

B.R.33003/264
August 1969

BRITISH RAILWAYS



DIESEL MULTIPLE UNIT TRAINS
WITH 'RED TRIANGLE' COUPLING
CODE AND TORQUE CONVERTER
TRANSMISSION

PART 3
FAULT FINDING
DATA AND CHARTS

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NOTES FOR THE GUIDANCE OF DRIVERS WHEN A FAULT OCCURS

1. If a D.M.U. train shows only a slight reduction in power no immediate action is necessary. A check on the equipment should be made at the next stopping point. If no obvious defects can be seen the journey may be completed.
2. If a severe reduction in power occurs an investigation should be made within five minutes, at the most convenient stopping point. An immediate stop must be made if there is excessive noise or smoke emitted from any equipment or if the fire alarm bells ring. (See the chart applicable to fire protection.)
3. A shortage of power may be accompanied by an engine indicator light becoming extinguished.

GREAT CARE MUST BE TAKEN TO ENSURE THAT NO SIGNAL ASPECTS OR LINESIDE WARNING BOARDS ETC. ARE MISSED WHENEVER INSTRUMENTS OR DRIVING COMPARTMENT INDICATORS ARE BEING CHECKED.

4. If a complete loss of power occurs an attempt must be made to coast and bring the train to a stand under the protection of the next fixed stop signal.

When a train has been brought to a stand as a result of an equipment defect and the necessary Rules have been carried out, refer to the chart with a heading applicable to the indication or defect.

This will show the various possible causes of the trouble and indicate the action to be taken. In some instances the possibilities may be numerous and the simpler defects should be checked before the more difficult ones. When a cause for a defect can be definitely established and it is known that it can be corrected, inform the nearest signalman, station official or the Traffic Control, stating how long it will be before the trouble may be overcome. When the defect has had attention, start the engines and make a test to ensure that traction power may be obtained and that all systems function.

The train may then be worked forward.

If any doubt exists as to the possibility of overcoming the fault, assistance must be requested immediately. If the train can only work forward on reduced power, the nearest signalman, station official or the Traffic Control must be advised of the circumstances.

5. At the end of the turn of duty, or before this time when applicable, the defects must be reported and all necessary repairs must be entered in the Repair Book of the defective vehicle. This will greatly assist the maintenance staff at the depot in which the repairs are carried out.
6. The following chart indicates the readings given by all instruments and indicates the action to be taken if incorrect readings are given when the engines are running.

Instrument	Reading with engines running at least 10 minutes		Action to be taken
	Train standing	Train moving	
Main reservoir air pressure gauge	90-105 p.s.i.	90-105 p.s.i.	Report any variations below the minimum or above the maximum
Vacuum brake pipe gauge	0-21" Hg	21" Hg	Report any variation from 21" Hg with the brakes released
Vacuum release pipe gauge	0-30" Hg	28-30" Hg	Report any instances where less than 27" Hg is obtained when running. Report all instances where vacuum is seriously reduced when releasing the brakes
Speedometer	0	0-70 m.p.h.	Report any defects

7. Effect of fuses rupturing in a D.M.U. power car

Various fuses are fitted in the electrical circuits of D.M.U. trains.

Two fuses are fitted which can bring a train to a stand in the event of rupture. These are:-

Control circuit fuse—No. 6.

Local control fuse—No. 7.

8. Effect of a No. 6 fuse rupturing

- The control circuit light and the air and axle lights will be extinguished.
- The brakes will be applied by the Driver's Safety Device.
- The engines will return to idling speed.
- The engines will not stop when the stop button is pressed in the driving compartment.
- The torque converters will revert to neutral.

Action to be taken if the fuse cannot be changed:-

- Apply the handbrake.
- Remove the control circuit switch key and place the reversing handle in NEUTRAL.
- Check the train for obvious defects such as overheated electrical equipment or smoke.
- If no defects are visible from normal observation, insert the control circuit switch key in another driving position and close the switch, noting that the control circuit light becomes illuminated.
- Return to the leading driving compartment, select a direction by the reversing handle, release the handbrake and proceed normally after receiving the guard's signal.

IMPORTANT NOTE

It must be remembered that the No. 6 fuse, due to being in the control circuit, may become ruptured due to a fault in the control

system of any power car on the train or even in the train lines through a trailer vehicle. If a serious defect of this nature exists, the No. 6 fuse of the car in which the control circuit key is inserted in accordance with the instruction in (iv) above) will rupture. A train with only two power cars would therefore become a complete failure.

If in carrying out the instruction in (iii) above, smoke is seen to be issuing from the leading power car of a four car (MC+T+T+MC) train the instruction in (iv) above should not be carried out and the following should be substituted:-

- (vi) Deal with the fire as necessary and ascertain if it is safe for the train to continue.
- (vii) Isolate the Driver's Safety Device in the defective car.
- (viii) Disconnect the jumper cables between the trailer car and the rear power car of the train and secure them into their sockets.
- (ix) Insert the control circuit switch key, reversing handle, brake handle and A.W.S. key (where necessary) into their positions in the rear driving compartment.
- (x) Check that the brakes are applied by D.S.D. action then release the handbrake in the leading car.
- (xi) Drive the train to the next point where the passengers can be detrained, with the Guard in the leading driving compartment observing the signals and operating the brake valve and horn as necessary. **THE BUZZER AND LOUDPHONE WILL BE INOPERATIVE IN THESE CIRCUMSTANCES AND THE GUARD SHOULD BE CLEARLY INSTRUCTED THAT HAND SIGNALS WILL BE NECESSARY.**

9. Effect of a No. 7 fuse rupturing

- (a) The torque converters will return to NEUTRAL on the affected car.
- (b) The brakes will be applied by the Driver's Safety Device.
- (c) The engines will stop on the affected car.

Action to be taken if the fuse cannot be changed:-

- (i) Apply the handbrake.
- (ii) Check which car has the defective fuse by noting the engine lights that are extinguished.
- (iii) Proceed to the affected car with the final drive isolating fork (where necessary).
- (iv) Turn both the final drive isolating plungers $\frac{1}{4}$ -turn to the ISOLATED position.
- (v) Operate the Forward and Reverse E.P. valve test buttons alternately, pausing 5 seconds between each operation, until the final drives have locked into NEUTRAL. Check by turning the cardan shafts.

NOTE: Final drive units with manual isolating handles may be isolated without operating the E.P. valves. The isolation CANNOT be effected by moving a driving compartment reversing handle between the two directions when a No. 7 fuse ruptures.

- (vi) Isolate the Driver's safety device in the affected car.
- (vii) Return to the leading driving compartment, release the handbrake and after receiving the Guard's hand signal, proceed under reduced power.

NOTE : If the defective fuse is in the leading power car, the control circuit key should be inserted in another power car driving position if the remaining running time is to exceed $\frac{1}{2}$ hour or if any lighting is to be used. This is because the batteries of a car with a defective No. 7 fuse will not be charged.

10. Effect of a lighting fuse rupturing

Failure of the lighting fuses will not normally extinguish all headcode and route indicator lights, but in the event of this happening the instructions in Rule 125 must be carried out.

11. Action to be taken in the event of fire

The following instructions supersede all others in previous driving instructions or in B.R.33003/6 concerning the action to be taken in the event of fire occurring on these particular vehicles.

If the fire bells ring:-

- (i) Note which engines have stopped by checking the indicator panel and bring the train to a stand.
- (ii) Open the control circuit switch **IMMEDIATELY** the train has been brought to a stand.
- (iii) Apply the handbrake and remove the reversing handle.
- (iv) Obtain a hand extinguisher and proceed to the affected car.
- (v) If the fire appears to be beyond the capacity of the automatic extinguishers, arrange for the local Fire Brigade to be called. If the fire is of a limited nature note the affect of the Graviner Automatic Equipment. If this does not completely extinguish the fire press the button marked 'PRESS BUTTON TO OPERATE SECONDARY FIRE EXTINGUISHERS.' Assist the fixed equipment as necessary with the hand extinguishers.
- (vi) Isolate both engines on the fire control boxes by placing the double pole switches into their OFF positions. Check that the bells are silenced and that the red lights are extinguished. If the bells continue to ring and the red lights remain illuminated after the double pole switches have been placed into their OFF positions, at least one of the re-setting thermostats is sufficiently hot to keep its contacts closed. Check that no remains of the fire are causing this.
- (vii) Isolate the final drive gearboxes. If these cannot be isolated for any reason the train must not be moved at more than 10 m.p.h.
- (viii) Thoroughly examine the equipment to ascertain if it is safe to proceed and if so, drive the train under reduced power (i.e. with the engines isolated on the damaged car) in accordance with instructions from the Traffic Control.

NOTES : A severe fire on a DMU car may cause insulation damage to control wiring. This may result in equipment becoming inoperative and may also cause the control (No. 6) fuse to rupture before the train comes

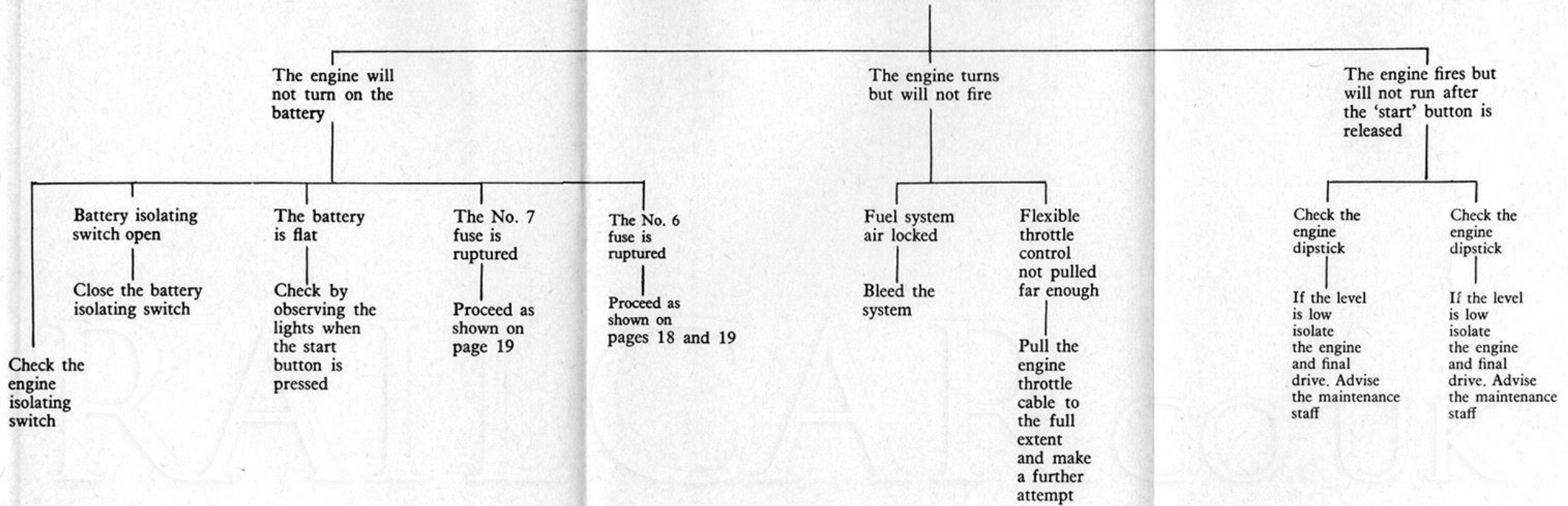
to a stand. It is therefore VERY IMPORTANT to open the control circuit switch immediately the train comes to a stand and leave it open until the jumper cables of the defective car are disconnected. See page 24.

If the automatic fire extinguishing equipment has operated, avoid breathing the discharge.

Drivers should thoroughly acquaint themselves with the operation of all fire extinguishing equipment and request information if in doubt about its operation.

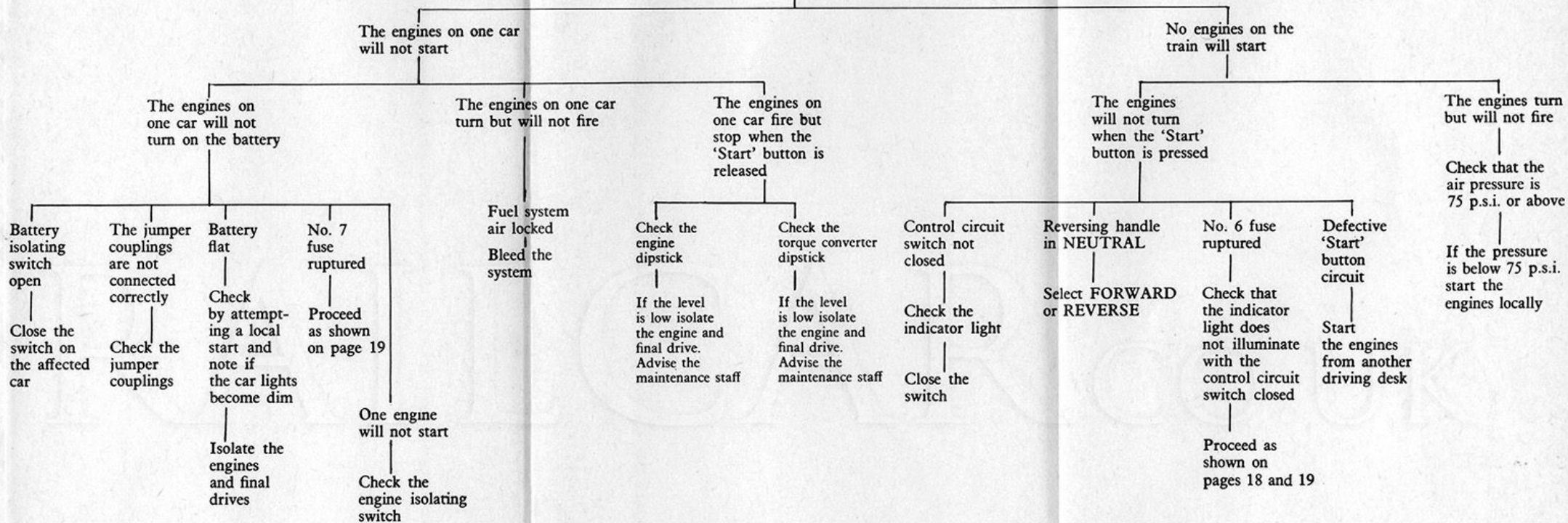
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**SIDE STARTING NO AIR PRESSURE
THE ENGINE WILL NOT START**



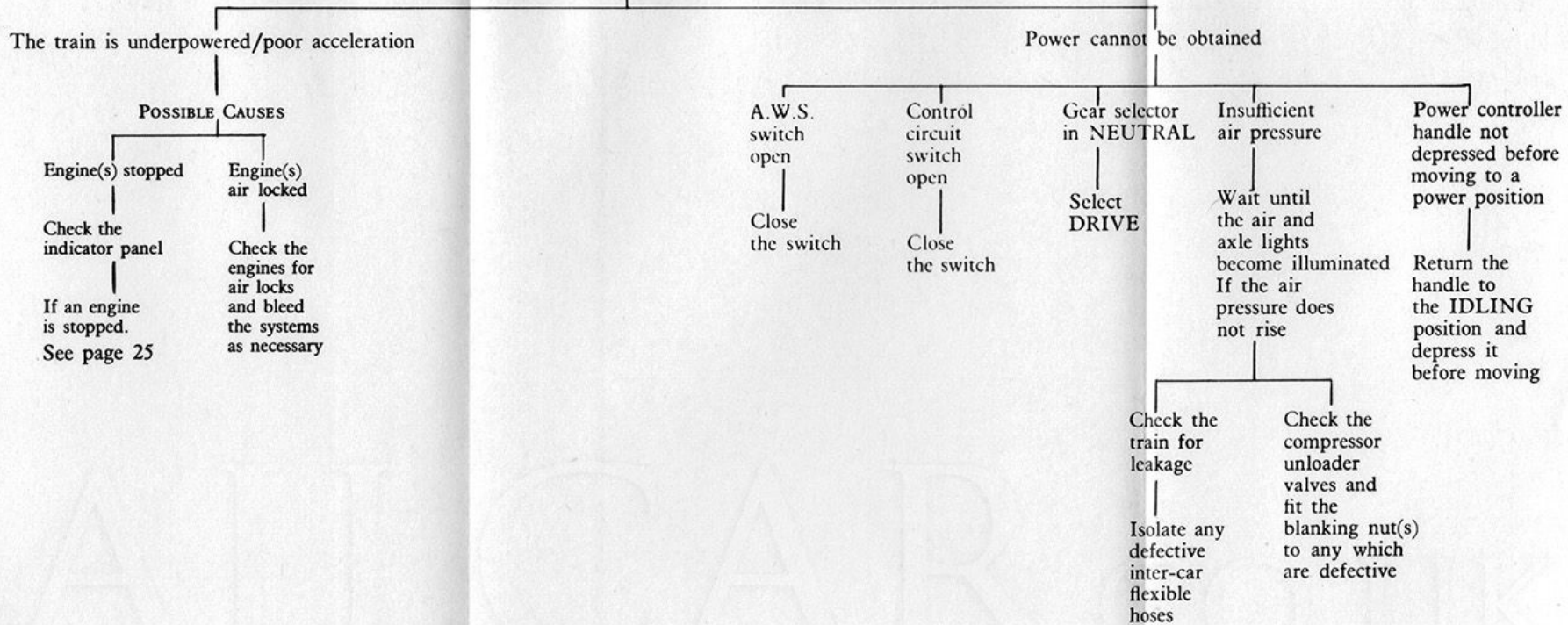
ALL DEFECTS MUST BE REPORTED

**CAB STARTING, 75 P.S.I. AIR PRESSURE OR ABOVE
THE ENGINES WILL NOT START**



ALL DEFECTS MUST BE REPORTED

POWER DEFECTS



ALL DEFECTS MUST BE REPORTED

AN ENGINE STOPS DURING SERVICE

PROBABLE CAUSE

No. 7 fuse ruptured

Proceed as shown on page 19

Fire (Firebells ringing)

Bring the train to a stand in accordance with Rule 188, and **IMMEDIATELY** open the control circuit switch

Apply the handbrake

Obtain a suitable hand extinguisher and proceed to the outbreak

Stop the other engine of the affected vehicle

Proceed as shown under "Action to be taken in the event of fire," page 20

Low engine coolant

Top up the coolant level or isolate the engine(s) and final drive(s) if no water is available

Low engine lubricant level

Check the dipstick

Request assistance from maintenance staff or isolate the engine and final drive

Low fuel level

Check the gauges

If no fuel is available isolate the engine(s) and final drive(s) of the affected car. Check the remaining fuel gauges on the train before continuing

Low lubricating oil level in the torque converter

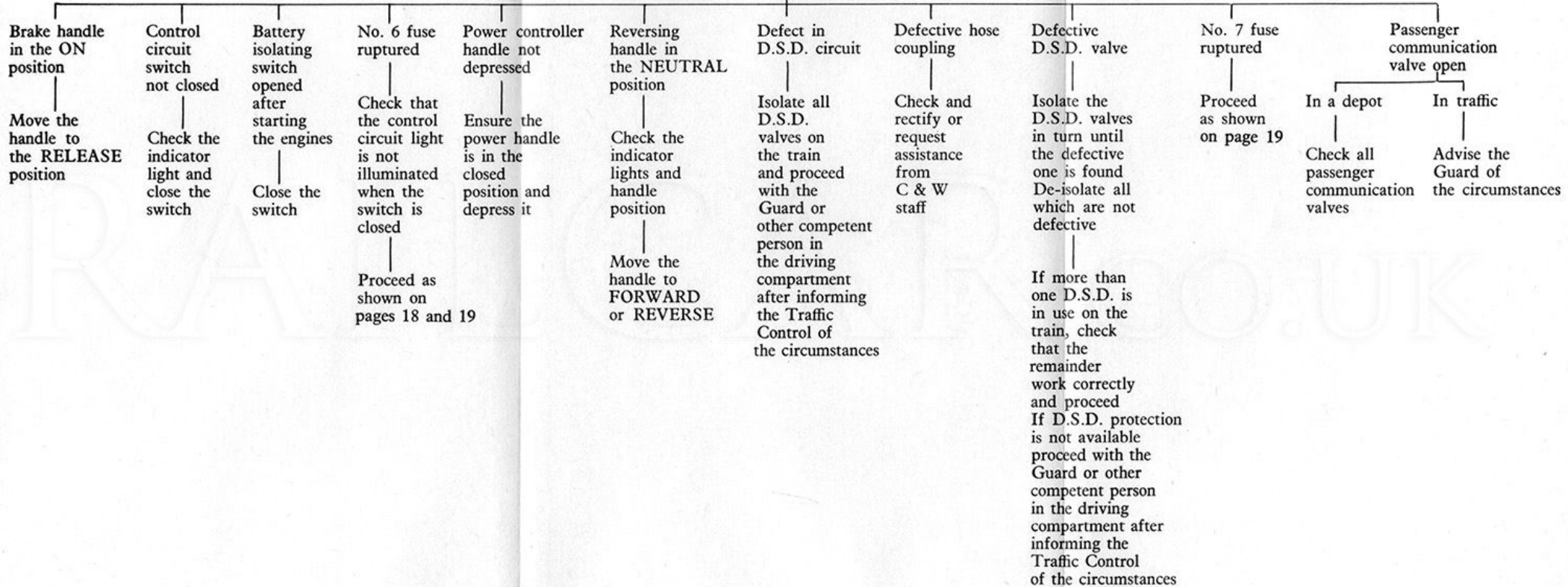
Check the dipstick

Request assistance from the maintenance staff or isolate the engine and final drive

NOTE: It is very important that the control circuit switch should be opened **IMMEDIATELY** a train is brought to a stand in the event of fire. This will reduce the risk of the No. 6 Fuse becoming ruptured due to wiring damage caused by the fire. It should then be possible to move the remainder of the train from the original driving position, if the leading car is not the affected one (see **NOTE** page 19) after the damaged portion has been uncoupled (Rule 188). If a D.S.D. application occurs after the firebells ring the cause may be a ruptured No. 6 fuse on the leading car or a No. 7 fuse on the car which is on fire. This should be checked by the indicator light on the desk

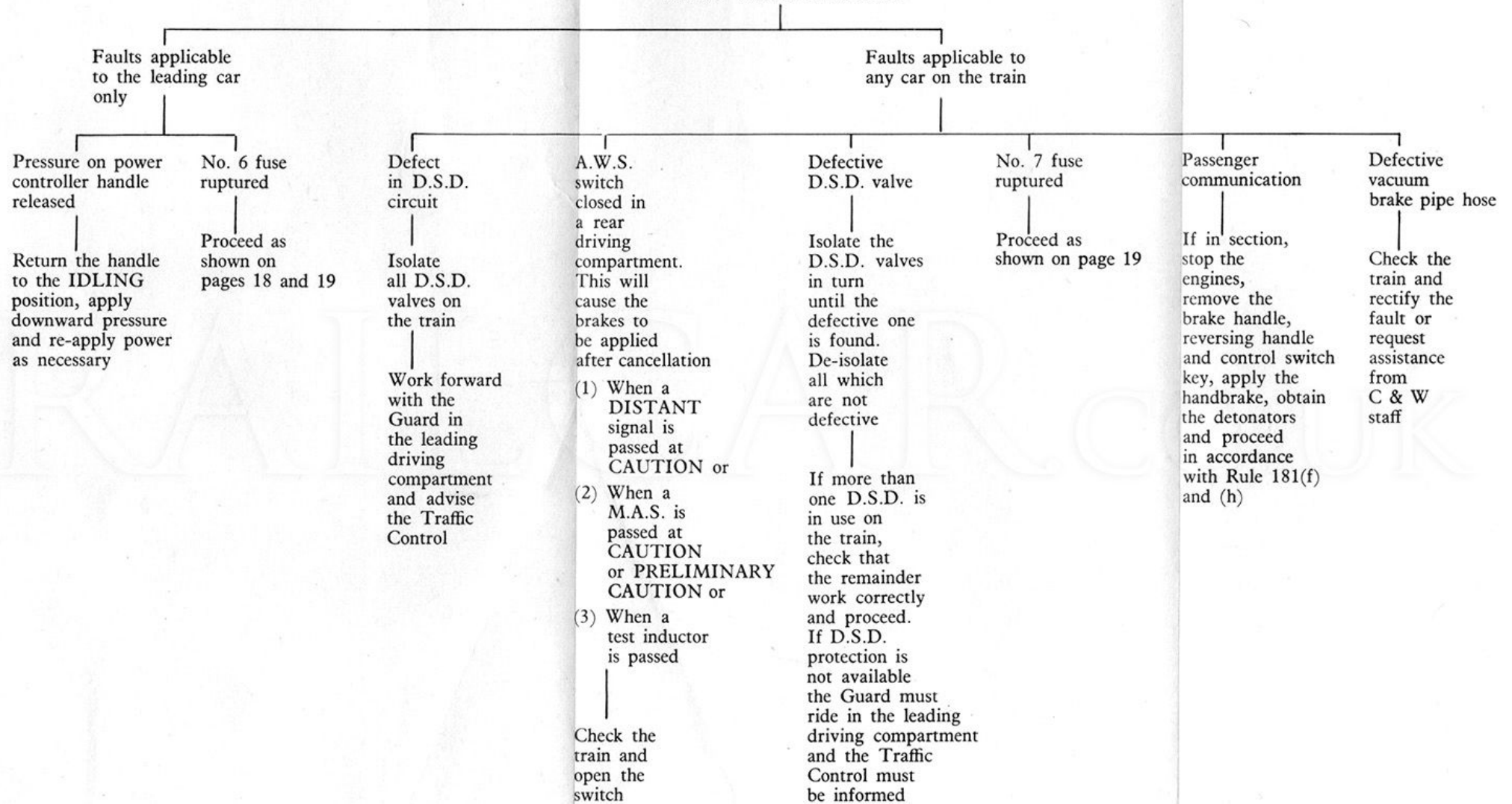
ALL DEFECTS MUST BE REPORTED

**THE BRAKES CANNOT BE RELEASED
WITH THE ENGINES RUNNING**



ALL DEFECTS MUST BE REPORTED

**THE BRAKES ARE APPLIED ON THE
TRAIN WHEN RUNNING**



ALL DEFECTS MUST BE REPORTED