Video transcript

00:00  **MAIN TITLE:** END OF THE LINE - The Electric Train Staff (ETS) System

00:10  **OPENING SEQUENCE:** KIAMA RAILWAY STATION, PASSENGERS BOARDING TRAIN, STEAM TRAIN, HISTORIC PHOTOGRAPHS OF STAFF INSTRUMENTS, MAN ON PLATFORM HOLDING SLING, FOOTAGE OF MAN COLLECTING SLING, OLD FULL-SIZE STAFF INSTRUMENT, LOADING A STAFF INTO IT.

**NARRATION 1:** THE HISTORY OF RAILWAYS IN NEW SOUTH WALES IS A COLOURFUL ONE AND SIGNALLING EQUIPMENT HAS PLAYED A LARGE PART IN MAKING IT SAFE.

**ONE OF THE EARLIEST SINGLE LINE SIGNALLING SYSTEMS WAS THE ELECTRIC TRAIN STAFF, (THE ETS), A UNIQUE TOKEN SYSTEM DEVELOPED IN ENGLAND AND INTRODUCED TO AUSTRALIA IN THE EARLY 1890S.**

**ON THE KIAMA TO BOMADERRY RAILWAY LINE, THE LAST REMAINING ETS SYSTEM ON THE NSW PASSENGER NETWORK WAS STILL IN OPERATION IN JUNE 2014. THE FORERUNNER OF THIS HISTORIC SYSTEM, TYRE’S TABLET, WAS INSTALLED AS PART OF THE OPENING OF THE LINE THROUGH TO BOMADERRY IN JUNE 1893 AND WAS REPLACED BY ETS IN 1908. THIS VIDEO TELLS THE STORY OF THE ETS AND ITS LAST FEW WEEKS IN SERVICE.**

**TONY EID, ON CENTRAL STATION PLATFORM 1:**
00:57  The Electric Staff System and the Block Tele system one hundred and fifty years ago is how we ran our trains and quite frankly, back then it worked well. There was a lot of single line and there was not a lot of trains, but when you’re running a modern railway like we run today, it requires modern signalling capabilities, it requires automation, a lot of it. The Electric Staff System between Kiama and Bomaderry is the only piece left on our network that is still run by the Electric Staff System. If you can imagine, just for one minute, that system, how it functions as a whole and how it operates down there and how reliable it is for us in 2014, when it was first put in a hundred and twenty years ago - it’s an amazing kit that we should never ever forget because that is our history. The electric staff is a weird system, it doesn’t take a lot to make it work, but over the years it’s been proven that it’s very reliable in its delivery.

**STEAM TRAIN RUNNING**

01:57  **WARWICK ALLISON:** In the early days they didn’t have any signals, they didn’t have any communications and knowing where the trains were was fairly difficult. The trains used to run on timetables and it has been said that they actually ran with smoke signals.
02:12 **KEITH BELFITT:** This is a miniature electric train staff instrument that allows a train to enter the section between Kiama and Berry. To enter the section they need the authorities given by the release of this staff instrument. It’s a type C, which is located here, it has engraved on it the section it’s between, which is Kiama and Berry. Each staff has an allocated number between one and fifty – this one is staff number fourteen.

The staff instrument is operated by holding down on the bell key from Berry until energising coils here, which will then allow us to lift the staff up, and if the polarities are right and everything is in phase, we’ll be able to take one out.

**KEITH TAPS IN BELL CODE ON STAFF INSTRUMENT**

03:04 **KEITH BELFITT:** Okay, the galvanometer had gone to ‘IN’ which means the instruments are in phase and I will be able to get a staff out, so I lift it up into the fold of the machine, pull easily and that releases a staff. This is the only authority for the train to enter the section between Kiama and Berry.

**TRAIN PULLING OUT OF BERRY STATION**

03:23 **ROBERT BAILLIE:** It’s a reliance on communication between two locations. If one staff, or token for the section is removed from either here or Kiama, or here and Bomaderry, a second one can’t be taken out. The whole basis of it is to ensure that there’s only one train in one section at one time. The drivers won’t go without it because it gives them the confidence to know that there’s no other train in that section, so it’s a clear section. That’s really how it works: it’s just a simple human mechanical idea and it works really well.

**QUESTION BY FRANK HEIMANS:** Now what’s the procedure in the use of the ETS, when a train, say, is leaving from Berry to go to Kiama. What do you do here?

03:58 **JOHN RASBORSEK:** When the officer at Berry becomes aware that a train is due, he will go to his instrument for Kiama, go the bell key and press a code, which will cause a bell to ring at the other end in Kiama. He will also notice on the galvanometer that it shows ‘OUT’. If the officer at Kiama is willing to accept the train he will go to his instrument from Berry and press the same code on the key. This will cause the instrument box at Berry to ring to that code.

**TAPPING IN CODE ON STAFF INSTRUMENT**

04:30 **GRAHAM DUKE:** There was a difference in the bell codes. The bell code that was one, two, three, three bells, and then a space, and then one would indicate that you had a fast-moving passenger train. If we had the quaint one, that used to get everybody, was the one bell code, and that was ‘talk on telephone’. The back-up one, if we did have problems, six bells. If you received six bells that was ‘obstruction, danger, or a major problem’, so your first reaction would be to acknowledge the six bell codes and go out and immediately and put all the signals back to the ‘STOP’ position, so no trains could move. The Morse Code system is where the bell codes came from and they were probably as quaint, or as important a part of the electric staff system as what the bells and the way the instruments work.
HISTORIC PHOTOGRAPHS OF STEAM TRAINS AT STATIONS

05:28 GRAHAM DUKE (voice over): The electric staff system, or a similar equivalent, was the first of the safe-working systems on the single line along the South Coast, and the South Coast line was opened through to Bomaderry/Nowra in 1893.

PETER RODDEN: I think it’s the last area in New South Wales with the electric staff system. It was only, I think it was about ten years ago when they electrified to Kiama that they took the kerosene lamps out of the signals between Kiama and Bomaderry.

STEAM TRAIN, STEVE FORD FIXING STAFF TO SLING IN OFFICE.

NARRATION 2: IN THE BEGINNING AN ARCHAIC AND RATHER DANGEROUS METHOD WAS USED TO EXCHANGE THE STAFFS.

STEVE FORD HOLDS UP SLING, PASSING FREIGHT TRAIN DRIVER CATCHES IT WITH HIS ARM IN THE OLD WAY.

06:18 JOHN RASBORSEK (INTERCUT WITH PHOTOGRAPHS OF STAFF EXCHANGES): The cane sling has the staff attached to it - that was held up by an officer who held that off the edge of the platform. The driver would then have his arm out the window and he would hook the sling on his arm and pull it in. That would have to be coordinated so that someone didn’t get injured because both of them could fly either way and it was done at low speed.

06:40 ROBERT DONOVAN: Oh yeah, when you’re exchanging the staff on the run, if you had the slings, both of you had a sling each, what you used to do, you’d hold yours out and you’d pick the other one up like this, you’d hold that, he’d grab that with his arm like that and you’d pick it up like that, but if he didn’t have a sling and he was only giving you the staff you’d hold it out and you’d turn your hand this way, not that way, because it used to hit your thumb and you were inclined to drop it. You used to always have it that way, and if you’re waiting to go and they haven’t given you a staff you used to go like that (thumps his elbow) and the Station Master would know ‘Oh, I haven’t given him the staff yet’.

07:23 GRAHAM DUKE: The faster freight trains and the passenger trains all went through the stations using the steel ring, about fifteen centimetres in diameter and it was attached to an automatic ground exchanger, which under today’s OH&S regulations probably wouldn’t be allowed to be even used.

SHOTS OF AUTOMATIC STAFF EXCHANGER APPARATUS BESIDE TRACK

GRAHAM DUKE: It was quite a heavy instrument that was pulled out of the ground at the station and the electric staff was attached to the steel ring and as the train approached the driver would have the previous section’s staff and they would put it onto the same type of steel ring and attach that onto the engine exchanger. It was a bit of engineering at its best where a train could go through the station and deposit the incoming staff, and pick up the outgoing staff at over a hundred kilometres an hour.
BOB DONOVAN: You’d be coming along at about seventy mile an hour and you’d pick ‘em up and there used to be a hell of a thump, you know, and a couple of times you wouldn’t pick them up because they were out of alignment and then you’d have to walk back, get the right one, and give him the right one, and by the time some of the trains pulled up, it’d be about a mile and a half walk, yeah.

QUESTION BY FRANK HEIMANS: So what happens when a driver loses or drops a staff?

RAY HIDDLESTONE: The driver is required to report the fact and then a detailed eight-hour search is carried out, a search of the driver’s cab, or of the countryside, to try and locate that staff and if one cannot be found then six months later a replacement staff will be found, or manufactured, and installed to turn it back to its standard position.

STEVE FORD ENTERS STATION CARRYING A STAFF, INSERTS IT INTO THE MACHINE AT LEFT, TAPS IN BELL CODE.

POLES WITH COPPER WIRES ABOVE STATION.

ROBERT BAILLIE: There’s two copper lines, very narrow gauge, it’s bare wire, low voltage, so you’ve got one line with current going forward and one line with current coming back, so the line of current goes to the bells, takes it over – he sends the bells back and then holding down, that line of voltage allows the mechanisms in here for me to move a staff.

POLES CARRYING WIRES

JOHN RASBORSEK (VOICE-OVER): There are approximately six hundred line poles in this section for these two staff instruments. It’s a very labour-intensive task to keep this line wire section working. That is one of the reasons why this type of system is no longer desirable. Line wire is copper wire, copper is very expensive these days and that is one of the difficulties with this system now – there is a lot of theft of line wire.

KEITH BELFITT: Approximately four weeks ago we had a staff failure, we tested the instruments and it showed that there was an open circuit out on the track. We proved that it was outside. During the night we don’t go chasing faults any more, it’s too dangerous. We came back in the morning, done some testing and we found two kilometres of wire missing down Nowra. We reported this to the police – due to the time of day we didn’t fix it at that time, we organised to come back the next day, in which there was another two kilometres missing.

WOLLONGONG TRAIN CONTROL ROOM.

GRAHAM DUKE: The train controller is the one that’s got the big picture, all drawn out on the graphs in front of him, and they are the ones that call the shots. The Train Controllers, with the electric staff system are the ones that gave us approval to remove our staffs, our electric staffs for the departure of the trains. On top of that, with the electric staff, the Train Controller would take over when the electric staff system would fail, whether it was through a staff instrument failure, or a broken staff, or a lost staff, or something along those lines – the Train Controller would be the one to get all
parties on the line and go through the safety checks to be able to bring in an alternate safety system for the moving of the trains.

WOLLONGONG TRAIN CONTROL ROOM. JOHN DOYLE POINTS TO PANEL.

11:16 JOHN DOYLE: This is actually a representation of the South Coast panel. We have Kiama there, which is where the electric staff instrument is located on the platform at Kiama. At the moment we have Kiama and it shows the tracks to about two or three kilometres south of the station, with the electric staff system - once we get the new system in the tracking will be right through to Berry, we’ll be able to monitor the train as it gets all the way down to Berry, there’ll be several tracks, fairly long tracks. The station staff at Kiama will put a staff into the instrument, request another staff for the train to go back.

QUESTION BY FRANK HEIMANS: Now what happens if there are no staffs left in the instrument?

11:58 ROBERT BAILLIE: No staffs? Well, it never does. They have put what’s called a staff balance in process. So when you get down to – the minimum we can get down to is seven in any one instrument – when that happens the Signal Electrician will then go to the other location. At present we’ve got most them here, so Kiama, I think has got about ten, so within a week they will have to do a staff balance.

12:23 JOHN RASBORSEK: When an electrician has to do a staff balance because one of the instruments has almost run out of staffs and the station is unattended, he must manually remove the staffs by himself. To remove the staffs out of the instrument you need three hands, so it’s allowable that you must use something else. There’s a lever here, which lifts the electric lock - he must use his chin to lift the electric lock as he pulls the staff out. He lifts the staff from the mechanism of the instrument and pulls the staff out. He can pull out as many staffs as he needs by this process. He then travels to the other end of the section with his staffs, to the empty instrument and inserts the staff back into the instrument. That will put both instruments back into phase and equals up the number for the train movements ahead.

13:17 TRAIN ARRIVES AT PLATFORM. STEVE FORD EXCHANGES STAFFS WITH DRIVER.

13:28 WARWICK ALLISON: The new system that’s going in is one of the latest technology – we’re using two different methods to supply the signalling down there. The first is that we’ve got fibre optic cables, which bypass level crossings and is used through interlockings, and between the interlockings, where there’s a long section we’re actually using the rails themselves to pass the signalling information. Signalling information is connected to small computer-based interlockings of each of the stations and through those the signals there are now controlled.

14:00 FREIGHT TRAIN APPROACHING

TONY EID: We are now, in 2014, very soon to realise that the last piece of electric staff will be stopped on our network. It’s a very exciting time, but a very historic time, one not to forget.

FREIGHT TRAIN CARRIAGES PASSING
14:19 **BOB DONOVAN:** When this new system comes in it’s going to be a lot better and a lot smoother. It’s sad to see it go, but, you know, it’s got to go with progress.

**TWO MINIATURE STAFF INSTRUMENTS AT BERRY STATION.**

**STEAM TRAIN THROUGH COUNTRYSIDE.**

14:33 **GRAHAM DUKE:** I’ve always called it a nostalgic type of system. It’s very strange, when you have customers on the platform that come up and ask ‘Is that some sort of a ceremonial ritual that you’re carrying out?’ but I’m not nostalgic enough that I would put my hand up and say ‘I would like an electric staff in my lounge room to look at.’

**GRAHAM DUKE CHANGING POINTS ON TRACKS**

14:57 **KEITH BELFITT:** It’s the end of an era. I must say that they’ve been very reliable themselves and very fun to work with at times.

**PASSENGER TRAIN COMING INTO STATION.**

15:07 **JOHN RASBORSEK:** It’s important that we upgrade to new technology. Society, the user of our system expect to know where trains are, to get on them reliably and this system, while it is very nice, it is costing us a lot of time and money to keep running. I believe that these are going to a museum - I would like to see them keep working because I think people would find these interesting. We can look at a device and think that is a marvellous bit of engineering, but the lives of the people and the things they’ve done, they get lost with time, and that’s a shame, that’s a shame.

**STEVE FORD ON PLATFORM- TRAIN PASSING**

15:44 **GRAHAM DUKE:** In today’s push-button computerised age it’s a quaint system. It still serves its purpose brilliantly – the engineering that went into it in the 1890s is incredible- the fact that it stood the test of time and the majority of the drivers and guards I’m sure that have been interviewed would have said that they felt quite safe while they were in possession of the staff.

1605 **TONY EID:** And we’ll be sad to see it go. That is the last piece on our network. A very historic moment for our organisation.

**FADE TO TITLE 1:**

THE ETS WAS DECOMMISSIONED IN JUNE 2014 FOLLOWING COMMENCEMENT OF AUTOMATED SIGNALLING ON THE SOUTH COAST LINE. THE COPPER LINE WIRE WILL BE REMOVED AND THE ETS TOKEN INSTRUMENTS CONSERVED AS A REMINDER OF THE PAST.
TITLE 2:

THE OPINIONS EXPRESSED IN THIS VIDEO ARE THOSE OF THE INDIVIDUALS CONCERNED AND DO NOT NECESSARILY REPRESENT IN WHOLE OR IN PART THE POSITION OF SYDNEY TRAINS AND NSW TRAINLINK.

TITLE 3:

THE PRODUCERS WOULD LIKE TO THANK ALL WHO TOOK PART IN THE PRODUCTION OF THIS VIDEO. PHOTOGRAPHS AND HISTORICAL FOOTAGE PROVIDED BY AUSTRALIAN RAILWAY HISTORICAL SOCIETY.

TITLE 4:

CAMERA: PAUL REE
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TITLE 5:

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TITLE 6:

Transport, Sydney Trains logo.

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(Total duration of video: 17 minutes, 10 seconds.)