

Part 6 Paving

(including hand laying)

Information you need BEFORE the job starts.....

The contractor's method statement for the scheme

The laying plant to be used and the asphalt plant which will supply to the job

Bond coat type – should be a polymer modified emulsion

Name of man in charge (*foreman/supervisor you talk to especially if things are not done properly*)

Delivery and rolling temperatures if a modified bitumen mix is to be used, *otherwise the BS594987 temperatures.*

Start and finish times for the Traffic Management. Check all diversion signs and TM is in place and OK

Check dips written on surface meet thickness requirements

Ironwork lifted in good time so concrete is set

Laying records to check

Rate of spray of bond coats (used for all layers) and correct product

Correct material being supplied

Delivery times and temperatures

Identify delay times and location of paver stoppages.

Wind speed, surface and air temperatures (in winter) c.f SHW
CI 945

Density checks with calibrated gauge and coring base and if possible binder course

Texture depth and rolling straight edge (if in the spec)

How much material has been cut off

Painting of kerb faces, ironwork and joints

NB

Make sure all prepping has been completed

BEFORE paving starts, not whilst it is in progress or after!

*(ie setting manhole frames,
gully frames, valve boxes etc)*

Pavers

Tracked pavers give the best riding quality but are not widely used in the UK



Older, 4-wheeled paver, showing main parts very clearly (*These produce more even surfaces than 2 wheeled pavers but very few are still being used.*)



Modern paver, 2 large driving wheels but the wheels under the hopper are also driven



Another modern paver with built-in bond-coat tank and integral spray bar



Small paver, note just 2 wheels under the hopper, OK for non-critical jobs such as factory yards but not roads



Paver hopper (*showing the conveyors which feed the asphalt to the screed and the rollers by which the delivery truck is pushed*)



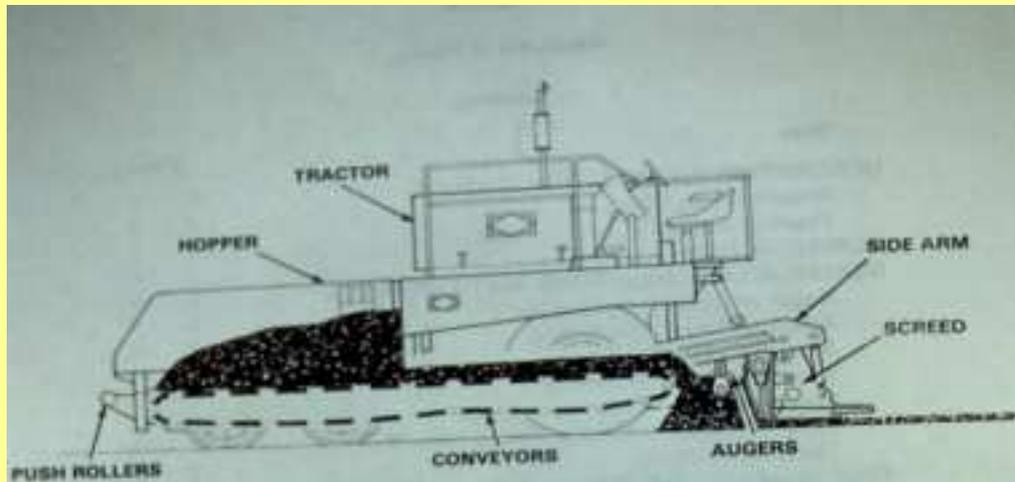


Figure 2 - 1 Material Flow Path - Side View

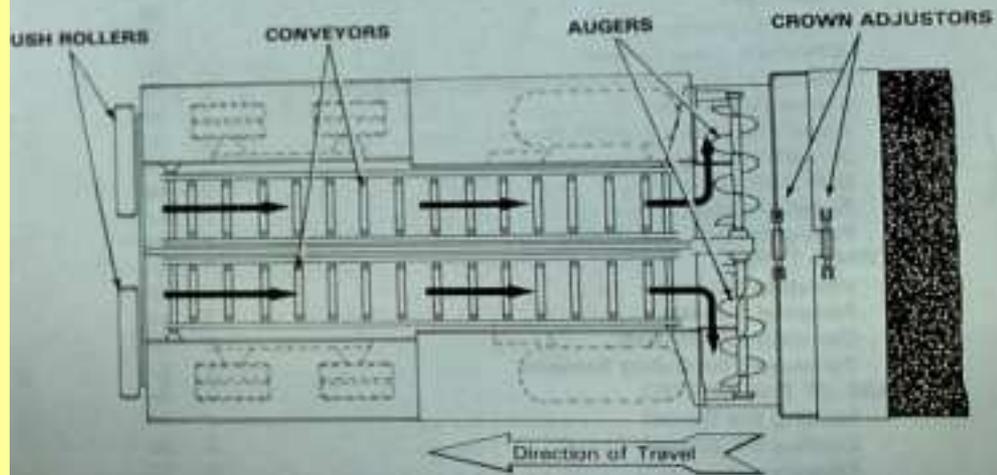


Figure 2 - 2 Material Flow Path - Plan View

Side view of screed (showing auger, tamper, and gas heater exhaust. Many screeds are now electrically heated)



Hydraulically extended screed *(The 2 larger pistons/cylinders are simply to make the screed more rigid when extended)*



An older screed's width being extended (*these are generally more rigid than hydraulically extended screeds*)



Delivery of asphalt to the paver

Ideally, on any but the smallest job, start with 60t, ie 3 trucks, in front of the paver (*The paver is meant to move steadily with no start/stops*)



Truck protects asphalt in paver hopper



Don't let the truck bump into the paver !!!
(*this causes a ridge across the new asphalt mat.*



No prizes for spotting this problem !!



Spot the problem!!

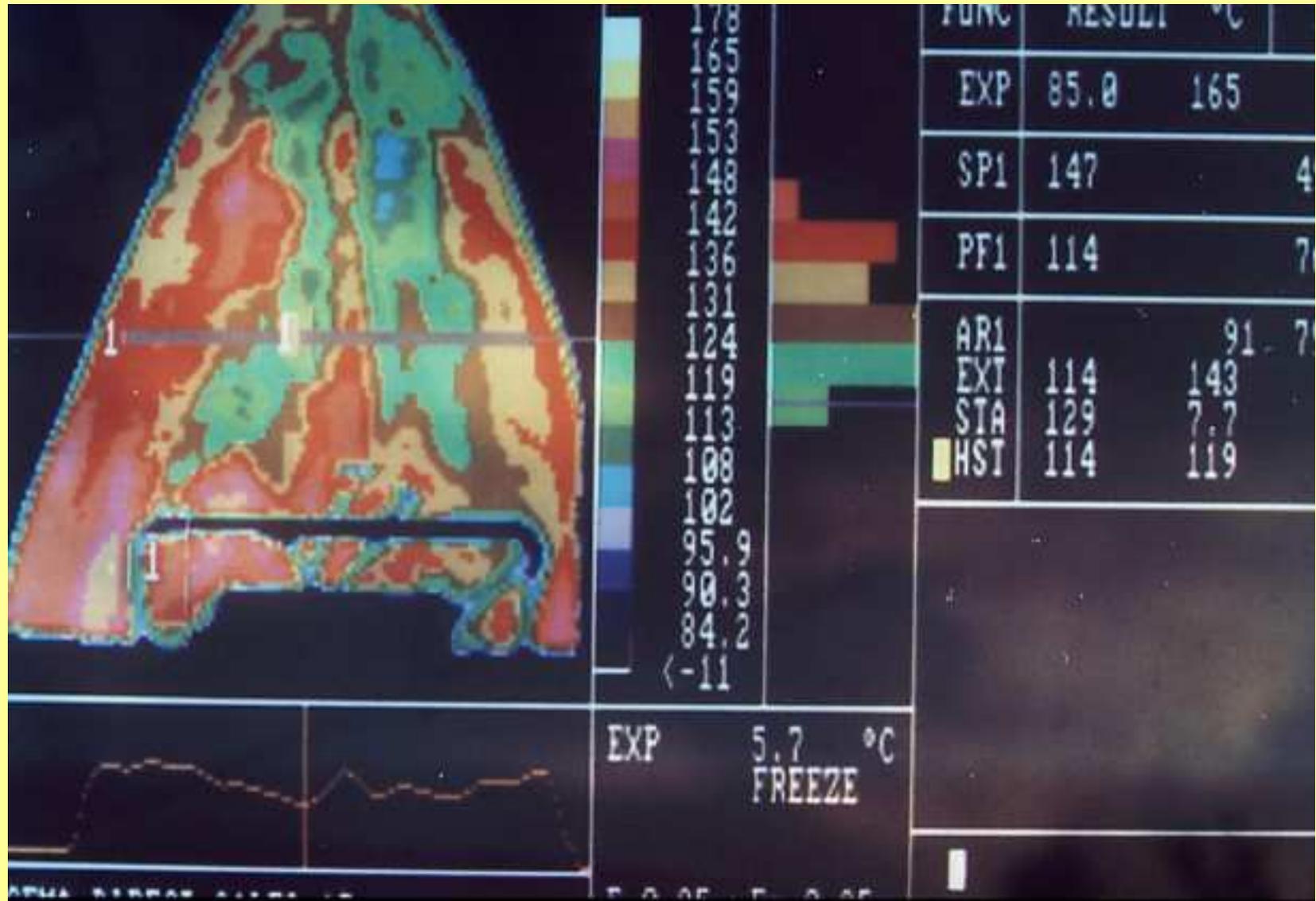
(Note empty delivery truck at bottom of screen)



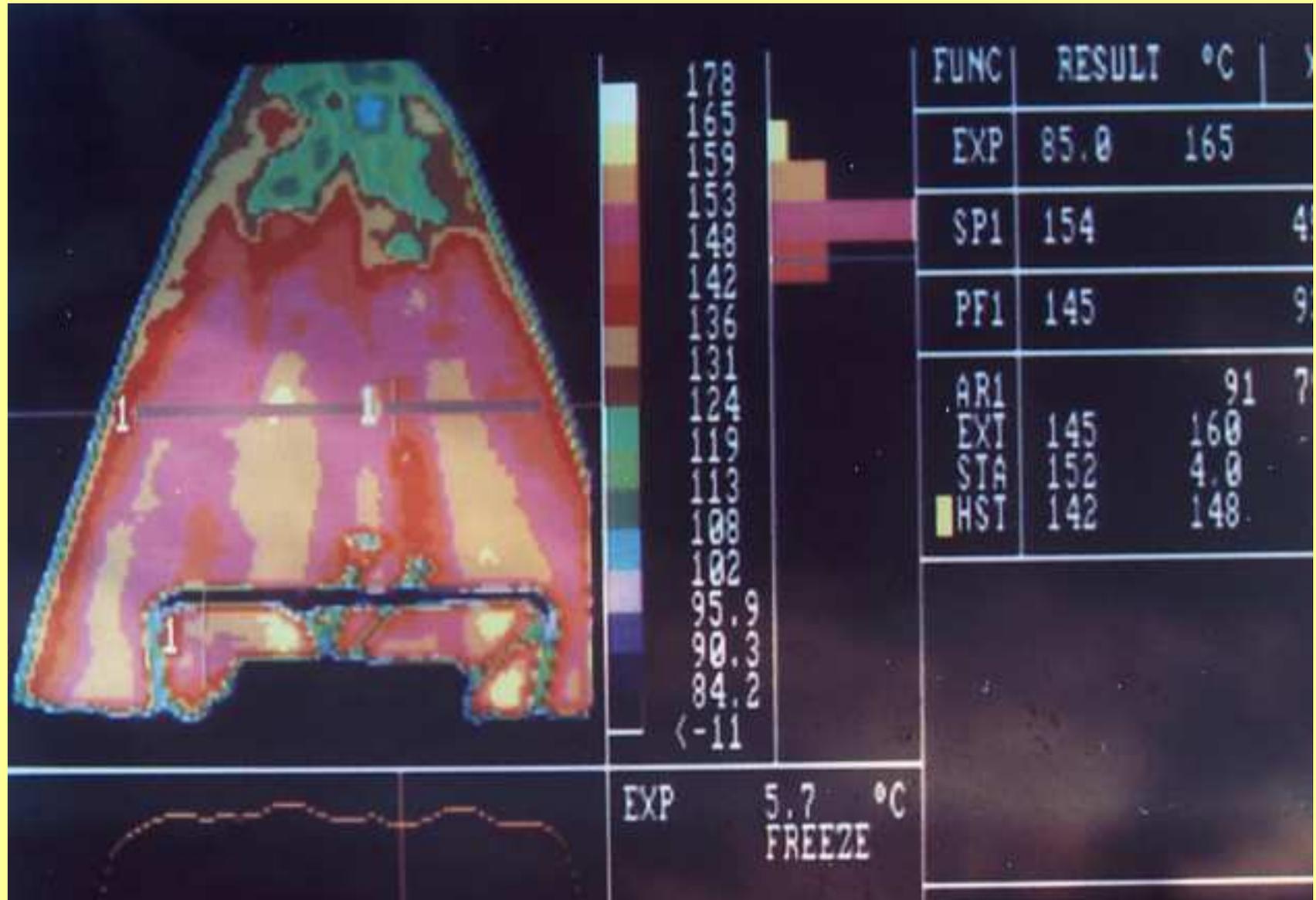
Paver hopper *(showing un-insulated steel sides (or “wings”))*



Thermal image of a “just-laid” mat *(Note cold areas of asphalt from the previous load, from the hopper wings)*



The same mat, 20 metres later



“Insulated” paver hopper, Tarmac
(pity all paver hoppers are not like this)

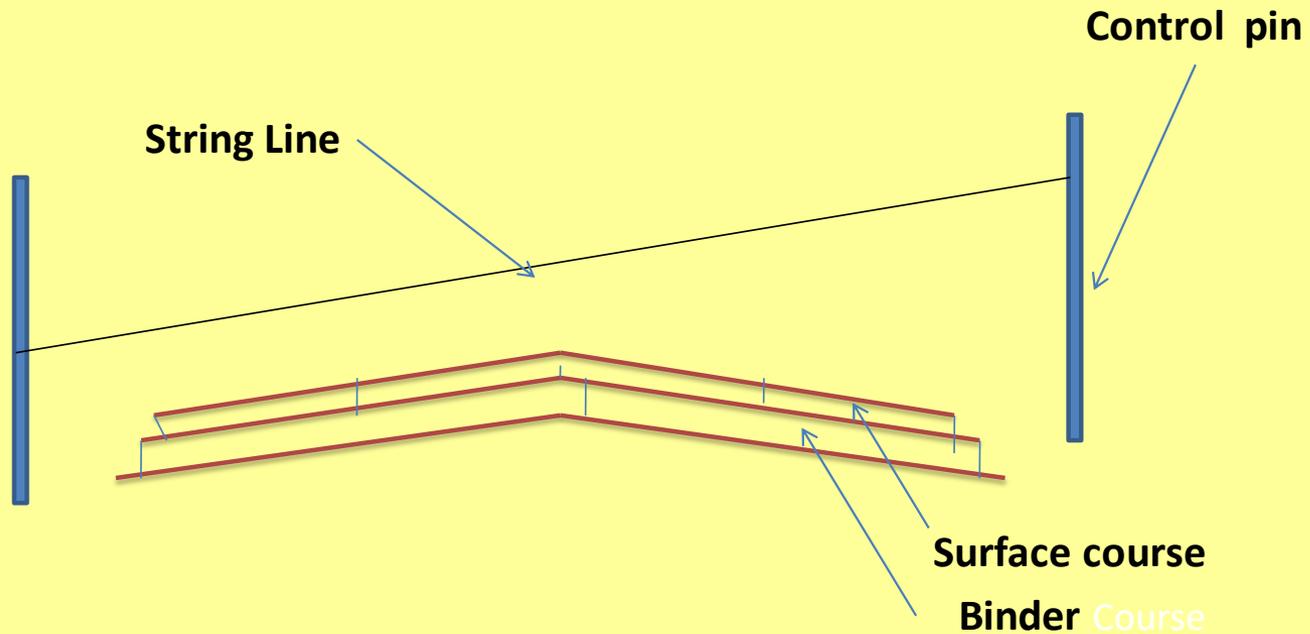


Checking temperature of hot mix (*Today, he would be wearing safety goggles*)



Controlling the thickness of the as-laid
asphalt.

NOTE: The string line must always be parallel to finished road profile



DIPPING TO DETERMINE REQUIRED THICKNESS OF NEXT COURSE

Checking the mat thickness

For inlays.....

Measure new height of kerb face

Generally

Check the dips (*thickness*) sprayed on carriageway

Check the thickness of edges of mat after laying

Take a level on site and check some levelling points

Use a screwdriver pushed through the hot mat and hold against a steel rule to measure thickness of hot mats

NB Remember the permitted tolerances

Main paver inputs influencing level control

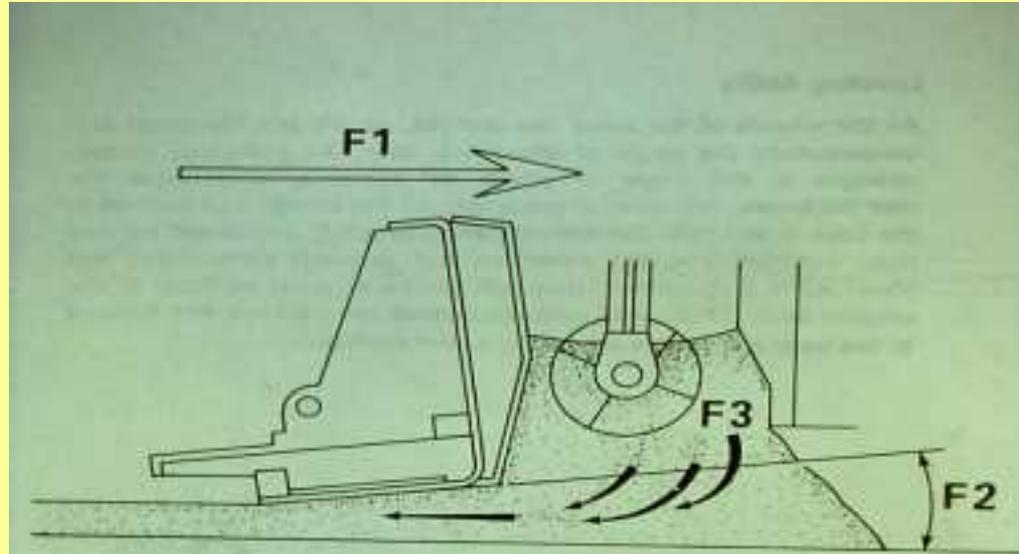


Figure 2 - 15 Factors Affecting Screed Performance

A mat-follower *also* screed control switches (used by the “screwman” to control the thickness/level of the as-laid asphalt. Mat followers are not commonly used)



Averaging beam *(Gives a better riding quality than the paver alone)*



Use of regulating material (*Uneven thickness of surface course will roll down unevenly and result in poor quality ride*)

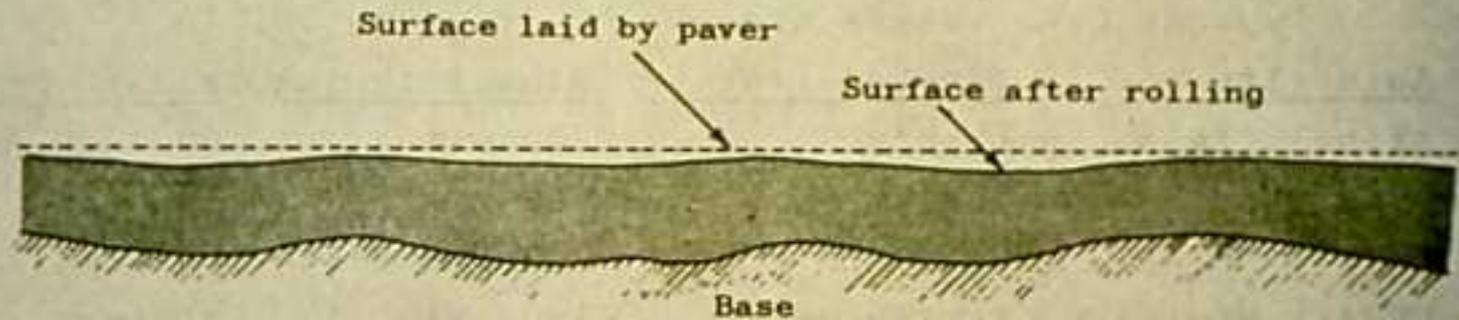


Fig. 28

Finer points about laying

Pavers working in echelon (*extremely good practice, central surface course joint is made “hot to hot” no poor joints*)



Note neatly cut edge to this first-laid mat
(*This now needs painting with hot 50 or 70 pen bitumen before
the next mat is laid*)



Attention to joint (1), roller runs on mat 1 with just 150mm overlap onto mat 2.



Attention to joint (2), mat 2 just laid (*today, these men would all be wearing safety helmets*)



Good practice, note temporary cover on gully



Removing temporary cover to gully



ALWAYS hand-tamp around gully



Making good around frame



VERY poor, lapped joint, not durable, likely to fail within 4 or 5 years instead of 15 to 20.



Screed extensions incorrectly adjusted



Mat patterns caused by unskilled paver set-up, (*uneven pressure and compaction by screed extensions*)



Reflective crack in 2 year old, well-laid surface course (*entirely due to poorly made binder course joint*)



Note that IAN 154/12 allows longitudinal joints between mats may be located in the middle of the traffic lane, but must be at least 300mm from any joint in the layer beneath.

(This is to avoid good asphalt being planed out when carrying out resurfacing works.)

Gritting just laid, still hot sma mat



Asphalt lump removed from paver screws



Problem due to cold lumps



Problem, oil in truck body to make asphalt slip off truck easily, (use soapy water instead)



Hand lay work

Excellent patching, with HRA

(see the reflection of the sky in the rain which shows the rain stays on top, ie no voided areas)



Very poor hand-laid work (see *uncompacted areas at edges,, insufficient asphalt used so it is too low to be rolled*)



Very poor work (*exiting roller has damaged the transverse joint PLUS the binder course is finished too high so there is no for 40mm surface course PLUS no sign of joint painting.*)



Cold areas, poorly compacted



Bobcat job, even base but rough edges (preferred in USA since gives better interlock with new asphalt)



Sawn edges as preferred in UK

(but uneven base to area caused using a pneumatic breaker so uneven surface finish very likely)



Good practice (*Pushing new mix against vertical, bitumen coated edges. When rolled will make strong vertical joint*)



Material must always be workable to be properly spread and then fully compacted.

If problems, consider use one of the following:-

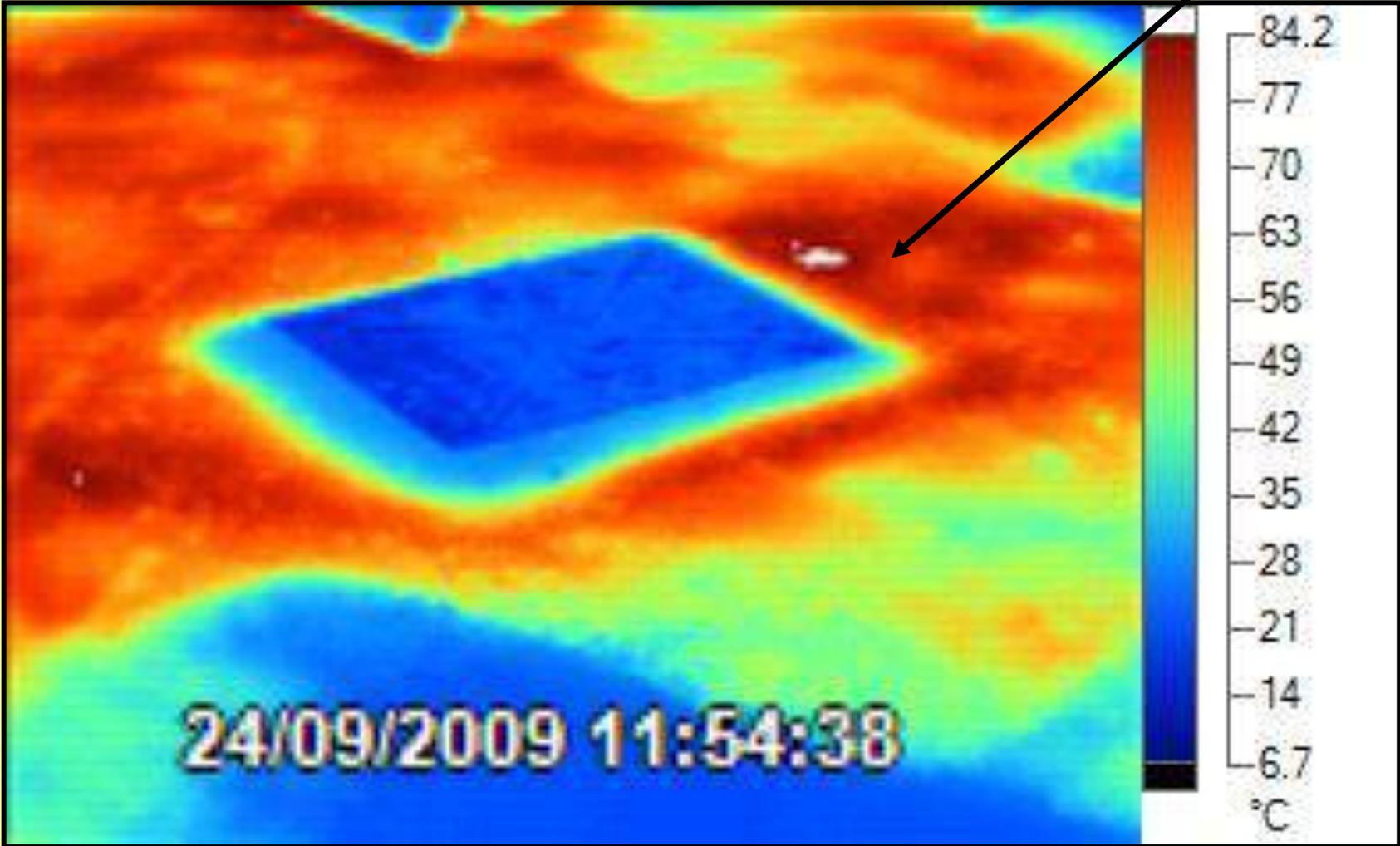
- . hot boxes,
- . fluxed mixes
- . or Sasobit, a wax additive
- . or lay over-thick, ie one layer NOT two
- . or use infra-red heaters for repairing patching

The following slides show how a 85mm thick reinstatement remains hot, much longer than the same material laid 30mm thick

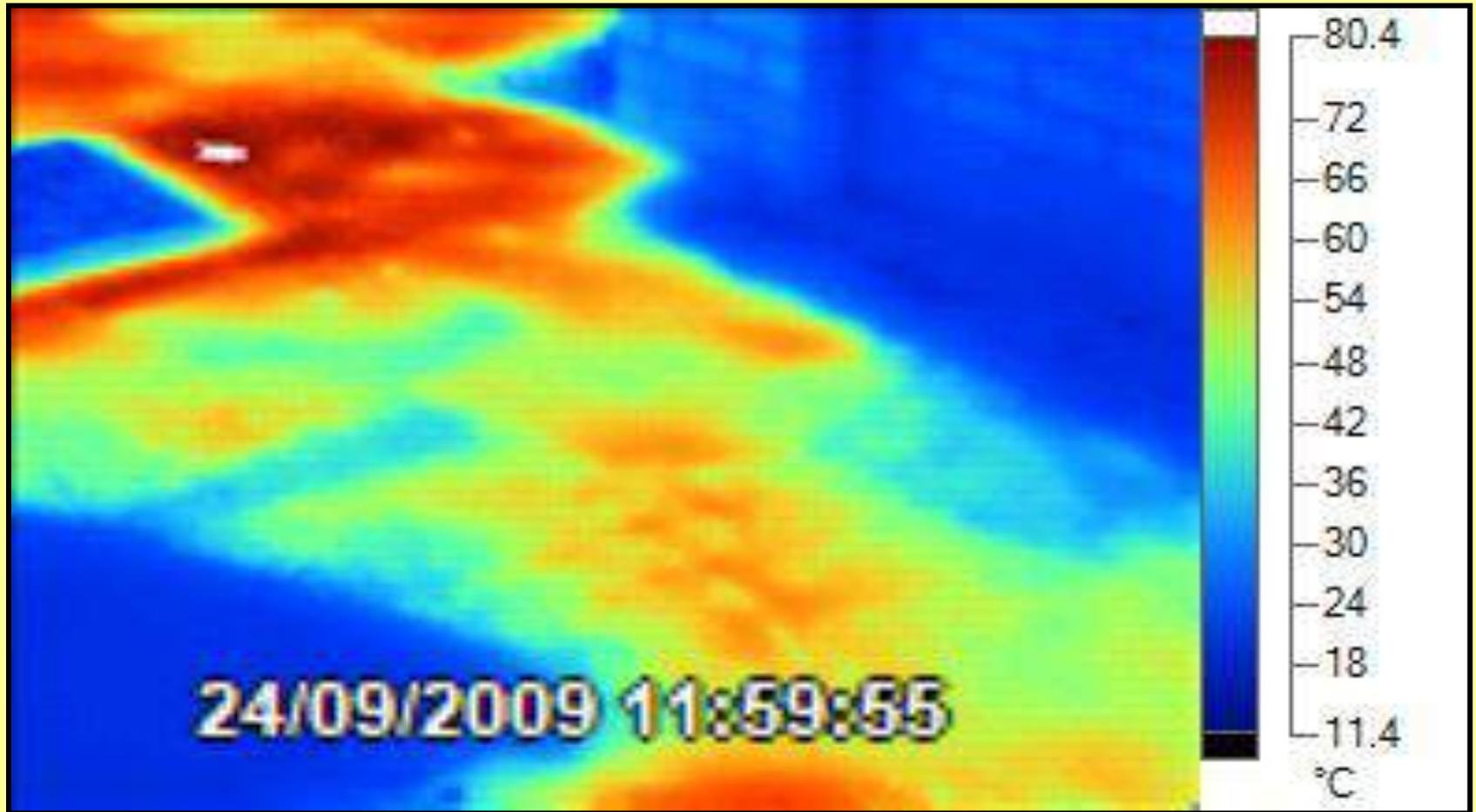
In small areas, use surface course asphalt in binder course and compact then quickly lay surface course and compact that.

For pre-season patching for surface dress don't hesitate to use 55/10 HRA up to 100mm thick in 2 layers

View around MH, depth at arrow 85mm, laying temperature 105°C, air temp 12°C, area shaded.



View looking back after 5mins (*The thicker asphalt is still hot so compaction will not have been a problem*)



Hot-box, good but use asphalt on the same day!!



Pathetic job.

Greek hand-laid job, car tyres as roller, holiday photo.



Any questions?