issue which is causing this to happen.

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- the most recent edition of the TRU, on the same day it goes to the printers.
- having your own personal copy.
- access to archived copies.

- Send an email to; [REDACTED] today.



**askolly@tube.tfl.gov.uk**

From: [REDACTED]  
Sent: 10 July 2017 20:02  
To: Ask Olly  
Subject: **POM Refunds**

Hi Olly,

I would appreciate some clarification on how you would process a POM refund for kept non-cash of £25?

Here is the scenario: A customer attempted to purchase two Oyster cards, paying with his debit card. However, only one Oyster card was actually dispensed.

All the necessary investigations were done, but only concluded to be a POM failure after a final check on the SAF journal.

Kind Regards,

[REDACTED]  
CSA  
Marble Arch Area

Hi [REDACTED]

Thank you for your email and query.

If the POM fails after the issue of the first card, the customer will be charged for the whole amount and a "Failed Sale" will be shown on the SAF. This is one of the few scenarios where a customer paying by bankcard, will actually be charged and not receive what they requested. For bankcard transactions the payment is not taken until one ticket, or Oyster card has been issued or a product has been successfully added to a card.

In the scenario you have outlined, providing the SAF journal shows a failed sale for the £25, then the second Oyster card can be issued from the TOM adding the £20 PAYG top-up and then a miscellaneous transaction for a POM Refund of £25 completed to balance your account. In these circumstances the card issue and PAYG will be indicated on the card history as being paid for in cash.

Regards

*Olly Oyster*

Hi [REDACTED]

Thank you for your email. Glad you found our previous article on Auto Completion useful.

Unfortunately although Auto Completion is a very effective tool for dealing with unfinished journeys, the functionality cannot help where the customer is unable to touch-in. In such circumstances the normal advice would be to get the customer to touch-out at their destination and speak to staff there as you have suggested. As a known incident staff would be able to use the POMs to resolve the resulting incomplete journey at the fare the customer should have paid.

The other option for customer's with an Oyster online account, is for them to log into their account and use the auto-fill facility to resolve the incomplete journey with the details of the missing validation and thereby generate a PAYG refund back to their Oyster card.

Regards

*Olly Oyster*

From: [REDACTED]  
Sent: 04 June 2017 05:38  
To: Ask Olly  
Subject: **Faulty gates**

Dear Olly,

Thanks to the TRU team for the explanation of how Auto Completion works and how it should be implemented in TRU 100. However I am still unsure what to do if the gateline is faulty at your station and customers are entering the system. What is the solution for them not to be charged the maximum fare? I know they could potentially exit and speak to staff at their destination station who could resolve the journey via the POM, but if a large flow of customers exit at one station it isn't exactly a feasible solution. Hope to hear your solution soon!

Regards

[REDACTED]  
Customer Service Supervisor  
Ladbroke Grove Group

From: [REDACTED]  
Sent: 02 June 2017 14:34  
To: Ask Olly  
Subject: **Gateline management**

Dear Olly,

I would like to know how far away I can monitor the gateline without actually being present by the gates.

One supervisor told me that there used to be 4 second rule that if you are more than 4 seconds away you leave the gateline open.

So what is the reasonable distance before I need to open the gateline.

Thank you.  
Regards,

[REDACTED]  
CSA (P/T)  
Mile End Area

Hi [REDACTED],

Thank you for your email and query.

The rule that your supervisor was referring to was called the "5 Second Rule" and was an undertaking given following the Kings Cross fire, that there would be a member of staff within 5 seconds of the Emergency Open plunger within the ticket hall, to open the gates in an emergency.

A lot has changed since then, including the linking of the gate Emergency Open circuit into the station fire alarm system and the gating of the smaller stations outside of Zone 1. The original undertaking also ignored the fact that gates could be opened in an emergency more quickly from a Station Control Room at our bigger central London stations.

The rule was revoked many years ago and was replaced by a requirement, currently within **T&R Book 7 Section 10**, that gatelines could be monitored remotely from a Station Office/Secure Suite if local risk assessments were undertaken. This assessment being around the length of time that it would take for customers to block back from the gates.

So in answer to your query, the distance will really depend upon the station concerned, the throughput of customers and the layout of the ticket hall, but certainly a lot longer than the 4 seconds you were quoted.

Regards

*Olly Oyster*

Hi [REDACTED]

Thank you for your email and query.

The Oyster card data that the Staff Oyster Help Line (1265 service) uses is not completely "real time". So it will largely depend upon how much time has elapsed since the last journey was made.

In the scenario you have described, where the customer was unable to touch-out, the journey is likely to still be shown as being current until another event, e.g. touching-in again at another station, takes place.

Providing the details of the start of the journey have fed through onto the Oyster card data, then the entry charge will have been deducted from the card balance. However, if the enquiry is made not long after the entry was made, it is possible that the card balance may be as it was at the end of the previous journey.

Hope this answers your query.

Regards

*Olly Oyster*

From: [REDACTED]  
Sent: 09 June 2017 00:06  
To: Ask Olly  
Subject: **Staff Oyster Help Line**

Hi Olly,

Can you answer a question for me?

A customer touches-in with an Oyster card and then makes a journey and for some reason the card fails and they cannot touch-out.

If I call the Staff Oyster Help Line on Auto 1265 to get the PAYG balance, is this balance given affected by an incomplete journey charge?

Cheers

[REDACTED]  
CSA  
Morden Area



## TICKET IRREGULARITY SURVEY

The results of the February 2017 On-train Ticket Irregularity Survey have been published by the TfL Transport Strategy team. This survey was conducted throughout that month by RCIs, following set criteria for each line. Customers were surveyed on LU trains 7 days per week, from the first train out of a depot to the last one back in at night. In total **49,983** customers were checked, of which **2.28%** had a ticket irregularity of one form or another.

Below we have provided a detailed line by line breakdown of the number of customers surveyed in February and listed the number of offences encountered.

It is worth pointing out that although there is recognised fraudulent travel across the network, almost 98% of all customers who use our services are in possession of a valid ticket, Oyster card or contactless payment for the journey they make.

Survey Date	On train irregularity	Estimated revenue loss
February 2016	2.30%	1.31%
May 2016	2.54%	1.63%
November 2016	2.64%	1.51%
<b>FEBRUARY 2017</b>	<b>2.28%</b>	<b>1.29%</b>
12 month average	2.49%	1.48%

Line	Best	No	Runners	No Ticket	Out of Area (Magnetic)	Adult on Child ticket	PAYG not validated	Out of Area (Oyster)	Other	Total invalid
	Worst									
BAKERLOO		4885	7	54	18	20	23	11	2	135
CENTRAL		5657	3	94	3	6	50	4	36	196
CIRCLE		2249	1	6	4	2	8	5	9	35
DISTRICT		8930	20	50	4	11	40	18	9	152
HAMM & CITY		3030	0	6	9	4	8	9	10	46
JUBILEE		2766	3	20	4	0	5	2	1	35
METROPOLITAN		5086	2	15	11	5	37	16	16	102
NORTHERN		6570	9	71	2	1	24	5	4	116
PICCADILLY		6653	1	49	3	11	7	9	24	104
VICTORIA		4157	2	60	26	3	24	13	6	134
<b>Total (all lines)</b>		<b>49,983</b>	<b>48</b>	<b>425</b>	<b>84</b>	<b>63</b>	<b>226</b>	<b>92</b>	<b>117</b>	<b>1055</b>

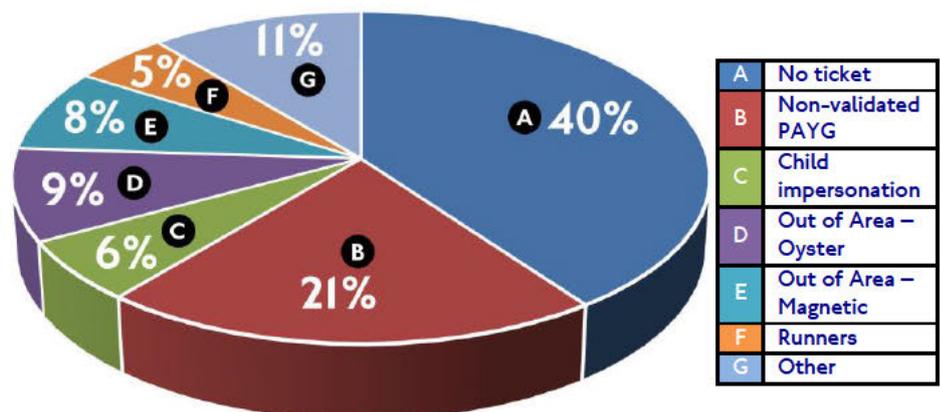
### Year on year trends

The table on the right shows the percentage of irregularities from each February survey between the years of 2011 and 2017.

There are a few trends and patterns, notably;

- An area of concern is the continuing year on year increase in the percentage of customers with "No Ticket" for their journey. Up 16% since 2011.
- Another trend has been the steady reduction in the number of customers with Non-validated PAYG. Down 12% since 2011.
- Although slightly up on last year, Adult on Child have reduced by half over the past two years.
- There has been a 3% drop in Out of Area (Oyster) irregularities, but a 2% increase in "Other" offences over the past 12 months.

Offence (%)	Feb 2011	Feb 2012	Feb 2013	Feb 2014	Feb 2015	Feb 2016	Feb 2017
No ticket	24	27	34	29	31	36	40
Non validated PAYG	33	25	27	27	26	24	21
Child impersonation	19	13	12	12	13	4	6
Out of area (Oyster)	10	12	12	11	12	12	9
Out of area (Magnetic)	8	10	8	10	9	9	8
Runners	2	7	2	2	2	5	5
Other	4	6	5	9	7	9	11

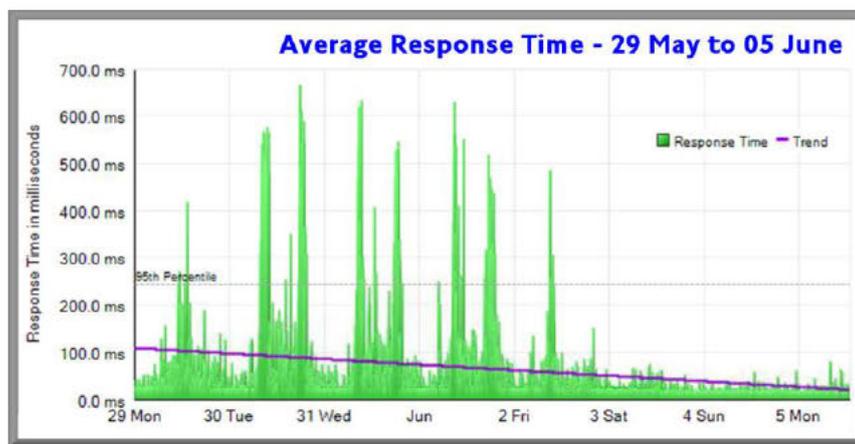


## BANKCARD OVERLOAD

At the end of May we had a couple of major problems with devices fitted with the new design of Chip & PIN unit (PED), where on consecutive days during the morning peak period, we lost bankcard acceptance on between 100 and 150 POMs for a short period.

On this occasion the problem was not with the PED hardware or device software, but with the communication link between our devices and *The Logic Group (TLG)* who are responsible for processing all of the bankcard transactions from the new PEDs.

Although two separate data lines had been provided, investigations subsequently established that all of the traffic was being routed down one line, the capacity of which had been exceeded on these two occasions. It also became apparent that the system did not include adequate provision for sharing the load across both lines.



Initially it looked as if the recent acceleration of the AFM PED rollout to 6 devices per night and the completion of devices at a number of busy sites had tipped the transaction volumes over the limit of this line.

To temporarily resolve the problem, all traffic was switched onto a third route with higher capacity and as can be seen in the graph below, this resulted in a sharp reduction in the peak transactions being sent in the following mornings.

It now seems that a contributory factor in these two failures, was a large number of transactions which initially failed and were then resubmitted for authorisation by our POMs.

As a precautionary measure we also temporarily suspended further AFM upgrades from Wednesday 31 May until Tuesday 06 June, but during this period we were able to upgrade AFMs in the Strand ticket hall at Charing Cross and at Whitechapel during closures for other engineering work.

The upgrade programme restarted on Tuesday 06 June and in the following few weeks we added a further AFM team to accelerate the programme and complete 8 devices per night (40 per week).

A further unrelated communications failure on Monday 19 June, when all devices with the new PED lost the ability to accept bankcard payments for a short period, led to a further suspension of PED upgrades, between Monday 19 June and Sunday 02 July, whilst assurances on the ability to mitigate against further failures was sought from our suppliers.

The longer term solution to these bankcard processing line issues, will see the installation of a new high capacity line and an arrangement that will allow us a quick switchover to a back-up system, should there ever be a failure of the principal line. At present it is planned to commission and test this new line in early August, with a view to switching over to using the new line during engineering hours a week or two afterwards.

We have currently completed just over 400 AFMs which takes us well past the halfway point of the AFM programme, with just over 200 machines left to complete.

All being well, and avoiding any further suspensions in the rollout programme, we aim to complete the final AFMs in mid-August. We have however come across around a dozen devices installed as part of various recent projects, where we have been unable to remove the AFM to complete the upgrade.

These are likely to be revisited at the end of the programme when we can programme some additional labour to remove and reinstate structures that are currently preventing Cubic from extracting the AFMs concerned.

# REVENUE PROJECTS

## SOFTWARE UPGRADES

Plans to deploy the final versions of the AFM and MFM software to support the new PED had to be put on ice after security concerns about the potential spread of the *Wannacry* ransomware.

The attacks that affected a number of NHS systems and computer networks of a number of other organisations worldwide, highlighted the need to have the latest updates loaded.

In reaction to this Cubic identified the need to download a patch to all devices fitted with the new PED, to protect against the Wannacry ransomware.



As a Vanguard, the patch was initially loaded to 5 MFMs, 5 AFMs and 5 QBMs on Wednesday 24 May. At the time, that represented all of the QBMs that had been upgraded with the new style of PED as part of the initial QBM PED Vanguard.

As this particular device change was relatively small and had no noticeable impact on the operation of the devices concerned, a decision was quickly made to deploy the patch to all MFMs and to AFMs that had already been upgraded with the new PED.



As the AFM and QBM programmes continue, the patch will now be downloaded to devices at the time that the PED upgrade is completed.

The next phase of work will see new software deployed, initially to MFMs (as outlined in the article below) before a vanguard commences on the QBMs currently fitted with the new PED and then on a selection of AFMs, before network wide deployment to all AFMs.

Details of some of the changes incorporated within these forthcoming software releases were outlined within TRU100.

## ERROR 96 ON MFMS

Since completion of the PED rollout on the MFM we have seen quite high levels of error code 96 being reported on certain devices. This fault relates to the PED believing that a card is stuck within the bankcard reader, when in most cases the card had been removed. When it does occur it renders the POM unable to accept card payments until reset.



We currently believe that there may be a couple of possible causes behind this, one of which has been traced and fixed by Cubic. This fix is being deployed to 11 MFMs at stations which have shown very high levels of error 96, as listed in the table below.

Station	MFM	
ELEPHANT & CASTLE (Bakerloo)	30	31
FARRINGDON (Cowcross Street)	31	
HIGHGATE	30	
LEYTONSTONE	30	

Station	MFM	
MOORGATE (Northern)	30	31
ST PAULS	30	
VAUXHALL	30	31
WALTHAMSTOW CENTRAL	30	

This latest software release also contains some enhanced event logging software, which Cubic are hoping will enable them to capture more detailed information if an error 96 does occur.

At the moment this appears to confirm that the incidents of error 96 we have seen on the vanguard devices are all down to one issue, for which a software fix has already been developed.

This fix will be incorporated into a further version of software, which we plan to vanguard from 06 August, before deployment to all MFMs. This MFM upgrade will also include changes to the bankcard transaction limit and a change to assist with some of the note acceptance issues we have seen recently.

The changes incorporated into this final MFM release will also be included in updated versions of the AFM and QBM software (as outlined above), which are scheduled to be vanguarded later in August.

## PHASING OUT THE ROUND POUND

The process of withdrawing the old design of pound coin is now well underway and recent figures have indicated that larger numbers of the old coins have been withdrawn from circulation, than the number of the new design of coin released.



Any of the old round pounds being banked will immediately be withdrawn by the cash processing centres and then melted down. Some of this material is then being recycled in the production of further batches of the new coins.

In preparation for the old round shaped £1 coins losing their legal tender status in October, we have recently been finalising our plans to upgrade our machines to stop them taking the old design of pound coin.

Work on this will commence on **Monday 14 August**, when Cubic will start a programme to update coin validators on AFMs to prevent them accepting the old £1.

This programme will initially commence at the north end of the Metropolitan line and will then cover the outer London stations on other lines. This phase of the work is being undertaken during engineering hours.

Approximately two weeks later the teams will move on to day shifts and complete AFMs at inner London stations before finally completing AFMs at the larger central London sites during the last two weeks of this phase of the programme. The last of our AFMs is scheduled to be completed by Friday 15 September.

During this period all stations will have the ability to accept both old and new £1 coins via the MFM.



EAGLE VALIDATOR

Following on from the conversion of the AFMs, Scancoin will be upgrading our Cash Handling Devices to no longer accept the old £1 coin. This update will be completed remotely at most stations and will commence in the first week of August, following the same rollout order as the Cubic AFM updates.

At these sites any old £1 coins removed from the MFM, which are likely to be very small, will be rejected by the CHD and will need to be counted manually.

They must still be treated as valid currency but we will not be able to bank them as bulk coin. At these stations we will therefore only be banking complete bags of the new design of £1.

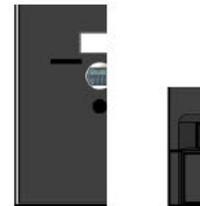


Any of the old coins should be used to float the MFM and hopefully the number of old coins in circulation will be very low by the time that we embark upon upgrading the MFMs to also reject the old £1 coin.



Work on the MFM will be completed in two phases;

- The first phase - covering MFMs with BNA units which will remove the ability to accept paper £5 notes and the old £1 coin on these devices.
- The second phase - concentrating on the 98 MFMs with BNR units will be completed after the launch of the polymer £10 note and as well as stopping acceptance of the old £1 coin, the upgrade will also reconfigure the bank note recyclers to provide more capacity for the new polymer notes. Currently the smaller of the two £10 note recyclers is configured for polymer notes, with the large capacity unit taking the current paper notes.



The upgrade in September will utilise the higher capacity recycler for polymer notes, which will be dispensed in preference to paper notes.



# REVENUE PROJECTS

## COUNTDOWN TO POLYMER £10 NOTE LAUNCH

Many readers will have seen that the Bank of England recently announced the date for the official launch of Thursday 14 September 2017, for the new polymer version of the £10 note, featuring an image of Jane Austen.



As reported previously in the TRU, the three Scottish note issuing banks will also be issuing polymer versions of their £10 in September.

Preparations for the acceptance of the new notes are already almost complete. All of our Cash handling Devices (CHDs) and all of the MFM's fitted with Bank Note Acceptor (BNA) units were upgraded with the necessary note images to be able to accept the new notes at the time that they were upgraded to accept the polymer £5 note last year.

The 98 other MFM's that have Bank Note Recycler (BNR) units were made ready for the £10 polymer note in May, when Cubic upgraded all of these devices to prevent them from accepting the old paper £5 notes.

A further visit to each of the devices with BNR's will be required later in September, once the £10 polymer notes are in general circulation, to reconfigure the note recyclers, so that the higher capacity recycler unit holding £10 notes, is configured to accept and dispense polymer £10 notes and the smaller capacity unit is then designated for the paper version.

This final visit will be combined with an update of the Coin Handling Unit (CHU) to prevent these devices from accepting the old design of £1 coin (as outlined in our article on Page 13 overleaf).

### 5 facts about the £10 note

1. The Bank of England £10 note was first issued in 1759, during the 7 year's war, in an attempt to preserve Britain's dwindling gold reserve. The earliest notes were handwritten, on one side only and bore the name of the payee, the date, and the signature of the issuing cashier.
2. The design stayed pretty much unchanged until 1945, when it was completely withdrawn from circulation for 19 years.
3. To date there have been 5 different £10 note designs. This will be the sixth.
4. There are currently over 800 million £10 notes in circulation (£8.05 billion).
5. Most modern £10 notes in circulation are first issued to customers via one of over 70,000 ATMs across the country.

## SAF BASEDATA UPDATES

A further batch of 9 stations (with a total of 13 ticket halls) had the details of their safes updated on the SAF as part of a base data upgrade on *Sunday 02 July*.

As with stations completed in previous rounds of work, the update will see the removal of safes that have been physically removed as part of the ticket office closure and CHD rollout programmes, from the menu displayed on the SAF.

At stations where we now only have one safe, the description on the SAF will be changed to 'Safe' rather than Float safe or Deposit safe.



STATION	FLOAT SAFE	DEPOSIT SAFE	OTHER INFORMATION
BAYSWATER	Deleted	Renamed as "Safe"	
BAKER STREET	Met	No change	Delete - Deposit Safe (Chiltern St) & Float Safe (Chiltern St)
	Bakerloo	No change	
EARLS COURT	Main	No change	
	Warwick Rd	Deleted	
GREEN PARK	Deleted	Renamed as "Safe"	Delete - Float Safe (Assistance)
HAMMERSMITH C&H	Deleted	Renamed as "Safe"	
HIGH BARNET	Main	Renamed as "Safe Main"	
	Remote	Renamed as "Safe Remote POM"	
HYDE PARK CORNER	Deleted	Renamed as "Safe"	
KNIGHTSBRIDGE	East	No change	
	West	No change	
PARSONS GREEN	Deleted	Renamed as "Safe"	

A further small batch of stations will be updated in the following base data load on *Sunday 16 July*, with all other stations requiring changes to safe data being included within a final batch of changes on *Sunday 30 July*.

## PNEUMATIC GATE UPGRADES

The oldest version of automatic gates in use on our stations, principally in Zone 1 will shortly be facing some changes.

A new version of software was recently loaded to gates at the two Pneumatic gate Vanguard stations (Liverpool Street (Central) and Tower Hill), in an attempt to address an issue which for several years has seen customers validating their cards, but the gate paddles not opening. In conjunction with this, a third Vanguard site has also been added with the upgrading of all of the gates at Old Street on the night of Tuesday 11 July.



We are currently waiting for Cubic to undertake some further observations at these stations and to monitor the instances of Reject Code 21 (card already used) to see whether the instances of this occurring when a customer has been unable to enter through a gate, have gone down or not.

A decision will then be taken on the whether to start the deployment of the LCP3 to the other stations that have pneumatic gates. This will be the final leg of a project which started on stations with E2 gates a very long time ago.

In a further planned upgrade to our pneumatic gatelines, Cubic will shortly be embarking upon a programme to replace the Dump Valves at all of our stations that still have pneumatic gates.

As an initial pilot, Cubic have already replaced Valves at Victoria (District) and Baker Street (Bakerloo) ticket halls. The forthcoming programme is scheduled to start on Sunday 17 September 2017 and will continue at a rate of 5 devices per week. However, prior to this a number of stations will require preparatory work to be completed.



For those readers who are not familiar with this terminology, the Dump Valve is a piece of equipment often located either in the Upper machine room or within the bottom of the SCU cabinet, that causes the air supply to be removed from all of the gates in the event of an Emergency Open activation taking place.

Loss of the air supply which keeps the paddles in the closed position will cause all gates to open and remain open until the air supply has been restored. Failure of this little known and hidden piece of kit, can therefore often lead to a complete failure of a whole gateline.

ANSWERS TO  
T&R TRIVIA

Pt. 1

WHERE'S  
WOLLY?

How did you do?

Pt. 2

Q2 B

When balance falls below £10

Q3 D

£20 or £40

SEE PAGE 4

Pt. 3

SEE PAGE 5

(a)

(b)

(c)

(d)

(e)

EALING BROADWAY

EAST PUTNEY

EDGWARE

EPPING

EUSTON SQUARE

ALL STATIONS BEGINNING WITH "E"

LAL MXIDE  
PU

# ...AND FINALLY!

## LATE NEWS

Typically on the day that we had planned to publish this delayed edition of TRU, a further outage of the bankcard processing line used by the new PEDs occurred.

As outlined in our article on Page 11, there had been a couple of previous failures, but everything had been relatively stable for the last 4 weeks or so.

The problem on Monday 24 July was initially caused by a failure of the temporary line we have been using, but was compounded by the virtual private network (VPN) which had been configured as a fall back not working.

An attempt was subsequently made to switch traffic onto the original line, but as this has a known capacity limit, this not surprisingly also failed. The result was that all devices with the new PED showed an error 92 and could not process bankcard payments until traffic was diverted back onto the line that had originally failed, once it had been checked and confirmed to be operational.

The reasons behind this failure are currently under investigation, but early indications are that this time it was not related to a capacity issue, as the line was only operating at about 60% of its capacity at the time.

We will update you on the findings of this investigation in the next TRU.



## PINK ROLL STOCK

IN TRU99 we told you that we had started to receive a large number of enquiries from stations that had built up large quantities of pink ticket roll stock in their secure suites... and many were simply running out of space to store them.

A network-wide stock-check revealed the problem was a lot worse than we feared, with many stations holding enough stock to last them multiple years. A brief snapshot of some of the worst cases is reproduced in the table below;



Station	Rolls in stock	Yearly use	Years in Stock	Date will run out
Roding Valley	32.9	0.4	92.2	27-May-2109
Barkingside	174.3	2.3	75.8	19-Jan-2093
West Harrow	84.5	1.7	50.6	28-Dec-2067
Northwood Hills	163.4	4.1	39.7	11-Feb-2057
South Harrow	114.1	3.2	36.1	12-Jul-2053
Dollis Hill	117.5	4.0	29.3	21-Sep-2046
South Woodford	237.3	8.5	28.1	01-Jul-2045

The good news is that we have started to move stock from stations with high levels to stations that have a high consumption rate; such as Victoria, Euston, Kings Cross and Paddington. To date we have so far managed to relocate over 1000 rolls and we hope to increase this rate over the next few weeks as more resource becomes available. We have also placed all automatic deliveries on hold to stations, while this redistribution takes place.

We will inform stations as and when large volumes of stock are to be collected and any staff help in preparing rolls for collection is greatly appreciated, as this will help speed up the process considerably.

## NEXT ISSUE

Late publication of this edition of TRU has meant that we have had to hold over the publication of a couple of articles that we had planned to include this month, until our next edition in August.

TRU 102 is due for publication at the end of August and will include:

- *Preview of the September Fares Revision*
- *A Special Feature on Incomplete Journeys and Journey Resolution*
- *A look at the plans for a forthcoming make-over for the TOM/SAF*
- *Updates on other T&R projects*

...Plus all the other latest T&R news and a selection of our other regular features.

