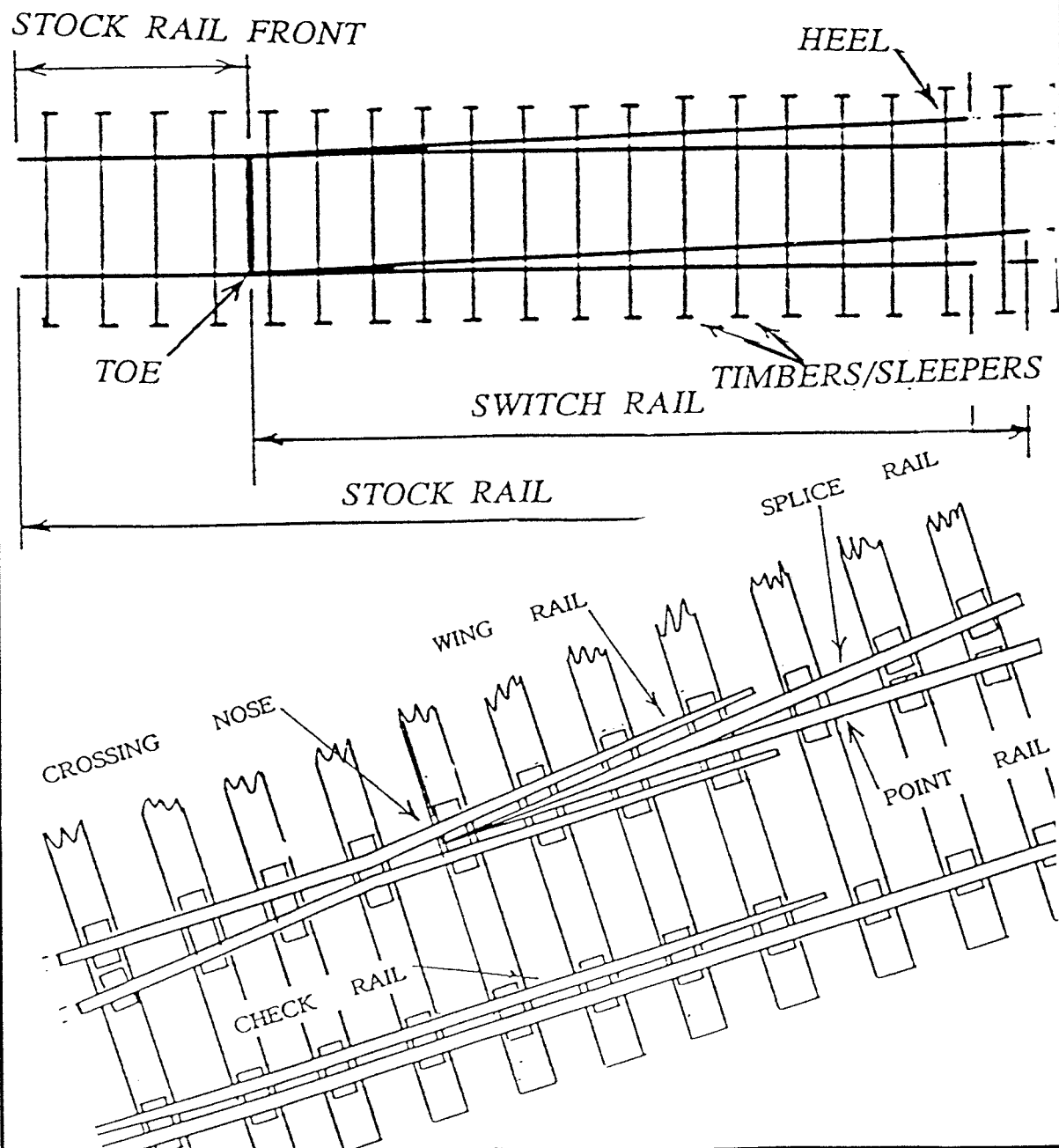


DIRECTOR OF S & T ENGINEERING.
WEST MIDLANDS PROJECTS GROUP.

*BONDING & THE CIVIL
ENGINEERS SCALE DIAGRAMS*



BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS

When involved in any re-modelling of the railway in "points & crossings" areas where track circuits are affected you are required to have a reasonable knowledge of Civil Engineers scale plans.

The Civil Engineer requires to know before completing the detailed scale drawings and issuing them to the manufacturers of "points & crossings" (P & C) exactly where our department need to place insulated joints to ensure the track circuit will function correctly and safely.

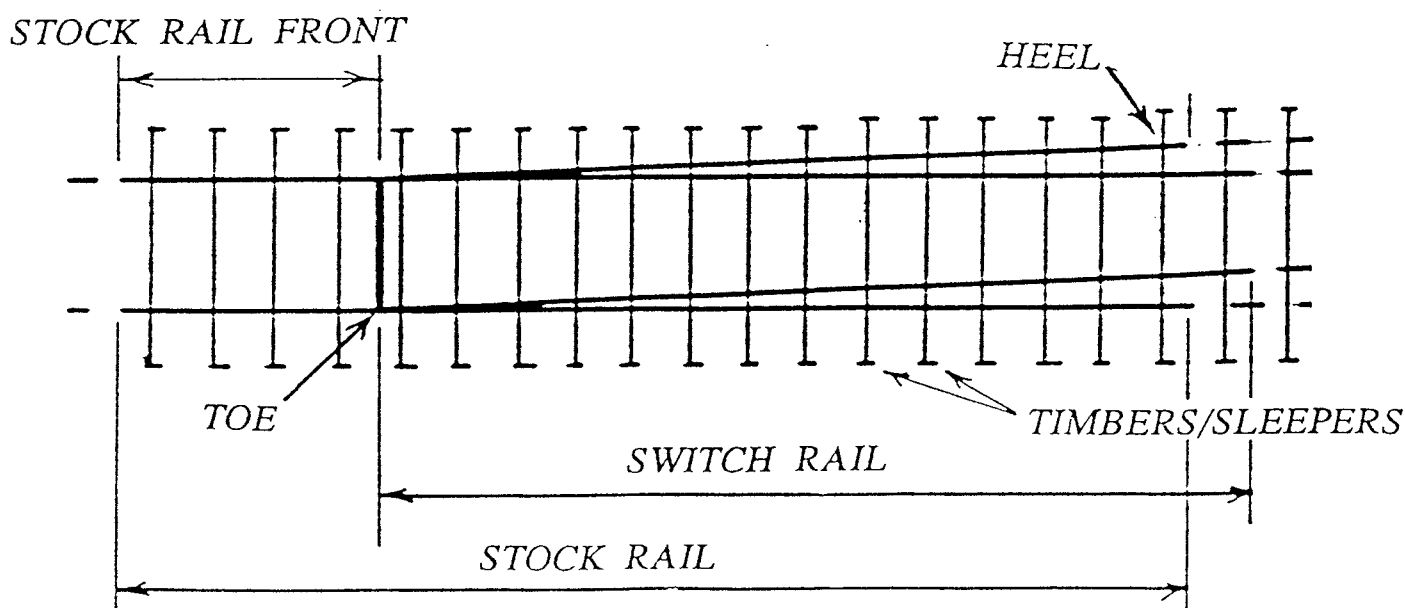
The Civil Engineer issues the D of S & TE with a 1:100 or 1:200 scale plan to enable us to indicate our requirements. Therefore a knowledge of these plans is essential as an error at this stage tends to be very costly to rectify later.

The type of information we present to the Civil Engineer not only involves placement of insulated joints, but also the following additional items:-

- extended timbers for point M/C's
- "soft spots" for manganese crossings
- insulated sole plate identification
- identification of clamp lock operated points
- drilling of concrete sleepers for AWS installation

First of all we will consider some terminology that you will have to be familiar with.

POINTS



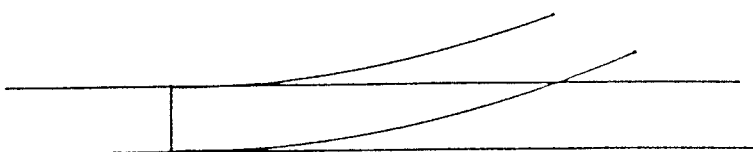
continued

BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS

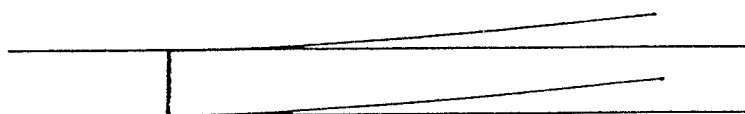
Points are identified by a distinguishing letter corresponding to the angle of turnout.

An "A" switch has a severe angle of turnout therefore can only be used on "low speed" divergences, whereas an "H" switch has a very gradual angle of turnout and can be used for "high speed" divergences.

"A" Switch



"H" Switch



Listed below are the types of switch and the maximum speed that the points can be run over in the diverging position.

A = 15 mph,	B = 20 mph,	C = 25 mph,	D = 30 mph,
E = 40 mph,	F = 50 mph,	G = 60 mph,	H = 70 mph.

Details of the above switches and others in use can be found in the Civil Engineers Drawings:- BS 113A, VERTICAL SWITCHES, GENERAL ARRANGEMENT RE/PW/600 Series, an extract of which is shown on Figure 1.

Figures 3 & 4 show some common switches in use today with useful measurements of the stock rail front, switch rail, stock rail, timbers and the locations of single & double baseplates.

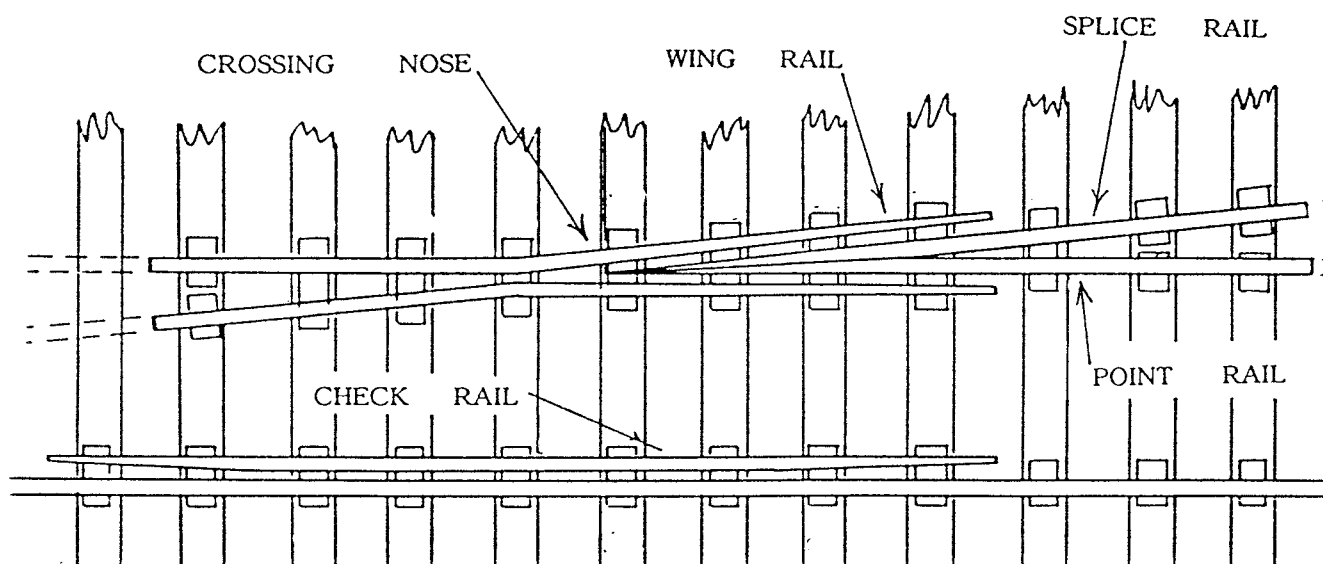
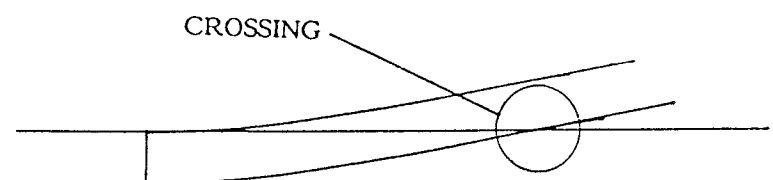
Heel joints **can** be used on switches "A"—> "D", however on switches "E" and above **do not** use the "heel joints" for bonding purposes because double baseplates will "short circuit" the track circuit.

BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS

CROSSINGS

With every set of points there is an associated "crossing" where the switch rail "crosses over" the adjacent switch rail.

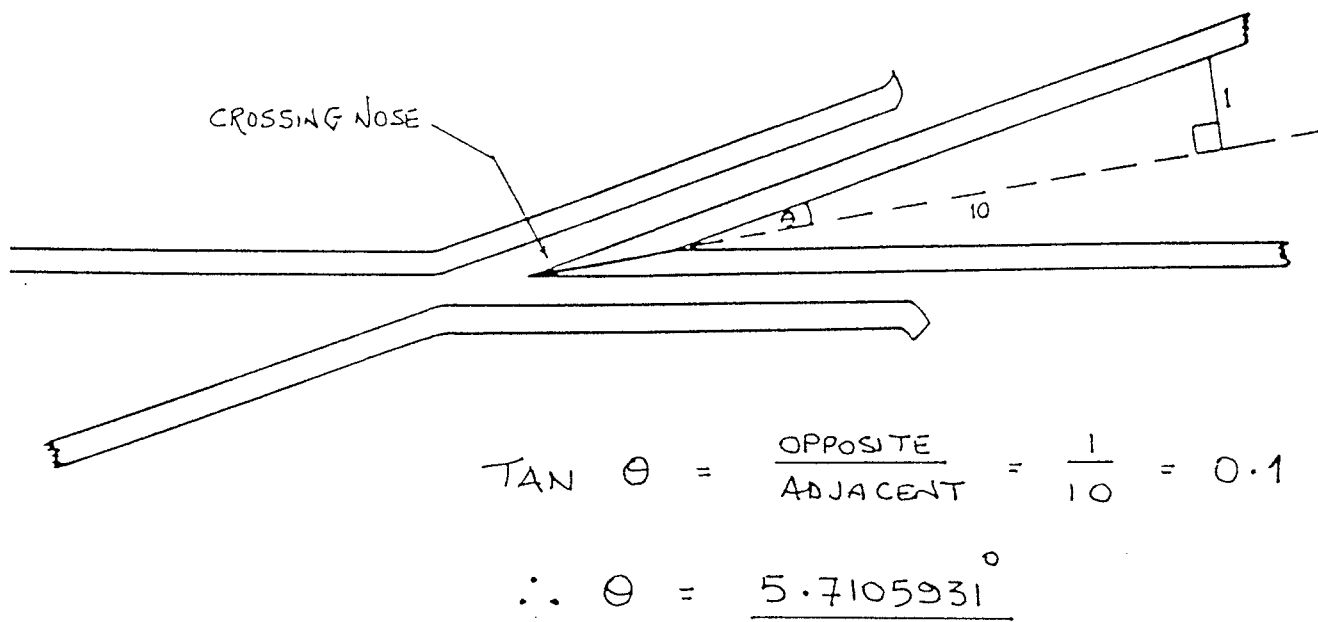
Crossings can be part welded or cast manganese, the latter requiring "soft spots" cast into the crossing and filled with mild steel so as the crossing can be drilled for track circuit bonding connections at a later date.



continued

BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS

Crossings are identified by marking on the crossing itself 1 in 10, 1 in 15, 1 in 24 etc. Where the figures 1 in 10 etc is the gradient of the crossing nose ie. the Tangent in Trigonometrical terms.



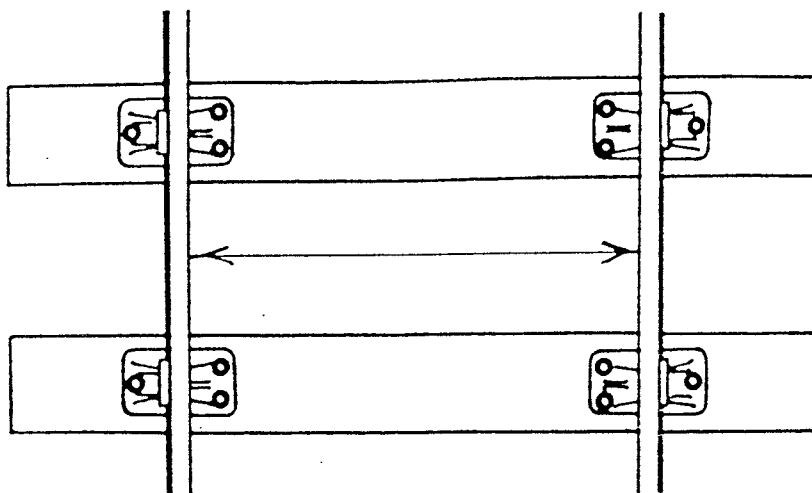
As you can see the higher the turnout speed the longer the switch and consequently the more acute the crossing angle becomes to allow safe diversion of traffic.

The Civil Engineer sometimes combines two different types of angle of crossing on the same drawing an example of which is shown on Figure 2. :

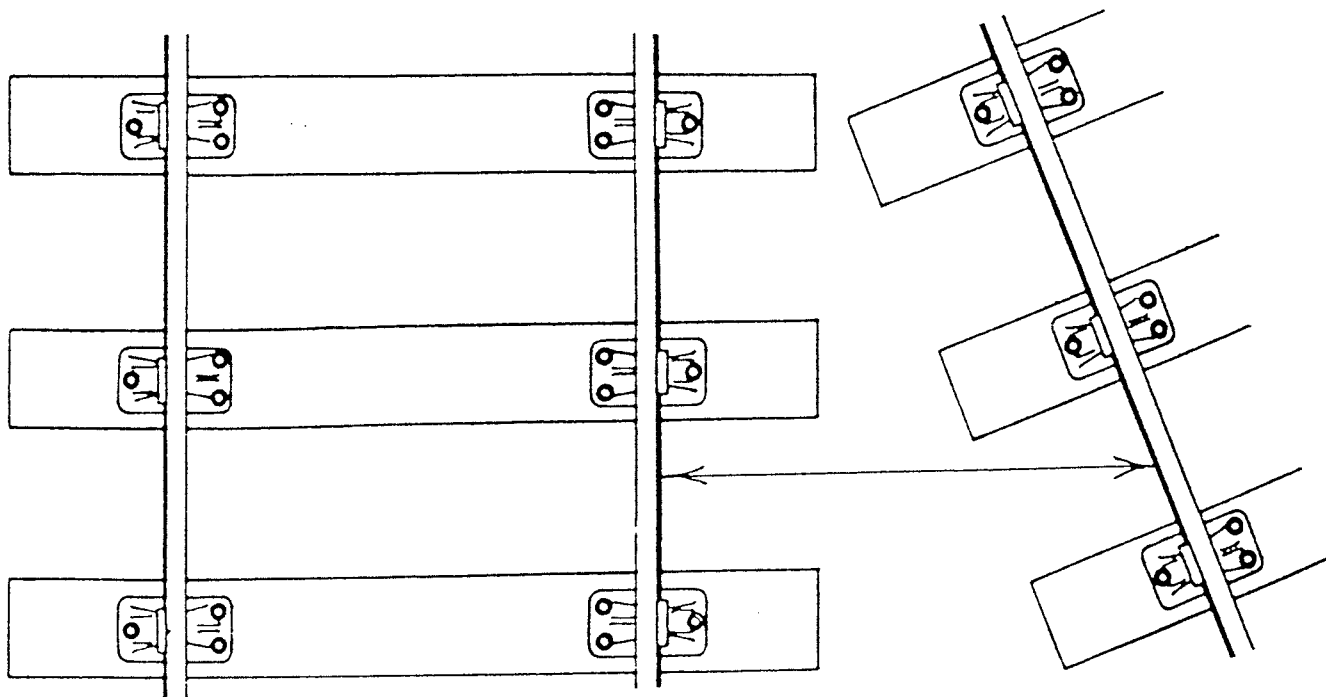
BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS

Important:-

The Civil Engineer when designing the 1:100 or 1:200 scale plans **always** draws the railway lines as an “inside rail” measurement.



When the Signal Engineer states a 6'-0" (1.83 m) fouling point this measurement is an “outside rail” measurement.

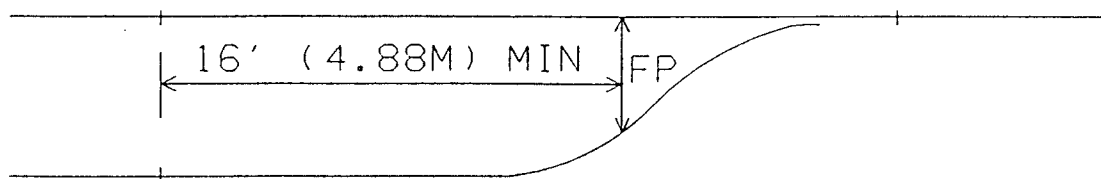


Therefore on Civil Engineers plans when marking up fouling points **always** take into account the rail width of 3" (76 mm) for each rail and therefore the fouling point would have to be shown at 6'-6" (1.98 m) on these plans.

continued

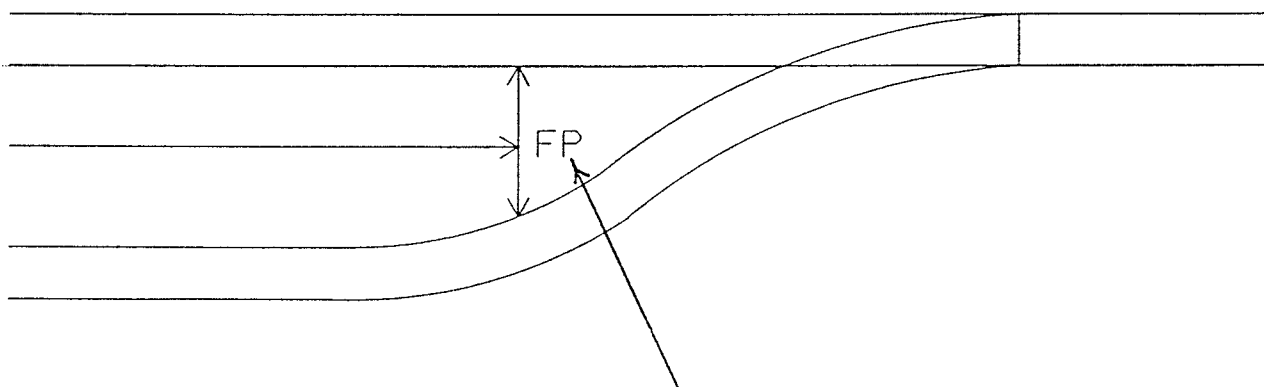
BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS

Fouling point as depicted on the signalling scheme plan.



FP = 6'-0" (1.83 m) measured from the outside edges of the rails on site.

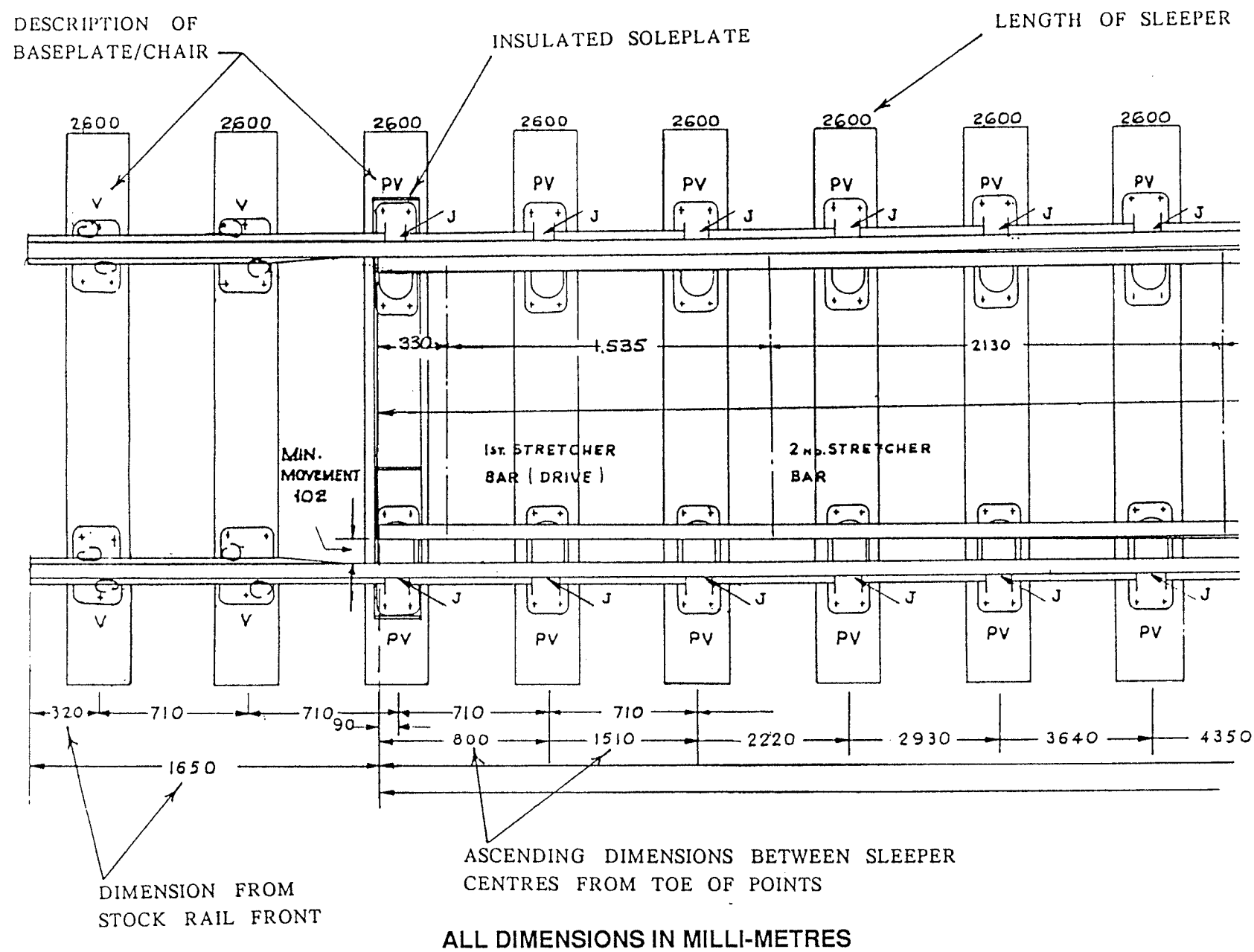
Fouling point as to be marked on the Civil Engineers plan.



Measure the FP at 6'-6" (1.98 m) on the Civil Engineers plan to cater for the difference between the inside/outside rail measurements.

Figure 5 shows the various notes you may have to consider or endorse onto the Civil Engineers plan to enable the CE to carry out the S & T Departments requirements accurately.

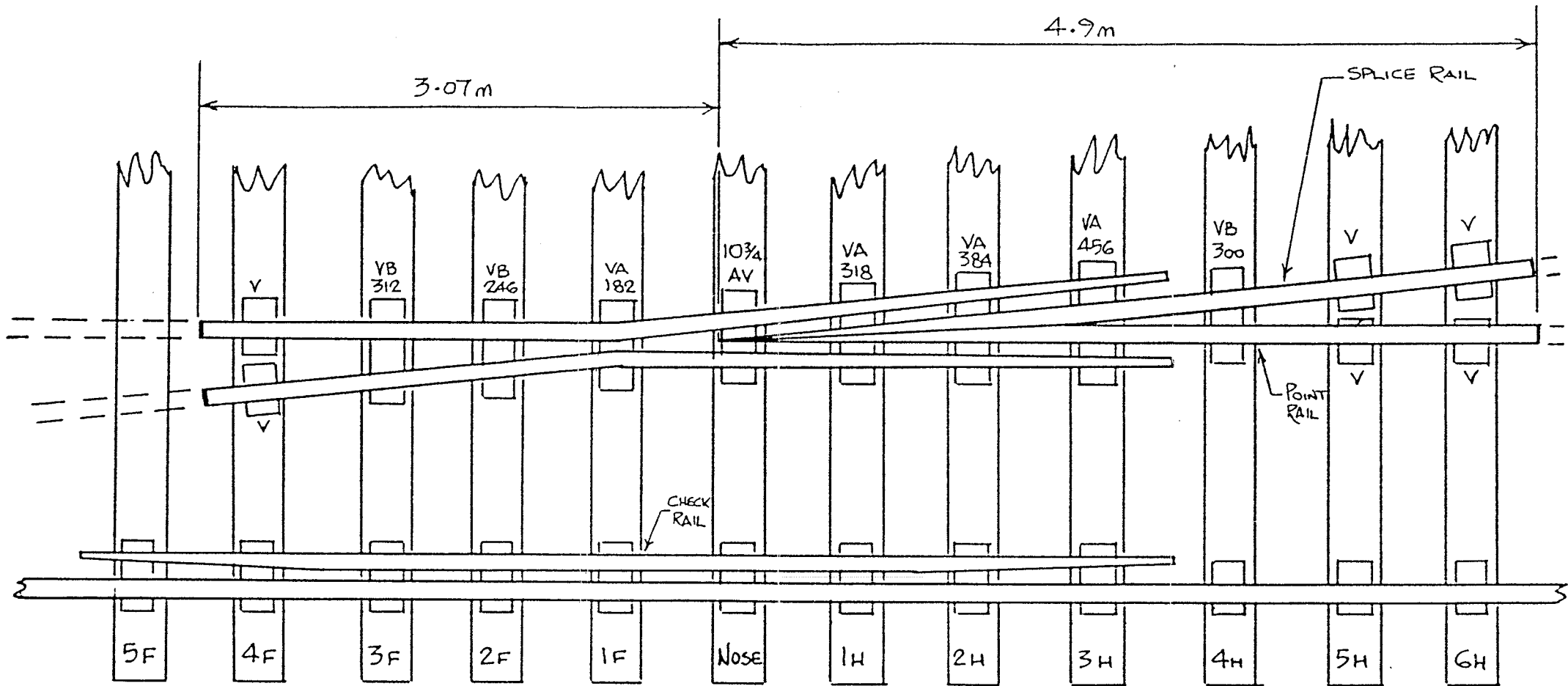
BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS



continued

BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS

BS 113A VERTICAL COMMON CROSSINGS
1 in 10 3/4 (illustrated) & 1 in 10



CROSSING	TIMBERS																						
	5F		4F		3F		2F		1F		NOSE		1H		2H		3H		4H		5H		6H
1 IN 10	V-V	710	V-V	710	VB324	710	VB252	710	VA192	710	10AV	710	VA324	710	VA396	660	VB462	561	VB294	660	VB360	710	V-V
1 IN 10 3/4	V-V	710	V-V	710	VB312	710	VB246	710	VA192	710	10 3/4 AV	710	VA318	710	VA384	750	VA456	766	VB300	750	V-V	710	V-V

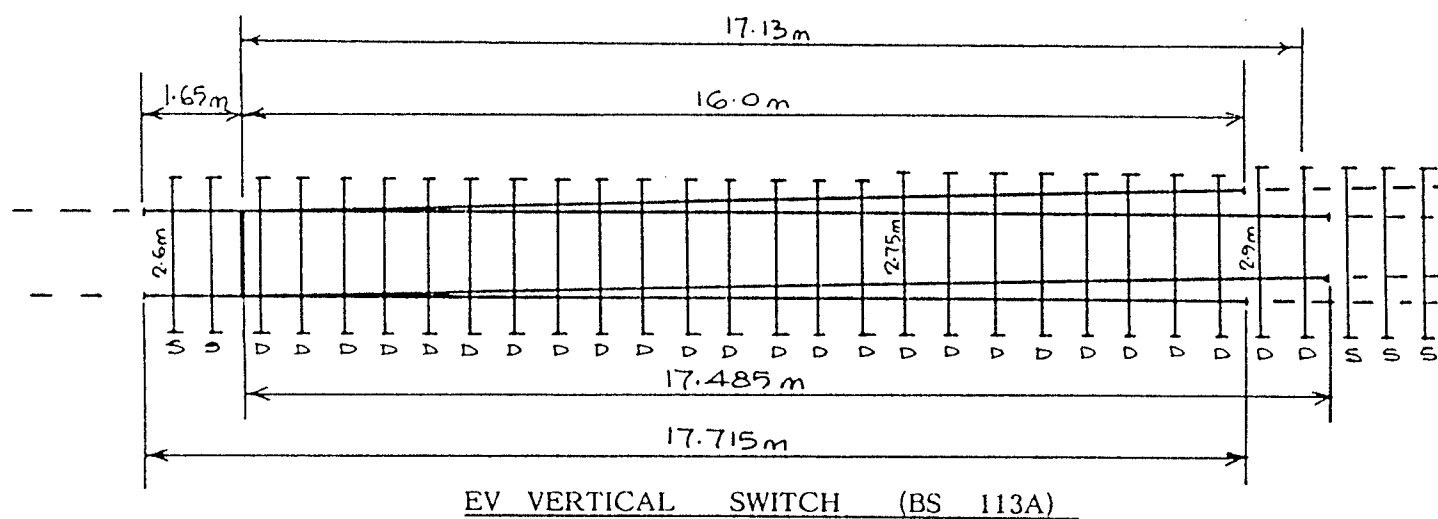
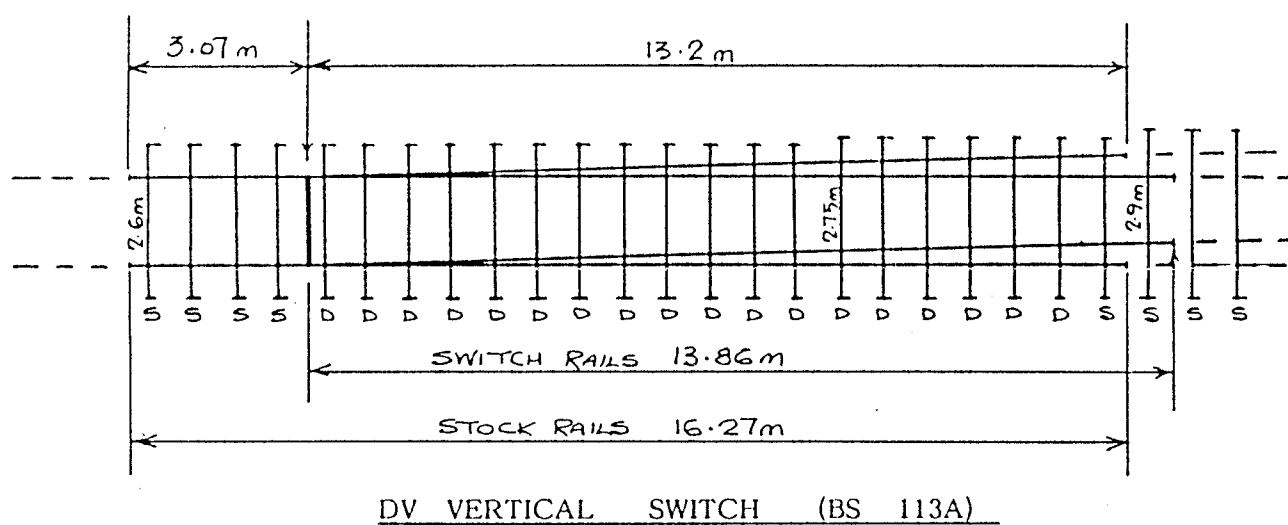
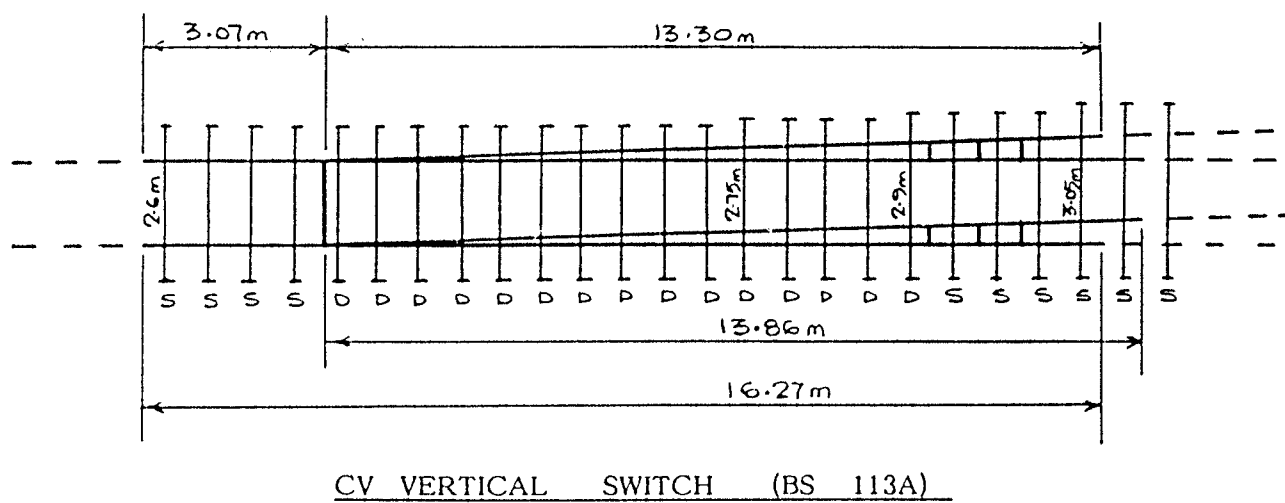
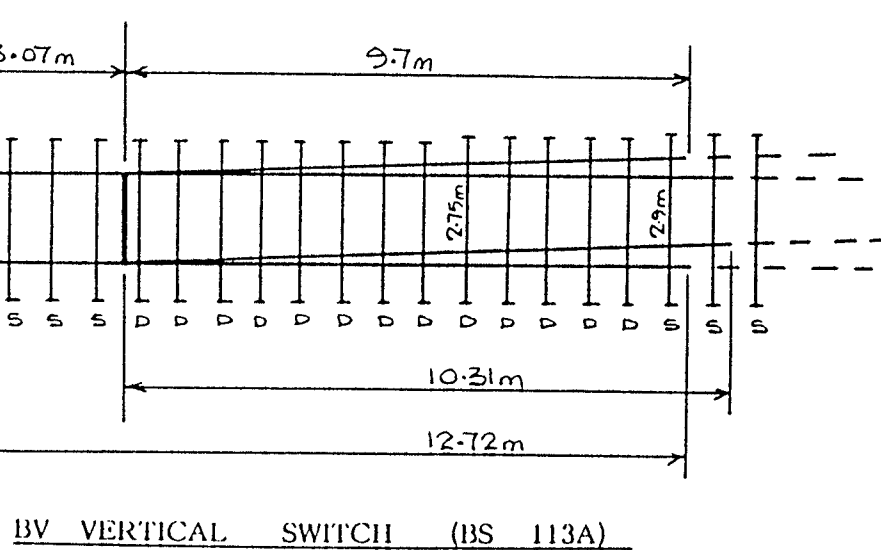
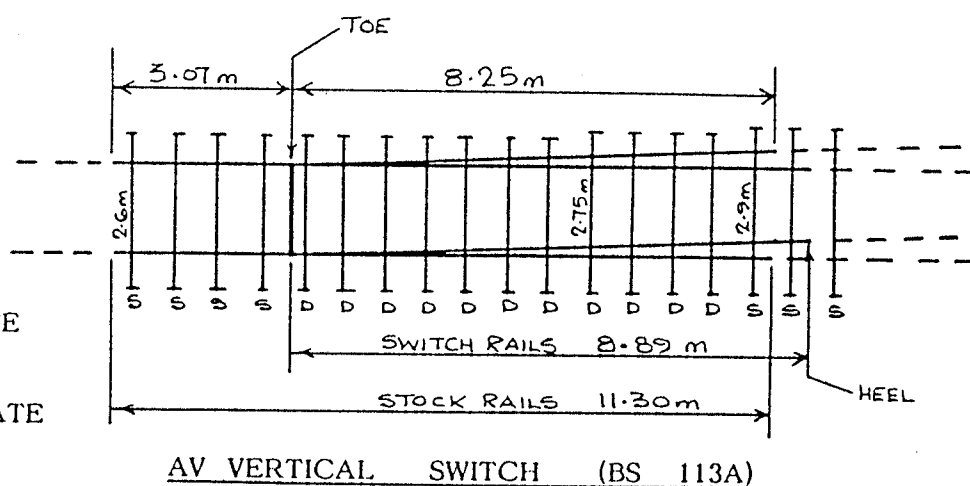
TABLE OF BASEPLATES & TIMBER SPACINGS

RCE DRAWING RE/PW/609 Refers.

NB. As a general rule on all crossings a minimum distance of 362 mm between rail running edges at sleeper centre line is required before single baseplates can be fitted. (If in doubt check with RCE).

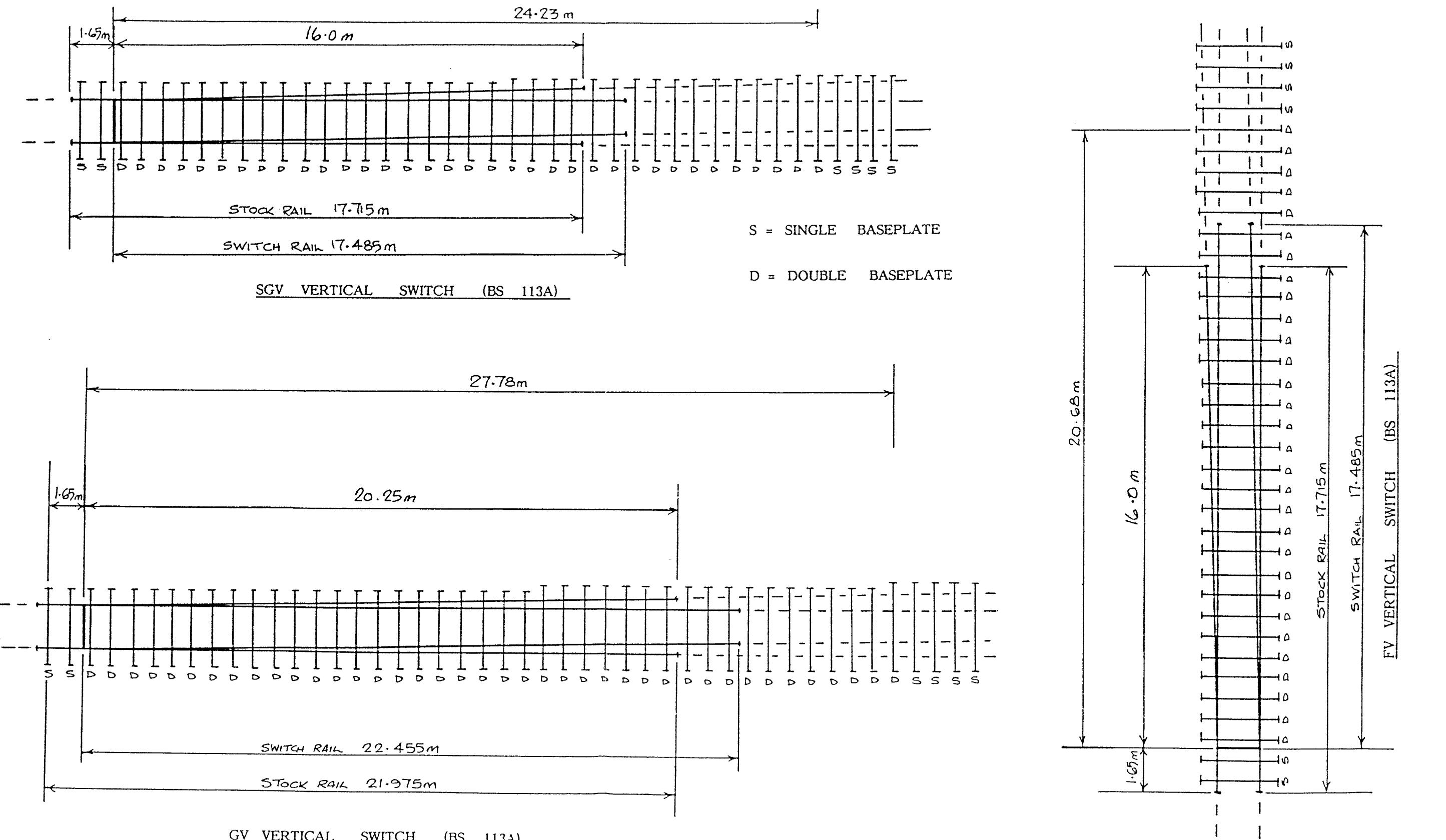
S = SINGLE BASEPLATE

D = DOUBLE BASEPLATE



See RE/PW/600 series for more detail.

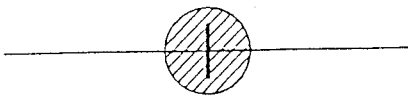
BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS



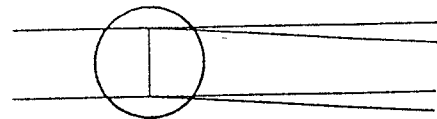
See RE/PW/600 series for more detail.

continued

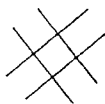
BONDING & THE CIVIL ENGINEERS SCALE DIAGRAMS



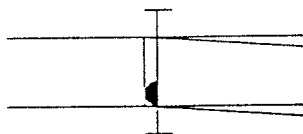
Indicates insulated joint required.



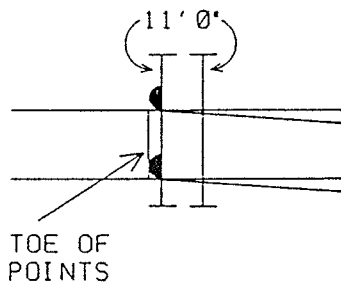
Indicates switch rail, stock rail, soleplate to be pre-drilled for hydraulic clamp locks with multiple drive and soleplates to be insulated in accordance with BRB Drg No BRS-SM 500.
(RCE Drawing RE/PW/55E & RE/PW/277 refers)
If concrete sleepers are used drill in accordance with BRS-SM 622



Indicates drilling of soleplate for mechanical FPL required to MD 82017



Insulated soleplate required (side of insulation to be shown)



Extended timbers/soleplates for fixing of combined type machine, **not clamp locks** [add (1) or (2)]

(1) Soleplates to be pre-drilled to BRS-SM 318

OR

(2) Soleplates to be pre-drilled to BRS-SM 319 (right hand drive) or BRS-SM 320 (left hand drive). For single/double slips.

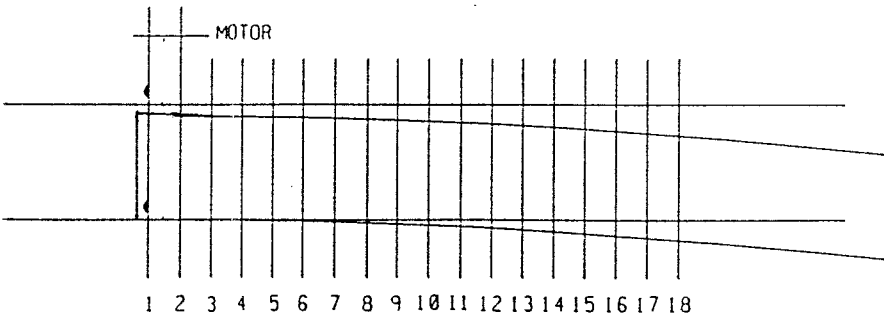
GENERAL INFORMATION

Cast manganese crossings to be provided with soft spots in accordance with the RCE's standard arrangement and be pre-drilled for track circuit bonding.

Extended timbers for 2nd & 3rd drives ("C" switches and above) are not required unless in DC 3rd rail territory (see Drg BRS-SM 350), this refers to clamp locks only.

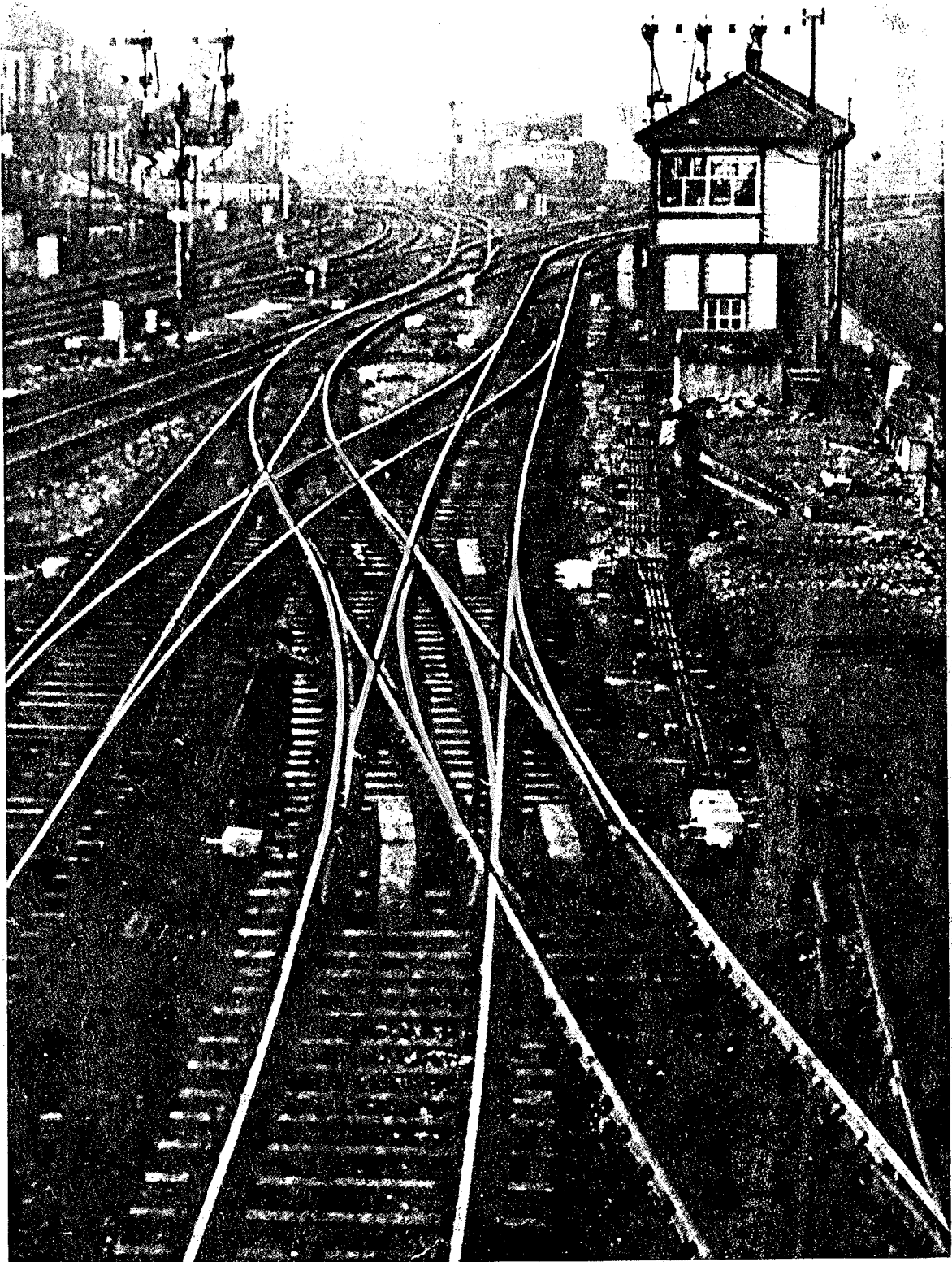
Supplementary detection to be fitted at the centre drive position on switch types FV and above with more than two drives. See Drg BRS-SM 350/3.

Combined Point Machine Extended Sleeper Arrangements:-



SLEEPERS 1 & 2 EXTENDED TO 11' FOR POINT MOTOR.

TYPE OF SWITCH	SLEEPERS TO BE EXTENDED 6" ON SIDE OPPOSITE TO MOTOR FOR 2nd & 3rd DRIVE CRANKS.
AV (F. B. VERTICAL).	-
BV (F. B. VERTICAL).	-
CV (F. B. VERTICAL).	7
OV (F. B. VERTICAL).	8
EV (F. B. VERTICAL).	11
FV (F. B. VERTICAL).	7 & 13
SGV (F. B. VERTICAL).	9 & 15
GV (F. B. VERTICAL).	10 & 17

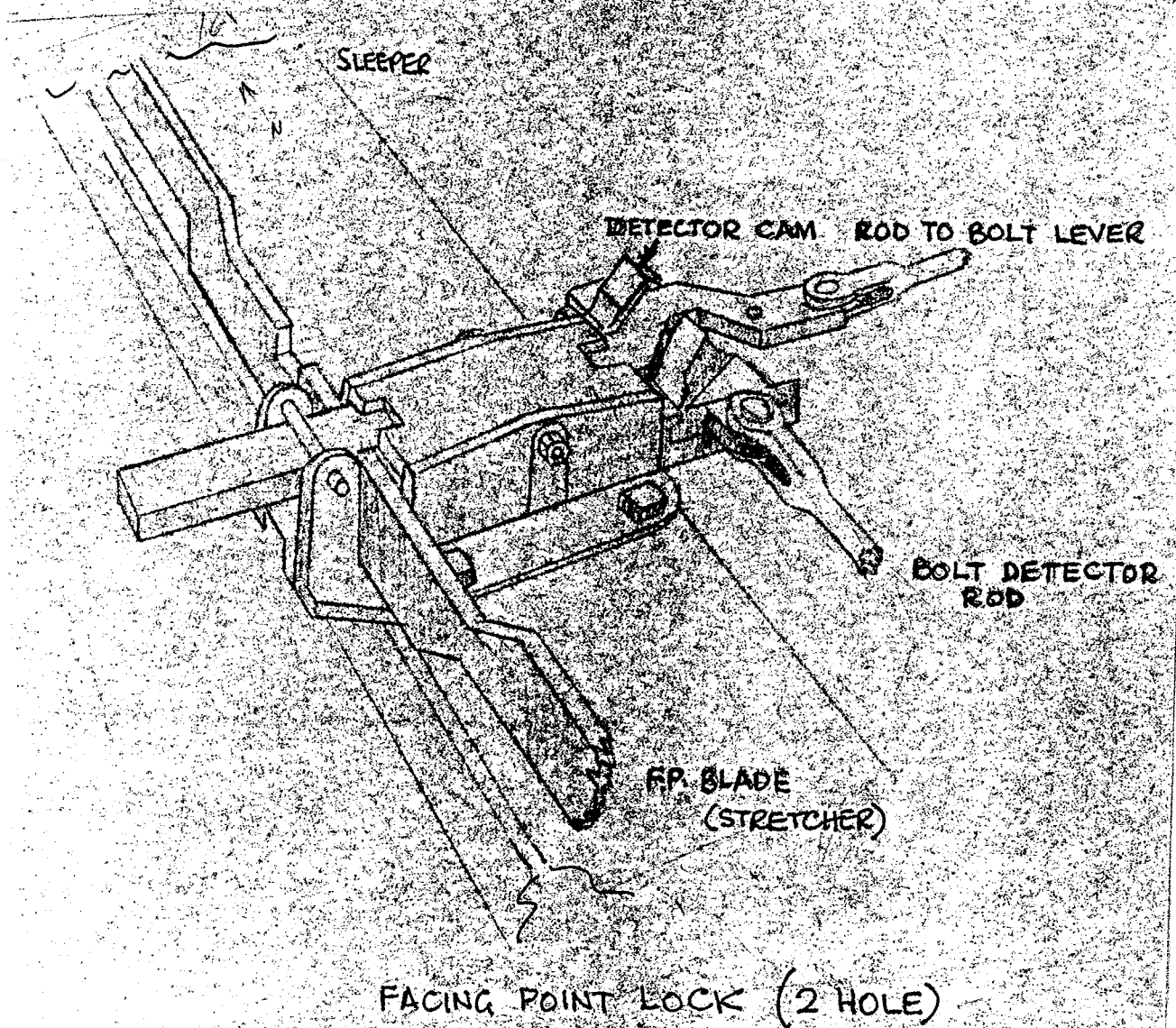


FIXED DIAMOND & DOUBLE SLIPS

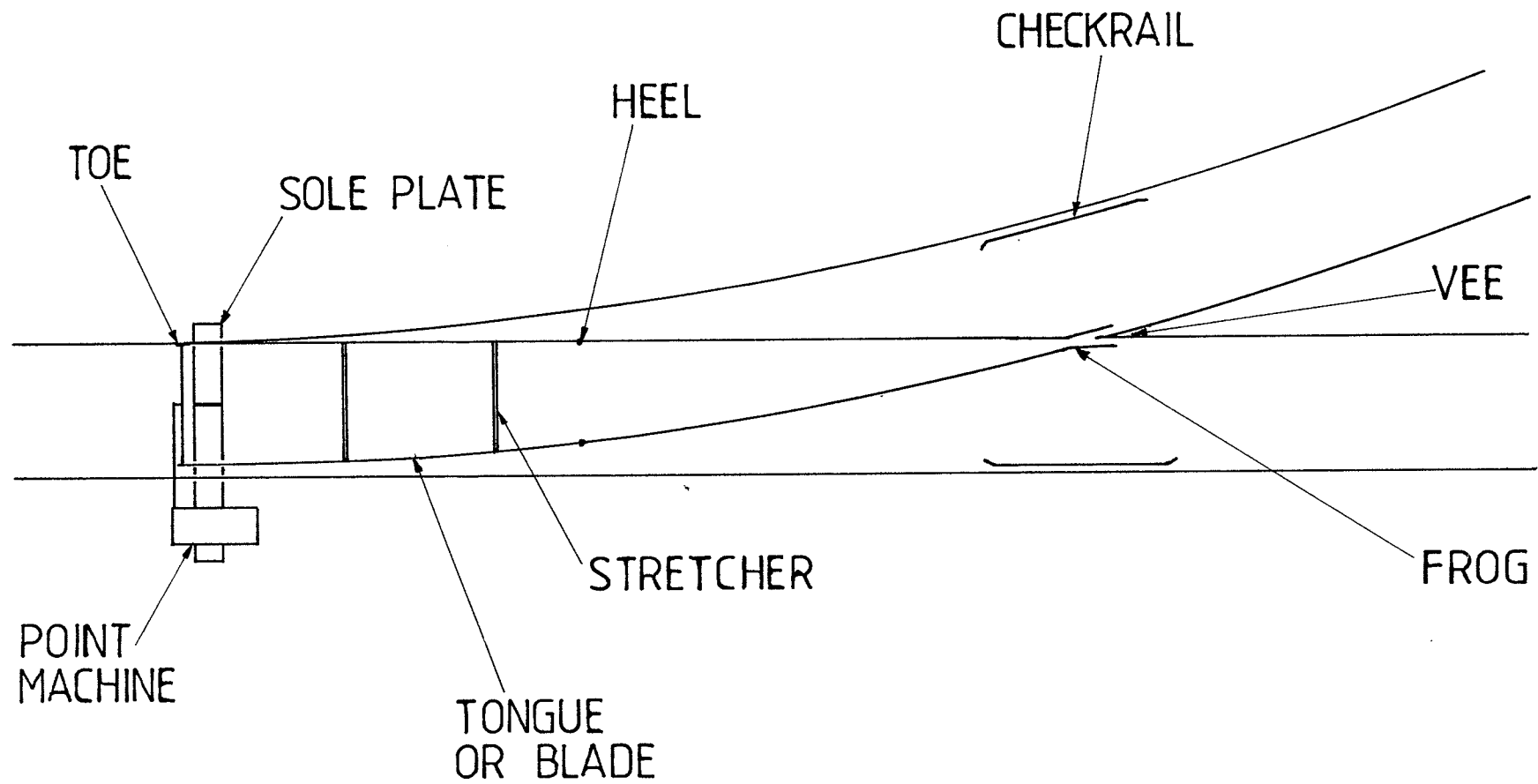


TYPICAL CLAMPLOCK OPERATED FACING POINT

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ONLY



POINTS TERMS



1/2

1/4

Page 1
CAM

1



DN CAERPHILLY
UP CAERPHILLY

2100
1100

DOWN LLANDAFF
UP LLANDAFF

2100
1100

(22.4)

15.1

13.7

11.1

12.6

No.3
3403

4.4

2.9

No.2
No.1

3.0

79.3

16.9

CARDIFF
QUEEN STREET

1m.08.4c.

QUEEN STREET NORTH JN
1m.16.9c. = 1m.22.4c.

CAR(1m.22.4c.) mileage
formerly from East Dock

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TYPICAL ENGINEERS'
LINE DIAGRAM