Oct 24.

DEPARTMENT OF
SCIENTIFIC AND INDUSTRIAL RESEARCH
Charles House, 5-11 Regent Street, London S.W.1
Telephone: Whitehall 9788   Telegrams: Resciendus, Piccy, London

Visit to the new Road Research Track
at Crowthorne, Berks

We have now been able to make arrangements for a visit to the new Road Research Track at Crowthorne on Monday October 24th. This day has been set aside for the convenience of broadcasting, film, and television organizations.

The Director of the Road Research Laboratory, Sir William Glanville C.B., C.B.E., F.R.S., has arranged a number of demonstrations which, I am sure will be of interest to you. It does not, of course, cover the entire field of the work of the Laboratory, but it will give a balanced view of the type of work which will be undertaken on the track.

I must point out that it will not be possible for visitors to drive round the track individually, because this might impair special sufaces necessary for research. It will, however be possible to drive round the track in conducted parties. Several live demonstrations will be given as well, and the Director and other senior officers will be available for interview.

If you are able to come will you please return the tear-off slip below and return it as soon as possible. We will then send you a map showing the route to the new track.

Yours sincerely,

L. E. Jeanes

L. E. JEANES
Broadcasting and Film Section

ROAD RESEARCH TRACK, CROWTHORNE, OCTOBER 24th

PROGRAMME

10.45 a.m. Arrival of visitors - assemble at entrance to track.
(NOTE: If required transport can be provided from Bracknell Station)

11.0 a.m. Tour round test track - opportunity for filming where required.

11.30 a.m. Talk by Sir William Glanville.

12.0 Noon Demonstrations:-

(1) Use of skidding test surfaces, ON THE LONG STRAIGHT.

(2) Equipment for the study of skidding, ON THE LONG STRAIGHT.

1 p.m. - 2.15 p.m. Lunch at the Admiral Cunningham.

2.15 p.m. Repeat of demonstrations (1) and (2) if required by correspondents.

Further Demonstrations:-

(3) Radio telemetry cars for studying the driver's task.
(IN THE CENTRAL AREA)

(4) Density detector for queues of traffic.
(IN THE CENTRAL AREA)

(5) Design of intersections - experiments with controlled traffic.
(IN THE CENTRAL AREA)

Opportunity to see a film on impacts between vehicles and lamp standards, exhibits dealing with the guidance of vehicles in fog and displays on other current researches into traffic and safety problems.

4.0 p.m. Correspondents leave. Transport to Bracknell Station if required.

NOTE If transport is required from Bracknell Station please indicate on the tear-off slip on the invitation.

- - - - - - - - - - - - - -

AY- 46

INDEX

- - - - - - - - - -

INTRODUCTION

The new Road Research Track at Crowthorne

Higher speeds, ever-increasing traffic, as well as the special problems of motorways and other modern roadworks, are among the many factors which underline the need for large-scale practical road research facilities. To help in meeting this demand, a new road research track has been built at Crowthorne, Berks. By 1964, the site will also house the entire Road Research Laboratory of D.S.I.R. - at present occupying two different centres at Harmondsworth, Middlesex, and Langley, Bucks.

Built at a cost of about £500,000, the new track will be used primarily for research in traffic and safety measures with particular emphasis on vehicle behaviour. Three miles long, it is in the form of a figure eight with a large paved area in the centre, and contains a number of different test sections and varying types of road surfaces. There is also a special length designed so that speeds up to 100 m.p.h. can be reached.

Light coloured and dark coloured sections will be used to study the effect of colour of road surface on visibility with headlamps. Provision has also been made for determining the effect of various types of street lighting on the visibility of vehicles, cyclists and pedestrians.

Banked Bend

The high speed section, which is approached by a banked bend, is covered with typical road surfacings which can be kept wet by means of a built-in watering system, fed from a large supply tank. This permits skidding and braking studies to be made. Tests such as these are becoming more and more necessary as a means of investigating the characteristics of road surfaces and tyres to reduce as much as possible the risk of skidding on wet surfaces at high speeds.

Beneath another section there is a laboratory with a special glass panel let into the surface of the track. Photographic studies can thus be made of the contact areas of tyres as vehicles are driven over it. This facility will help to extend our knowledge of the behaviour of tyres at the critical point of contact with the road surface and of the way in which this affects the skidding resistance of road surfaces.

It is hoped that these studies, too, may point the way to a substantial decrease in the number of accidents due to skidding in wet weather.

Vehicle and Traffic Control

The track will also provide means for experiments on the guidance and control of vehicles which may be of particular value in fog. Wires laid below the surface will emit signals which can be detected by simple electronic devices in the vehicles. The ultimate objective of this work is to see whether drivers can be helped to steer a safe course through and round hazards even in the thickest fog.

Similar electronic devices using energised wire loops in the track surface may also be used to warn vehicles of other vehicles ahead.

The very large paved area in the centre of the track will be invaluable for investigations on the layout of road junctions. These will include experiments on traffic signals, trials of new types of vehicle detectors and control systems for use at isolated junctions and at groups of junctions or at combinations of junctions. Traffic control and the nature of the areas required for the weaving of traffic will also be studied.

Some of the Research Problems

Research on the safety aspects of vehicles will be wide in scope. It will include:

Work on the problems of safety at high speeds.

The study of vehicle behaviour, particularly during emergency braking on different types of surfaces using various braking systems.

A study of the factors affecting the motion and response of a vehicle when known steering inputs are applied.

Measurements of motion and response of vehicles under adverse conditions or when maladjusted.

A study of vehicles running into kerbs of various shapes and dimensions.

Controlled crashes of vehicles into fixed barriers and/or other vehicles.

Impact of vehicles into guard rails, fences and vegetation.

The track will also be used for investigations into driving skill.

DEMONSTRATIONS OF TRAFFIC AND SAFETY EXPERIMENTS

The Press has been invited to see these new research facilities so that you and the public may have a clearer understanding of this work. Apart from the track itself, a number of practical demonstrations and exhibits have been arranged. They cannot in the space of a single day cover all the aspects of the Laboratory's work but they have been carefully selected to give you, as far as possible, a balanced and topical view.

The demonstrations and exhibits are:

1. Skidding (On Site A)

The long straight high speed section of the track has been designed so that the Laboratory can extend its investigations into the skid resisting properties of roads and tyres at the speeds at which traffic now travels on Motorways and other roads of that type. The approach to this section has been banked to permit speeds up to 100 m.p.h. to be attained on the special surfacings on which the tests will be made.

When finally completed a wide range of both rough-textured and fine-textured surfacings will be available to permit a systematic study of the skid resisting properties of road and tyres. Each of these types of surfacings is represented by three lengths, each 200 yards long and 12 ft. wide, one with a very low, one with a moderately high and one with a very high resistance to skidding. Other types of surfacings in which there may be a particular research interest from time to time can be provided.

In most measurements of skidding resistance it is essential that the road surface should be thoroughly wet and the long straight section has, therefore, been equipped with apparatus for spraying water over the test surface. This system will be seen in operation, and the various machines developed by the Laboratory to measure skidding resistance (described below) will be displayed and demonstrated.

Skidding tests with a Citroen car fitted with a fifth wheel

The car is equipped with an extra wheel so arranged that it slides sideways while the car is moving forward normally. This apparatus produces a continuous record of skidding resistance on a moving paper chart and carries its own built-in road watering system for testing on public roads. It is possible to test lengths of up to two miles of road with this machine.

Skidding test using a braked vehicle

To assist highway engineers and local authorities, the Laboratory has developed a simpler method for keeping a check on the skidding resistance of roads. A decelerometer of a simple type is mounted in a car or van which is then driven over the wetted test surface at the desired speed, usually 30 mile/h. The brakes are applied so as to look all four wheels for one second. The decelerometer then provides a direct reading of the skidding resistance of the test surface. This method is used by the Laboratory to study the performance of different type tread patterns and materials.

Portable Skid Resistance Tester

Another simple device which can be used by highway engineers is the Portable Skid Resistance Tester developed by the Road Research Laboratory. In this a rubber slider is mounted on the end of a pendulum arm which is made to swing across the wetted road surface. The frictional resistance between this slider and the road is indicated by a pointer on a calibrated scale. Over 90 of these testers are now in use in this country and abroad.

Trailer for skid testing at high speeds

For measurements of skidding resistance at high speeds the Laboratory has developed a small braking-force trailer which is towed by a car capable of making measurements at speeds of over 100 mile/h. With the towing vehicle travelling at the desired test speed the trailer wheel is locked for 2 to 3 seconds and a record of the force between the tyre and the road surface is obtained on a moving paper chart. This apparatus is used on motor ways and other roads of that type and also on airfield runways where slipperiness can also be a serious problem in wet weather.

Effect of high hysteresis rubber tyres (on Site B)

A demonstration will be given of the greater resistance to skidding in wet weather that can be achieved by using tyre tread material with a high hysteresis loss. Two identical cars with identical braking systems will be braked to a stop on a slippery wet surface and it will be shown that the car fitted with normal tread rubber travels farther before coming to rest.(The research aspects of this development were described in a D.S.I.R. Press Release on 17th March, 1959. Copies can be obtained on application to the Press Office).

2. Stability of vehicle in emergency braking (on Site B)

In an emergency it may be necessary to apply the brakes suddenly and heavily. The demonstration shows ways in which steering control may be lost if some of the wheels of the vehicle are locked.

3. Guidance of vehicles in fog (in Marquee)

The research track contains facilities for experiments on the guidance of vehicles in fog. These are not yet in operation but an exhibit illustrates how this work will be carried out.

4. Method of studying driver behaviour (on Site C)

It has been found difficult to study the interaction between drivers for example, when one vehicle follows another. In the system to be demonstrated, information from two moving vehicles, one following another, is conveyed by radio to a fixed receiving station. The distance travelled by each vehicle, the speed, the throttle position and the amount of braking are recorded for both vehicles on the same chart. The experiment in progress is one to determine safe following distances.

5. Traffic density detection (on Site C)

This is a demonstration of density detectors for queues of traffic and of a shortest route computer. The Laboratory is concerned with investigating methods of improving flow on crowded roads by detecting traffic congestion and by taking control measures to reduce it. Two alternative methods of detecting the presence of vehicles - whether moving or stationary - which can be used to indicate where traffic is congested, are shown.

Shortest Route Computer

A simple computer which calculates the shortest route through a road network and in which particular roads can be closed to traffic will also be demonstrated. Used in conjunction with density detectors and variable direction signs this device could route traffic away from roads which are temporarily blocked.

6. Road layout experiments (on Site D)

This exhibit illustrates the use of experimental layouts for controlled traffic tests in connection with the design of intersections and shows a typical experimental layout of a roundabout and its approaches, using movable kerbs. This technique has already provided essential information for the design of both roundabouts and signal-controlled intersections.

Other work of the Laboratory will also be exhibited and a short film illustrating impacts between vehicles and lamp standards will be shown.

Names to Note

Chairman of the Road Research Board	-	Mr. R.M. Wynne-Edwards D.S.O., O.B.E., M.C. M.I.C.E.
Director of Road Research	-	Sir William Glanville, C.B., C.B.E., D.Sc., M.I.C.E., F.R.S.
Deputy Director (Traffic & Safety)	-	Dr. R.J. Smeed, B.Sc., F.S.S.
Deputy Director (Materials & Construction)	-	Dr. A.R. Lee, B.Sc., A.R.C.S., D.I.C., F.Inst.P.

LAYOUT OF THE ROAD RESEARCH TRACK
CROWTHORNE

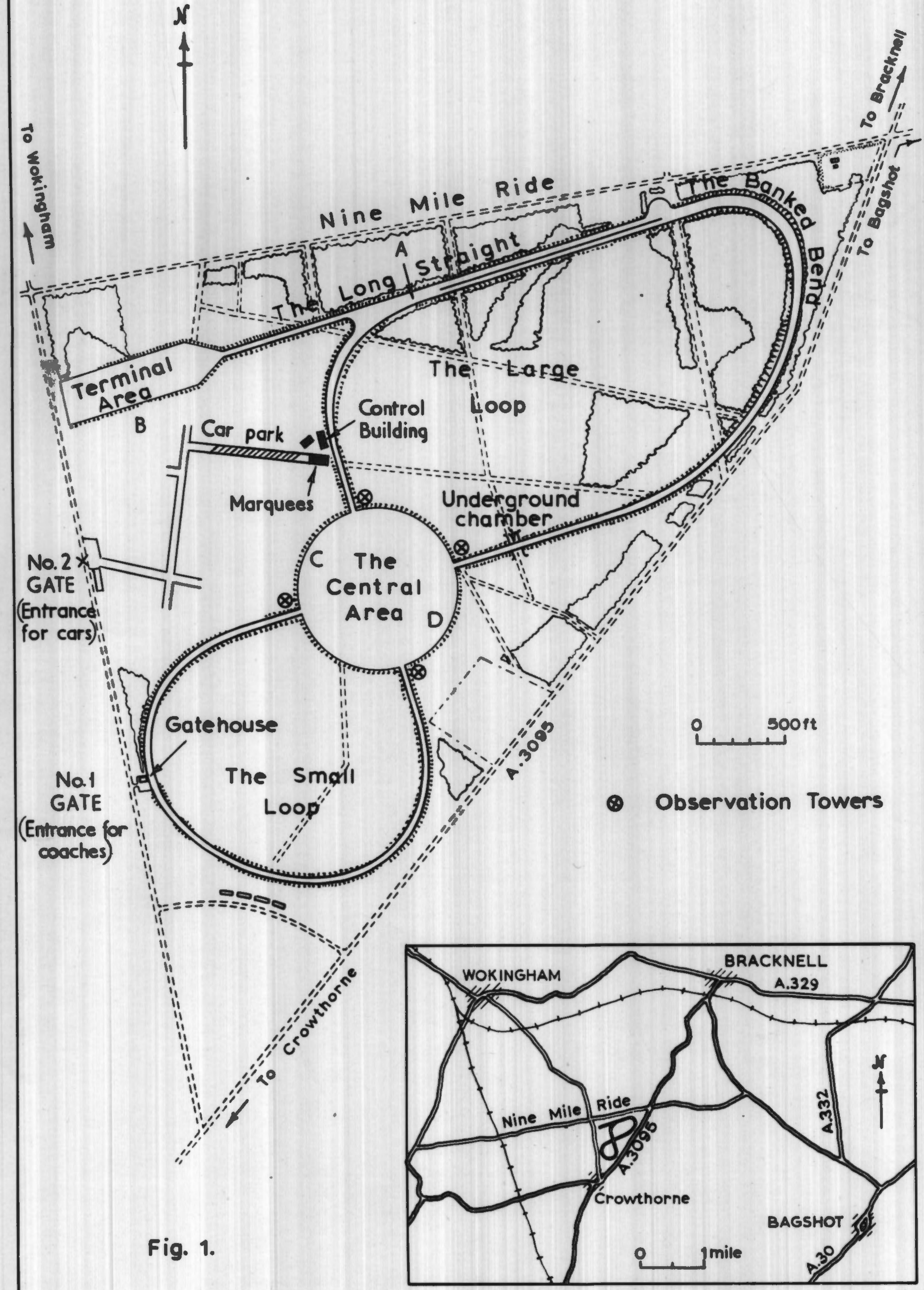

Fig. 1.

VISIT TO THE ROAD RESEARCH TRACK AT CROWTHORNE ON 25th OCTOBER, 1960

Sir William Glanville's Speech to the Press

It is a great pleasure to welcome you here today to show you our new road research track.

The first thing you will want to know is why we need the track. To view this in perspective we must look at the background - at the problems we have to tackle and the scale of them.

First of all we see that in common with all other highly developed countries we are in process of a transformation in which the motor vehicle is fast becoming everyman's means of transport, both for business and private purposes. Every ten years the number of vehicles on our roads doubles and congestion grows at an even faster rate. Roads are expensive to build and maintain and although we spend about 190 million pounds a year on them that is only a fraction of the money which the country is now spending annually on road transport and travel. Meanwhile vehicles become more powerful and travel faster, and accidents are a growing problem.

The job of this research organisation is to find practicable ways of cutting down the numbers of road accidents, to save the country money by discovering the most economical ways of building roads, and to save time and money by showing where and how best to build new roads and to improve existing ones so as to reduce the delays and congestion to a minimum.

Road research has proved a very profitable investment for the nation and, in addition to the savings in human life from the accidents prevented, the sums saved annually as a result of applying the lessons of research are a great many times its cost. As an example of these benefits, I will quote the case of sites at which skidding accidents have been frequent. Every year the Laboratory deals with many such sites and helps the highway authority to remedy them, often by a very inexpensive treatment of the road surface. An estimate was made of the savings in accidents at a number of such sites and the economic savings equivalent to this work out at an annual net saving of two thousand pounds at each site. We ourselves have detected over two hundred such sites. This is equivalent to an annual saving of 400 thousand pounds. We have also helped the highway authorities to find and treat other sites of this kind and the total savings must be many millions.

/To

To give you some idea of how small is the expenditure needed to achieve this result I may mention one road junction controlled by traffic lights. There, the cost of resurfacing, which prevented about ten accidents a year, was not more than had formerly been spent annually in replacing the traffic signals and bollards damaged in these accidents.

Similar work that the Laboratory does on airfield runways can also show improved safety, bearing in mind that overshooting on a wet runway is a great danger and that one such accident has been estimated to have cost half a million pounds.

In the past many decisions affecting expenditure on roads and the action to be taken in given circumstances had to be based on ad hoc judgements and on opinions formed from limited personal observation. Obviously errors were made, but with carefully conducted research, often of a statistical character, such decisions can be scientifically based. Thus for example it was thought at one time that a very rough-looking surface was the best that could be put on a road to prevent skidding, and hundreds of thousands of pounds must have been spent on re-surfacing roads to make them knobbly. Research however showed that some stones polished very quickly and this has led to a complete re-appraisal of the techniques for producing road surfaces.

Much of this research requires work on a large scale under controlled conditions. Before the war a short experimental track was built at Harmondsworth, mainly with the object of providing a controlled site for skidding tests. This proved invaluable, but after the war when research on traffic and safety was begun over a wider field, it proved quite inadequate. Since the war we have made extensive use of facilities made temporarily available at various airfields and by the Motor Industry Research Association on their test circuit. To do this work in scattered places proved, however, very expensive and time-consuming. During the last five years or so we have had to use a disused runway fifty miles away, to which large amounts of equipment and staff had to be conveyed, and where, moreover, the research facilities were by no means adequate. Worse still,

/many

many important experiments could not be done because facilities could not be found. For these reasons it was decided to build a special road research track and it is this track and its equipment which you are here today to see. Without the track we have had, as I have said, to employ airfields and we have had the use of those at Northolt and Hendon for certain traffic experiments. On the apron at Northolt, for example, we carried out a few years ago full-scale trials of various roundabout layouts and controlled intersections, the results of which have since been extensively used in the design of new road layouts. At Hendon we studied and compared the virtues of various forms of road signs which led to the adoption by the Ministry of Transport of the signs now used on Motorways.

Now I would like to say a few words about the track and the objects we had in view in designing it, for it is unique - there is no other track of its kind devoted to research into road traffic and safety problems in Europe, nor indeed in the world.

You have been given a document describing the work we propose to do, so there is no need for me to say a great deal.

The main objects, in designing the track were:

(1) to provide large flat areas with suitable approach roads to enable the stability of vehicles performing manoeuvres involving steering, braking and accelerating at normal road speeds to be investigated,

(2) to provide facilities for studying the skidding properties of wet surfaces, in particular the material and texture used for the surfaces, the effect of the properties of the tyre and the type of vehicle, its speed and braking system,

(3) to enable vehicle lighting tests to be carried out on straight and curved roads with surfaces of various types and colours,

(4) to enable crash-injury research to be conducted under appropriate conditions.

(5) to enable comparisons of street lighting systems to be made under controlled conditions,

/(6)

(6) to provide a continuous circuit round which vehicles can be driven while the actions and reactions of their drivers are studied,

(7) to provide facilities for traffic tests of intersection layouts, traffic signals, road signs, safety barriers and other aids to traffic flow,

(8) to provide facilities for the study of vehicle guidance and the many other matters with which the Laboratory is concerned.

The track is now complete except for minor details, so that you are in fact seeing it in its usable form almost at the same time as the research teams who are to use it. The demonstrations and exhibits you will be seeing today will show some examples of the work we propose to do here. We cannot yet show any results of the work, but when you come back on our "Open Days" we will, I am quite sure, show you some worthwhile results.

Before I close my remarks I would like to emphasize that in framing the programme of research we enjoy the advice of the Road Research Board and its many specialist committees. This eminent body of advisers is composed of men chosen for their specialist knowledge in every field affecting the road, the vehicle and the road user. The Chairman of the Board is a distinguished engineer with an important place amongst civil engineering contractors, and amongst the members of the Board and its committees are to be found the Chief Engineer of the Ministry of Transport, and several of his senior staff. There are also county and city surveyors, chief constables and economists, professors of engineering, automobile engineers, plant and road vehicle manufacturers and operators, public lighting specialists and many others. Joined with them on the Board and the committees are senior administrative and professional civil servants representing the dozen or so Government Departments who are concerned with road or runway problems.

Moreover, one of the features of the conduct of road research is the close contact and co-operation that is maintained with industry and with all the many bodies interested in highways, the traffic on them and road safety. In this way the research is kept in intimate touch with reality.

/It

It remains only for me to point out that the construction of this unique track was the responsibility of the Ministry of Works.

I suppose if you or I were to build a new house for ourselves with features not to be found in any existing building we should have to have long consultations with the architect and the builder, during which the final designs are hammered out. Well, we have had such consultations with the architects and engineers of the Ministry of Works and here today you will see the results of the collaboration and I would like to take this opportunity of saying a word of appreciation of the enthusiastic help we have had from the officers of the Ministry in getting this great track built to satisfy our sometimes exacting needs - and by the agreed date!

Mr. Snow of the Ministry of Works, who is now working on our new Laboratory buildings, and Mr. Pearson, the Ministry of Works engineer responsible for the work, and who represents the Ministry of Works on the Road Research Board, will now give you a short account of the constructional features of the track and of some of the problems they encountered in building it.

Afterwards they and I will be glad to answer any questions you may wish to put before we proceed with the rest of our programme.

Road Research Laboratory,
October, 1960.
RD.

M.O.W. 1300

MINISTRY OF WORKS PRESS NOTICE

Press Office: Reliance 7611

Ref.
EG. 6223/1
MOW. 62/60

ROAD RESEARCH LABORATORY

CROWTHORNE, BERKSHIRE

Notes on the Design and Construction of the Research Track and the future Laboratory buildings

---

The Site

A site of suitable size and shape had to be found which would take a three-mile figure-of-eight research track and, later, laboratories and administrative buildings. Eventually an area of about 253 acres at Crowthorne was selected for the purpose by the Ministry of Works and the Road Research Laboratory. The site, which is a fairly undulating one, is crossed by small streams and is covered with various types of trees from four to 40ft. in height. The minimum number of trees has been felled to allow the construction of the track and this was done in advance of the road works so that final check surveys and levels could be taken of the ground along the route of the track.

The geological strata are very varied and consist of beds of sand, gravel and clay which alter considerably in a very short distance. The original soil survey was carried out by the Road Research Laboratory and bores were put down approximately on the centre line of the track at about 300ft. centres. These were supplemented by a Ministry of Works survey consisting of bores at 50ft. centres in areas of cut and staggered across the width of the construction.

Track Design

The track was designed jointly by staff of the Ministry of Works and of the Road Research Laboratory. The figure-of-eight has a 900ft. diameter centre pan at the intersection, with a straight length of track leading off one of the loops and ending in a skid area.

An electronic vehicle control system is incorporated in the track. Timber observation towers, adjacent to the four entries to the centre pan, provide facilities for floodlighting and the observation of experimental work on the pan.

After the original design layout had been agreed, Ministry of Works prepared the detailed design including the shape of the banked bend and its transitions, and fixed the final levels to balance cut and fill. To check the designed shape of the banked bend the Road Research Laboratory set out the bend to scale with Abbotts model apparatus.

Ministry of Works prepared the general specification, in co-operation with the Road Research Laboratory who specified the finishes.

The track is of flexible construction, except for the banked bend and a short length of the skid track which are re-inforced concrete. It is designed to curve B of the Standard design curves using estimated values of the California Bearing Ratio beneath the finished road, based on the soil surveys.

Generally it consists of a granular sub-base of varying thickness, a 6-inch cement stabilised gravel base and a 3-inch two-coat finishing course of rolled asphalt varied for different sections.

The banked bend is designed for a safe speed of 60 m.p.h. to enable high speed skid tests to be carried out on the skidding straight. The aggregate used has a high polished stone coefficient and a sight line of 500ft. has been achieved without cutting down additional trees. The bend has a radius of 350ft. on the high speed line and is on a down grade of 1 in 25. The transitions are designed to connect the circular section at this gradient with the level skidding straight and with a large radius curve on an up grade of 1 in 75.

<u>Construction of Track</u>

Top soil was stripped over the whole area of the track to an average depth of 15 inches owing to tree roots and ridging which covers most of the site. Excavation was carried out by scrapers and deposited in fill areas in accordance with the specification which called for compaction in layers to a minimum air void content of 10 per cent at a controlled moisture content. Gravel for the granular sub-base came from a local pit and was compacted to a 5 per cent minimum air void.

The 6-inch base consists of imported as-dug gravel stabilised with five per cent of cement and mixed in a weigh-batch plant erected on the site.

The banked bend was constructed in transverse bays about 10ft. wide and up to 38ft. long. The bottom layer of concrete was laid and compacted with a vibrating screed to a thickness of $5\frac{1}{2}$ inches. A welded steel mesh was then placed in position and the top $2\frac{1}{2}$-inch thickness of concrete added. After tamping to closely specified limits the surface was hand trowelled and given a light brush finish. To facilitate work on the 30° slope in bad weather a light, movable shelter was used.

The contractor developed an adjustable steel shutter which helped to avoid the distortion to which timber formwork is prone and used much less material, as all transverse joints in the transitions were a different shape. By this means a degree of accuracy of finished level of plus or minus $\frac{1}{8}$ inch in a distance of 20ft., was achieved.

Grooves were cut in both concrete and asphalt surfaces with a Clipper saw for the guide wire system described hereafter under Engineering Services, to a depth of about $1\frac{1}{2}$ inches and a width of 5/16 inch. The saw was hand-guided, following an accurately set out line marked on the track.

Drainage

The surface water drainage scheme is of conventional design. The track, where it is in a cutting or level with surrounding ground, is graded to rubble drains; at higher levels the track drainage discharges to ditches at the foot of the embankment.

The centre pan is laid to a crossfall, surface water discharging to a concrete channel.

The rubble drains and ditches discharge to existing watercourses within the site. Except for a small area in the north-east connected to a watercourse on the north side of the track, the surface water is connected to two watercourses which converge into a single stream. At this point a balancing reservoir of approximately 400,000 gallon capacity has been constructed to control the maximum discharge into the watercourse external to the site.

Ancillary works have included the cleaning and regrading of minor existing ditches and the provision of cut-off trenches to protect the track from the passage of surface water from surrounding higher ground.

Engineering Services

1. Electricity Supply, Power and Lighting

The Southern Electricity Board brought in, by underground cable to a sub-station centrally placed on the site, the 11,000 volt three-phase electricity supply.

A 415 volt supply from the sub-station provides the following facilities by means of underground ring cables -

(a) Service Pillars : 48 track-side service pillars, at 100 yard intervals along one side of the track only, are installed to provide electric power for research experiments throughout the length of the track. Selected pillars have telephones and also socket outlets, with earth leakage protection, for supply to portable equipment including electrical tools and instruments.

(b) Track Lights : A simple lighting column to specified design is placed beside each pillar to give safety lighting, enabling the track to be used by traffic and by maintenance staff after dark, when much experimental work will be carried out. These 48 mercury lights are normally operated from the control switch at the sub-station with DC bias control to avoid additional switch circuits. Each light is also provided with a hand-operated switch in the adjacent pillar to permit the carrying out of experiments which demand an unlit portion of track.

2. Electronic Vehicle Control

An Electronic Vehicle Control System exists as the result of a decision made during the early part of the track construction to install P.V.C. covered electric wires under the track. This first large-scale practical application is generally based on comparatively small experimental installations in America by Radio Corporation of America and the General Motors Corporation. The design at Crowthorne permits the maximum flexibility of circuits for a wide range of experimental work leading to the development of electronic guide control and traffic safety systems suitable for installation in public roads. The system has three main functions -

(a) Vehicle detection - to give intelligence on traffic speed and density. This is effected by having two-turn cable loops of vehicle size laid 9 inches under the road and placed with a 2ft. gap between each loop on the centre line of the "Slow" traffic lane. The loops are connected to terminal boxes at the edge of the hard shoulders. They will be fed with radio frequency low power supplies.

(b) Vehicle guidance - to centre vehicles on traffic lane and so reduce hazards due to fog, bends, hillcrests, dazzle and fatigue of driver. The installation comprises a guide wire system laid just below the road surface and on the centre line of the "Slow" traffic lane for the whole figure-of-eight circuit, and also 900 yards on the "Fast" lane terminating at the end of the skid track.

The electric supply of audio-frequency will be connected to this circuit.

(c) Collison prevention - to regulate speed of vehicles and flow of traffic. A second conductor is provided as a twin to the guide wire for use as antennae which will enable signals to be given to drivers, advising them of relative speed and position of vehicles ahead.

The installation of the vehicle control system was carried out in a simple and inexpensive manner during the normal road construction process, to obtain practical experience in anticipation of electronic vehicle control facilities forming part of future public roads.

3. Water Supply and Sprinkler Installation

The water supply from the Mid-Wessex Water Company enters the site at two points on the north side, approximately half a mile apart.

A sprinkler installation is provided and is in three parallel lines just below the surface along 800 yards of the straight track. The three pipes, fitted at close intervals with special nozzles, are connected to a bus water main at the side of the track and are supplied with water from a 54,000 gallon storage tank placed on the north side. An electric pump provides the necessary pressure so that jets of water can be thrown from the nozzles to sufficient height to enable the track to be thoroughly wetted when required.

In addition to the sprinklers a small number of 3-inch water valves, similar to fire hydrants, are set just below ground level to enable larger quantities of water to be provided for experimental purposes.

Future Laboratory Buildings

The area of approximately 45 acres between the skid track and the south loop will be the site of the new laboratory and office buildings.

These buildings will consist of:-

(a) A main seven-storey Administration Block with two-storey frontal wing of general accommodation.

(b) Three-storey small scale laboratory wings on each side of the main central Administration Block.

(c) A large grouped building in the rear consisting of pilot scale laboratories, heavy test laboratory, engineering services, stores, garage and boiler house.

(d) Separate terrace type Soils Laboratory.

(e) Concrete and Bituminous Laboratories.

(f) Asphalt mixing plant and field experimental area.

(g) Library Block.

(h) Canteen.

These buildings are being designed by the Ministry of Works and it is planned to commence the erection in 1962.

<u>NOTE</u>: These Notes are issued for use only in conjunction with the D.S.I.R. Press Notice on the occasion of the preview on 24th/25th October, 1960.

List of Contractors and Sub-Contractors

Main Contractor	Turriff Construction Corporation, Ltd., Budbrooke Road, Warwick.
Sub-Contractors	
Earthworks	Dick Hampton, Broad View Farm, Black West, Alton, Hants.
Fencing	Chain Link Fencing Co., Ltd., Station Approach, Kings Langley, Herts. Crowthorne Concrete Co., Ltd., Swan Lane, Sandhurst, Berks.
Aggregate Limestone Gravel Rejects Sand Gravel Ballast	Ameys Asphalte Co., Ltd., Sutton Courtenay, Abingdon, Berks. Stuart Macey Ltd., Gordon Road, High Wycombe, Bucks. Ham River Co., Ltd., Ham River House, Vicarage Crescent, London, S.W.11. Hall & Co., Vale Farm Road, Woking, Surrey.
Flexcell Expansion Plastic Bitumen Sealing Compound	McCreath, Taylor & Co., Ltd., Phoenix Chambers, 84 Colmore Row, Birmingham.
Asphalt Carpet	Roads Reconstruction (1934) Ltd., Frome, Somerset.
Granite Chips	Hee's Hartshill Granite & Brick Co., Ltd., Hartshill, Nuneaton.
Reinforcement	Whitehead Iron & Steel Co., Ltd., Newport, Monmouthshire.
Tar	North Thames Gas Board.
Bitumen Emulsion	Lion Emulsion Ltd., Dundee Road, Trading Estate, Slough.

Sprinkler Mains	British Overhead Irrigation Ltd., Shepperton, Middlesex.
Water Storage Tank	Mechans, Ltd., Scotstoun Ironworks, Glasgow, 4.
Prefabricated Offices	Vic Hallam Ltd., Valley Works, Langley Mill, nr. Nottingham.
Observation Towers	Beves & Co., Ltd., Shoreham, Sussex.
Marker Post Plates	L.R.S. Ltd., Lion Works, White Hart Road, Thetford, Norfolk.
Manhole Covers	Broad Bros., Ltd., 4 South Wharf, Paddington, W.2.
Gratings	Tulley Engineering Co., Ltd., Newark, Notts.
Stoneware Pipes	G.W. Jacques Ltd., Lythalls Lane, Coventry.
Stoneware 4-way Ducts	Hepworth Iron Co., Ltd., Hazlehead, nr. Sheffield.
C.I. Pipes and Plumbing	Grocock & Day, Ltd., 18 St. James' Terrace, Leicester.
Groove Cutting Machine	Clipper Manufacturing Co., Ltd., Barkby Road, Leicester.
Guard Rail	Amco Ltd., 76 Grosvenor Street, London, W.1.
Concrete Pipes and Fittings	F.H. Smith (Westhaven) Ltd., Acocks Green, Birmingham.
Land Drains	G.W. Jacques, Ltd., Lythall Lane, Coventry.
Grass Seed	Wm. Lewis (Agricultural House) Ltd., Newport Road, Cardiff.

Electric Light, power and distribution cables. Vehicle Electronic Control System	Higgins & Cattle Ltd., 21 Orchard Street, London, W.1.
Terminal Boxes for Electronic System	Austin Taylor, Ltd., Failsworth, Manchester.
Service Pillars	Simplex Electric Co., Ltd., Blythe Bridge, Staffordshire.
Manhole Covers	Dudley & Dowell Ltd., Whitehall Foundry, Cradley Heath, Staffs.

LIST OF MINISTRY OF WORKS' PERSONNEL

CHIEF ARCHITECT'S DIVISION

Architects' Branch

Superintending Architect	- H.A. Snow, A.R.I.B.A.
Senior Architect	- J. Moss, A.R.I.B.A.
Assistant Architect	- R.D. Carpenter, A.R.I.B.A.

Structural Engineering Branch

Superintending Structural Engineer	- A.E. Hewitt, O.B.E., M.I.Struct.E.
Senior Structural Engineer	- R.W. Pearson, M.Sc., A.M.I.C.E.
Civil Engineer (Soil Mechanics' Section)	- R.P. Milner, M.I.H.E.

Public Health Engineering Branch

Superintending Public Health Engineer	- R.T. Gillet, B.Sc., A.M.I.C.E., F.R.S.H., F.I.P.H.E.
Senior Public Health Engineer	- T.H. Robinson, B.Sc., M.I.P.H.E.
Public Health Engineer	- G.E. Lane, A.M.I.Mun.E.

Site Control Branch

Chief Works Engineer	- R. Johnson, B.Eng., M.I.C.E., A.M.I.Mech.E.
Senior Civil Engineer	- J.R. Phillips, O.B.E., B.Sc.(Eng.), A.M.I.C.E.
Resident Engineer	- S.J. Crispin, M.I.Struct.E., L.R.I.B.A.

CHIEF MECHANICAL AND ELECTRICAL ENGINEER'S DIVISION

Superintending Engineer	- M. Woolfson, M.I.E.E., M.A.I.E.E.
Senior Engineer	- D.H.W. Channon, M.Sc.(Eng.), A.M.I.C.E., A.M.I.Mech.E., A.M.I.E.E.
Engineer	- A.E. Haseler, A.M.I.E.E., A.M.I.H.V.E.

CHIEF QUANTITY SURVEYOR'S DIVISION

Joint Senior Quantity Surveyors	- T. Grimshaw, F.R.I.C.S.
	- D.J. Mason, A.R.I.C.S.

24th October, 1960.