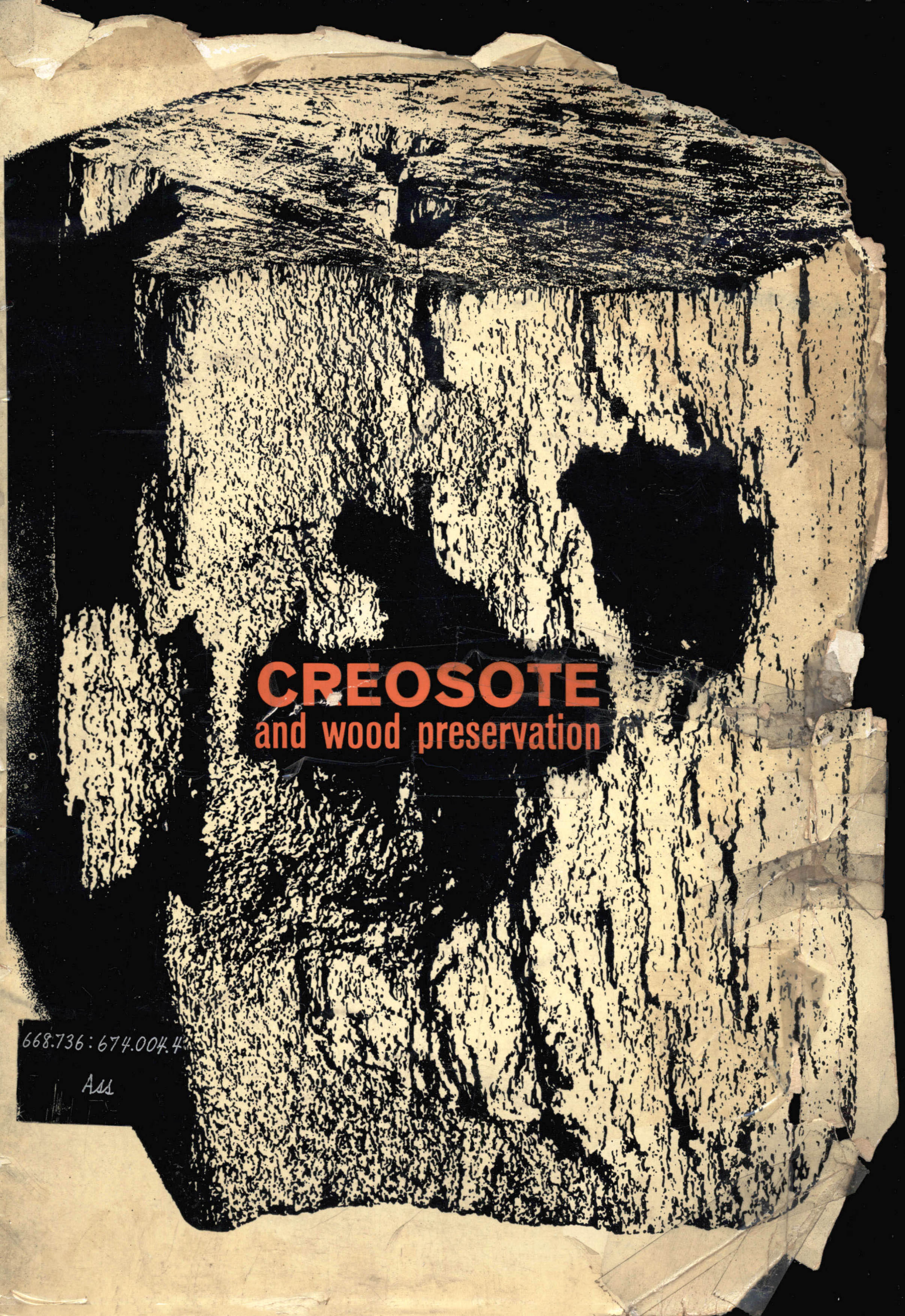
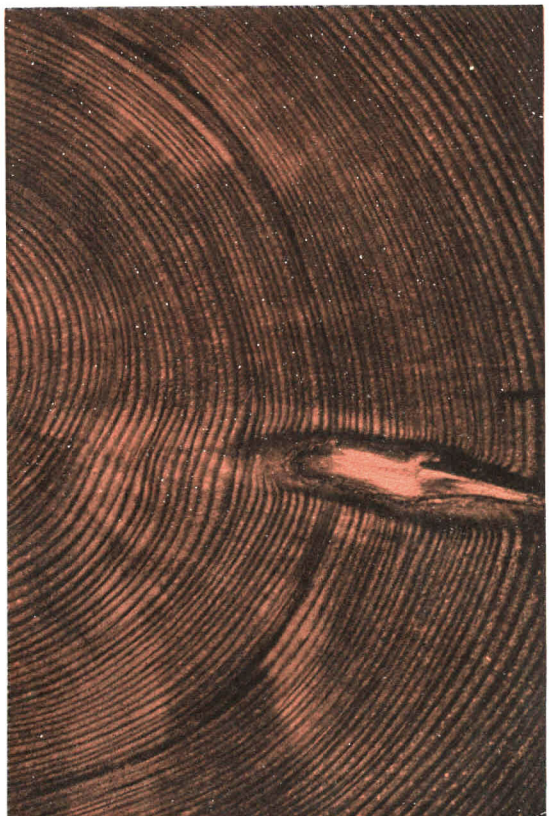


This brochure is addressed to all users of timber and those interested in its preservation. It concerns CREOSOTE which, with more than a century of outstanding service, has established a claim to be the World's leading timber preservative. It will tell you –



Why the need for preserving Timber

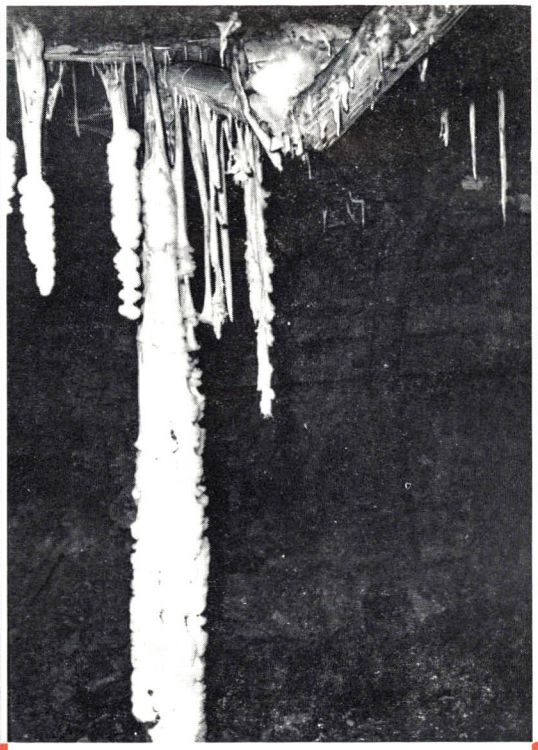
Wood itself is not an unstable or perishable material and for many purposes will last a very long time in its natural state. However, under certain conditions of use, e.g. in contact with the ground or in permanently damp conditions, or in sea water, it is subject to attack by some biological agencies including wood destroying fungi, insects and marine borers. Some woods, however, have a high natural resistance even to these forms of attack and durable timbers such as teak, oak, larch etc. have earned a high reputation as a result. Nevertheless, none of these expensive woods is as lasting as timber impregnated with creosote, and as a consequence ***the cheaper non-durable softwoods after creosoting have become the standard material for constructional work where conditions are favourable to fungal decay or other forms of attack.***

The softwood available today is, for the most part, obtained from second growth trees and contains a high proportion of non-durable sapwood. It is essential therefore for it to receive some form of preservative treatment, such as creosoting, if it is to be used under conditions favourable to decay.

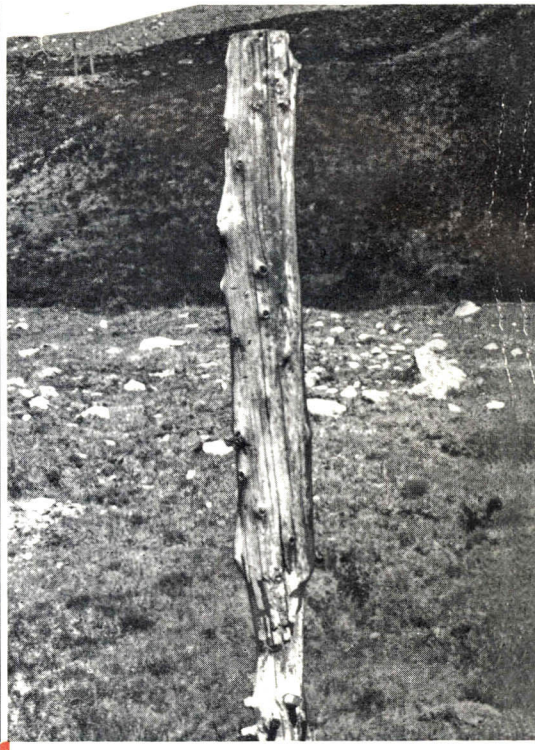
In addition to the saving in cost obtained by the use of the less expensive timbers, another great advantage of creosoted timber is that maintenance costs are virtually eliminated. There are innumerable records of pressure creosoted road-side softwood fences that have required no maintenance over a period exceeding 30 years. There are instances too of farm buildings built of pressure creosoted wood being in perfect condition after well over 50 years of trouble-free service.

DETERIORATION of untreated timber in service

Fungal Decay. Typical attack of housing timbers by Dry Rot.



Fungal Decay. Luxuriant fungal growth on mining timbers. Pit timbers in damp conditions are rapidly decayed by wood destroying fungi.

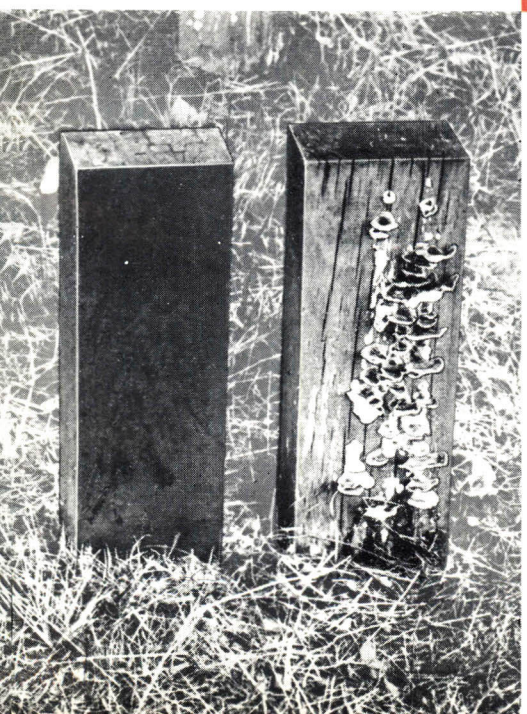


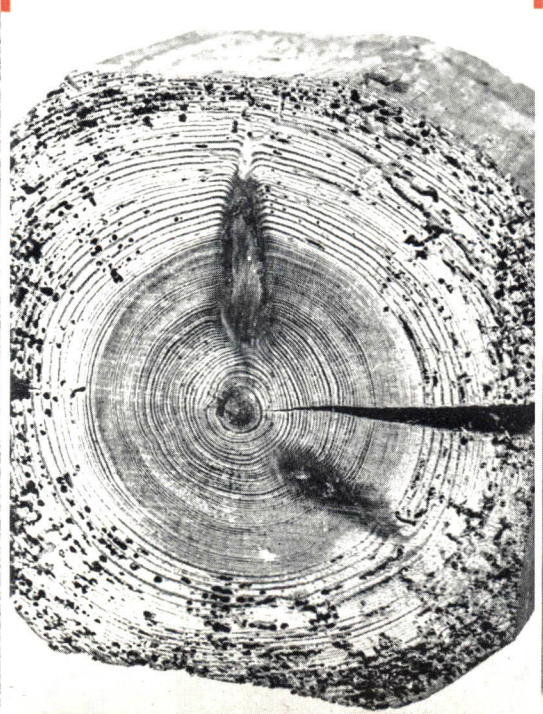
Fungal Decay. An untreated pole used as a snow marker destroyed by fungal decay.

Fungal Decay. Matched specimens under test in contact with the ground. Right hand specimen (untreated) shows advanced fungal decay with fungus fruiting bodies; creosoted specimen on left perfectly sound.

Insect Attack. Softwood attacked by wood destroying beetles.

Marine Timbers. Untreated timber attacked and virtually destroyed by Teredo (Ship worm)





What is Creosote?

CREOSOTE is a product obtained by the distillation of coal tar, which is itself the by-product of coal carbonisation. In the United Kingdom coal is carbonised both in coke ovens, for the production of metallurgical coke, and in gas retorts, for the manufacture of town gas. In either process, coal tar is formed from which numerous valuable products, in addition to creosote, are subsequently derived. The creosote used in this country is of an indigenous origin.

CREOSOTE is known to contain well over 150 individual chemical compounds, and its complex composition is undoubtedly the secret of its outstanding success as a wood preservative. ***It does not rely on one or two constituents for its effectiveness, but on a large number of chemical components with the result that the fungi, insects or marine borers responsible for the deterioration of untreated timber are unable to develop immunity to the creosote. This is in contrast to what has happened with some other pest control compounds and antibiotics of simpler composition.***

Why Creosote has no superior as a wood preservative

1) it is extremely toxic to all the normal wood destroying organisms i.e. fungi, insects and marine borers.

2) its low volatility and insolubility in water ensures a very high degree of permanency in the treated wood and consequently imparts long life. It is not leached out.

3) it is non-corrosive to metal.

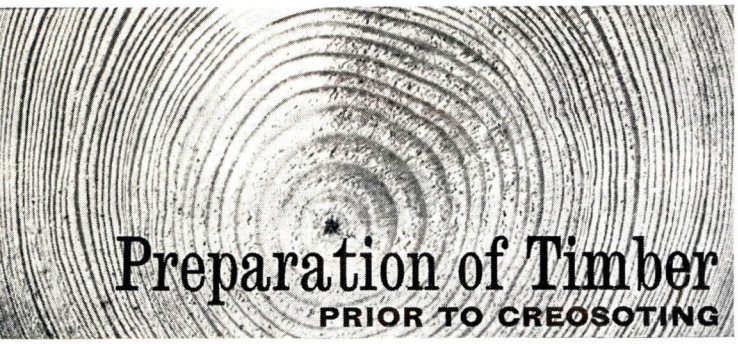
4) it has water repellent properties, protects timber against splitting and weathering and does not cause any dimensional changes in the wood.

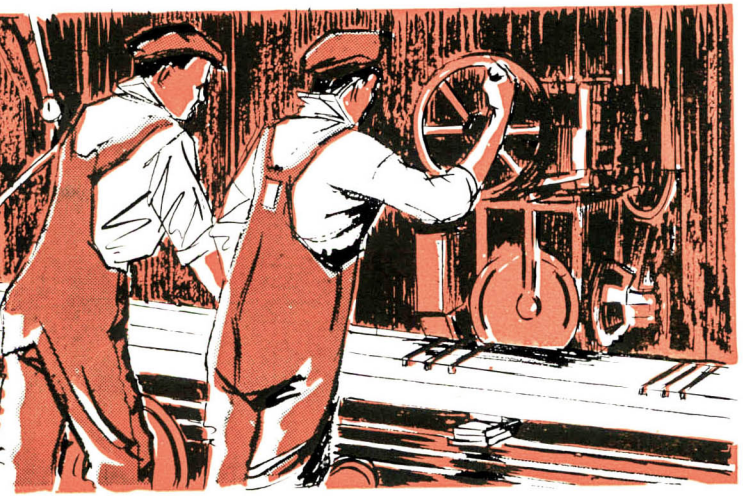
5) it maintains a high electrical resistance in timber, which is particularly important for transmission poles, from the safety angle, and for sleepers, because of track signalling.

6) it does not increase the fire hazard.

7) it is economical and readily available.

8) it is easily applied and presents no difficulty in handling.





Before timber is used for construction work it should be seasoned and this is of special importance where it is to receive any form of preservative treatment. When freshly felled, a log contains a considerable amount of water, but when the bark is removed or the log is converted at the mill, evaporation of the water begins and continues until the moisture content is reduced to a figure dependent on the humidity of the surrounding air.

The moisture content of the timber when all free water has disappeared from the cell spaces in the wood is known as the fibre saturation point and for most species of timber this is about 30 per cent. In order to achieve satisfactory impregnation it is therefore important, prior to creosoting, to ensure that the timber is seasoned to a moisture content of 30 per cent or less.

It follows also that as much as possible of the cutting, framing and boring work on the timber be carried out before creosoting, for otherwise there is a risk of exposing untreated wood to attack by the wood destroying organisms.

Tree felling
Stacking of timber for seasoning
Prefabrication of timber, sawing, drilling or incising.

Creosoting of Timber

Creosote can be applied by any of the known methods of timber preservation. The objective is to achieve absorption of creosote sufficient to impart the required long life to timber under the varied conditions of exposure. Where these conditions are most severe e.g. in fresh or sea water or in contact with the ground, pressure creosoting undoubtedly gives the best results. However, in many applications where the environment is not so conducive to attack by the destroying agents simpler non-pressure methods such as dipping, brushing and open tank treatment, are also effective.

These methods are described in the following pages.

It is important to ensure that the correct quality of creosote be used. The various grades are covered by the following British Standards which are obtainable from the British Standards Institution, 2 Park Street, London, W.1.

BRITISH STANDARD 144: 1954

Coal Tar Creosote for the Preservation of Timber

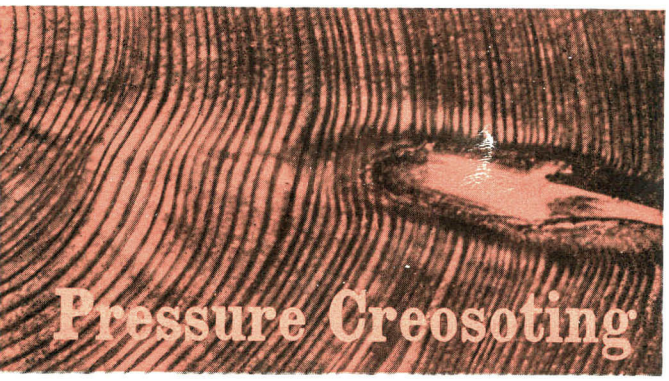
This British Standard specifies creosote obtained by distillation from the several types of tars produced in the carbonisation of coal. Specific gravity, liquidity, water content, distillation range, residue, phenols and matter insoluble in toluole are specified. Methods of sampling and tests are also described.

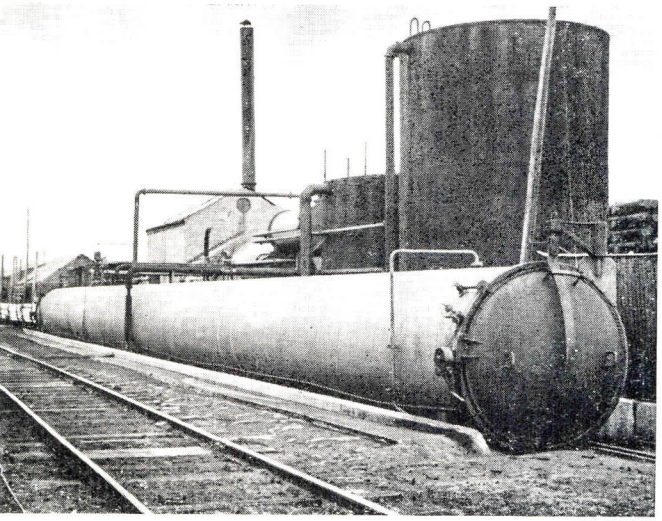
BRITISH STANDARD 3051: 1958

Coal Tar Oil Types of Wood Preservatives Other than Creosote to B.S. 144

These oils are primarily intended for the hot and cold dipping process or for brush or other surface treatment. Two types of oil are specified: Type A produced from high temperature carbonisation processes and Type B produced from other carbonisation or coal-gasification processes.

Specific gravity, liquidity, water content, distillation range, phenols, saturated hydrocarbons, flash point and insoluble matter are all specified. Sampling and test methods are described.





Pressure creosoting plant
(Photo by courtesy of Burt, Boulton & Haywood Ltd).

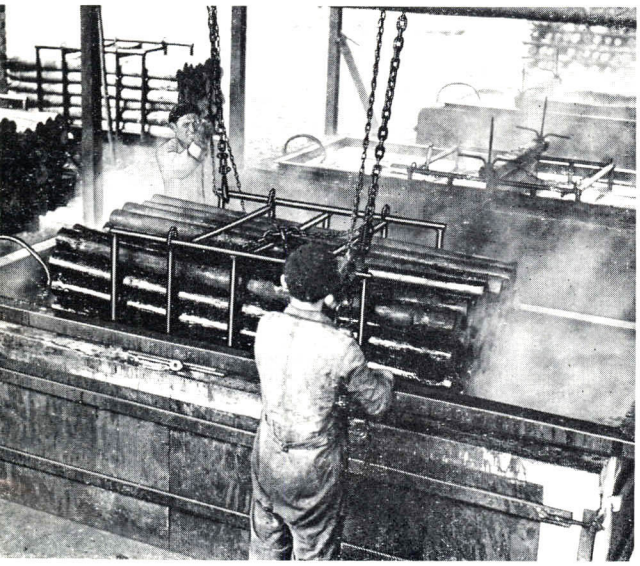
Addresses of firms specialising in pressure creosoting can be obtained upon application to the Association of Tar Distillers. Large consumers of creosoted timber such as the Post Office, Electricity Boards and British Rail have their timbers treated in this manner. Either of two processes may be used—

The Full Cell Process This treatment, also known as the Bethell process, leaves the cells filled with creosote and its main use is for timbers, e.g. marine pilings, exposed to the most severe conditions and where heavy retentions are desirable.

The Empty Cell Process The Rueping and Lowry empty cell processes are commonly used to obtain deep penetration of the timber without using excessive amounts of creosote. All transmission poles are creosoted by the Rueping process, whereas the Lowry process is used mainly for railway sleepers. The relevant Standard for the pressure creosoting of timber is *British Standard 913:1954*. This specification describes the schedules for both the full and empty cell processes, and also covers the initial preparation of the timber.

Timber creosoted in accordance with B.S. 913:1954 will have a maximum life and pressure creosoting is therefore strongly recommended wherever practicable.

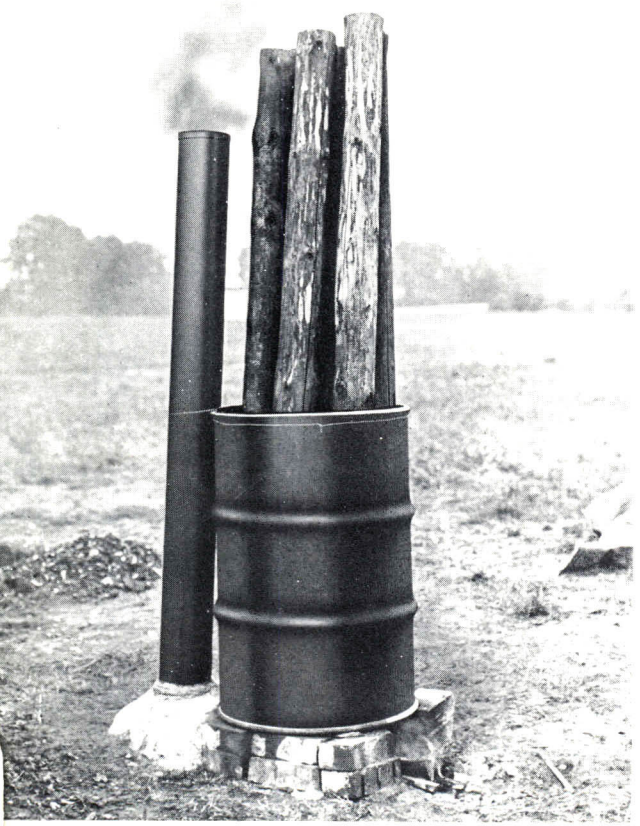
Open tank Treatments



What is known as the *'open tank hot and cold process'* gives excellent results in a relatively short time. The plant required is simple and cheap, consisting essentially of a suitably sized tank in which the creosote can be heated. The timber, weighted or clamped in position, is kept immersed in the creosote which is then heated to about 180°F–200°F. The creosote is held at this temperature for an hour or more, depending mainly on the sizes of timber being treated, and is then allowed to cool to atmospheric temperature. During the heating period much of the air contained in the wood is expelled by expansion. When cooling takes place a partial vacuum is created which draws creosote into the wood. Practically all the absorption takes place during this cooling period, and the importance of keeping the timber completely submerged throughout is evident. It is common practice to heat the creosote by an open fire but, because of the fire risk, it is preferable to use steam or electric immersion heaters.

With permeable timbers such as Scots Pine sapwood, Beech, or Birch, complete penetration of large size timbers can be obtained by this method, and experience has shown that timber treated in this way will have a life of 40 years or more.

Such timbers, however, often absorb more creosote than is necessary by the normal treating schedule and in such cases it is possible to recover the excess creosote by re-heating the charge to 180°F–200°F before removing the timber from the tank.

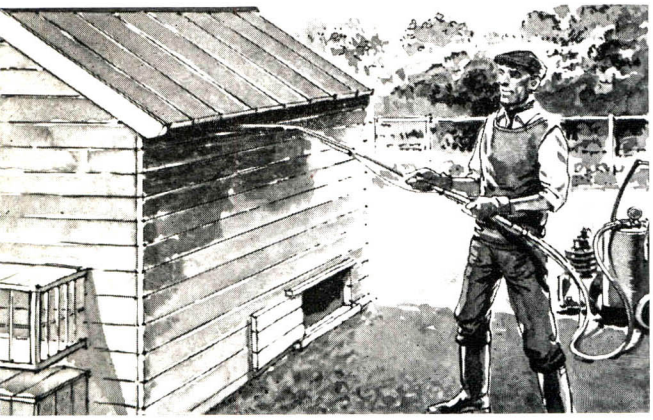


The *butt treatment process* is an adaptation particularly useful for dealing with small numbers of fence posts, hop poles or similar pieces. The posts are stood upright in an open ended drum containing creosote to a depth equal to that to which the posts are to be inserted in the ground. The creosote is then heated and allowed to cool as in the 'open tank hot and cold' process. The upper portions of the post can with advantage be given a good brush treatment at the same time with the hot creosote. A good quality tank or drum that will not develop leaks should be employed, especially if an open fire is used for heating the creosote.

When creosoting by either the 'open tank hot and cold' or by the butt treatment method, ***the creosote should not be heated above 200°F. in order to avoid damage to the timber and to obviate frothing and consequent risk of fire when an open fire is used for heating.*** It is recommended therefore that a thermometer be used to check the temperature of the creosote.

Open tank plant for creosoting fencing stakes
(photo by courtesy of the Forestry Commission)

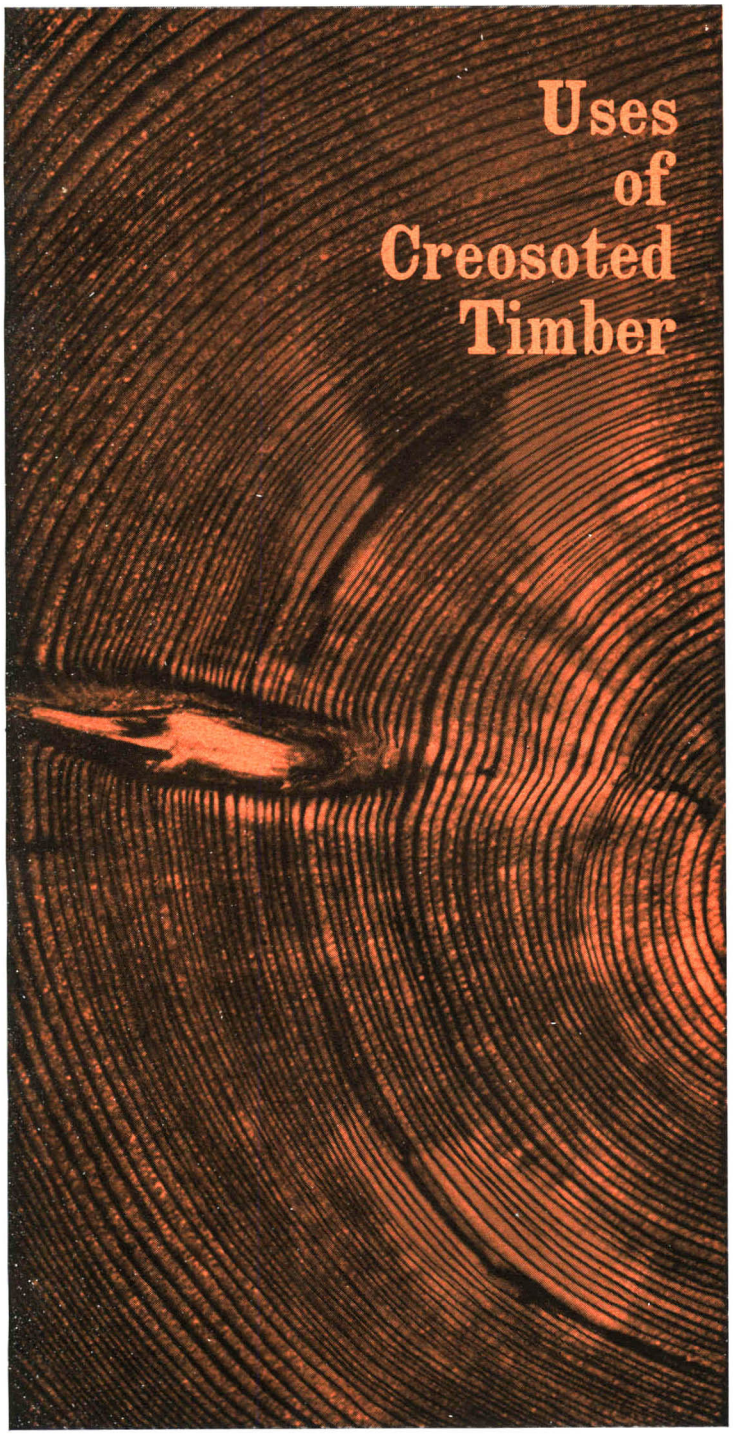
Butt treatment plant
(photo by courtesy of Forest Products Research Laboratory).



Surface treatment with creosote such as by brush, spray or dipping results in shallower penetration of the timber, except possibly in the case of the sapwood of the more permeable species, such as Scots Pine, Beech or Birch. This form of treatment is nevertheless quite suitable for timber structures not in contact with the ground, and for application to timbers in situ.

The creosote should be applied liberally to all surfaces of the timber which should be allowed to absorb as much oil as possible. Special attention should be given to joints and end-grain where decay usually starts. Dipping has the advantage over brushing or spraying in that all surfaces of the timber are effectively reached by the creosote. Prolonged dipping, or steeping, will of course increase the depth of penetration with consequent beneficial effect.

In surface treatments it is advisable to use creosotes that are completely fluid at ordinary temperatures, as specified in B.S. 3051. These oils have good penetrating properties and can be provided by most of the suppliers listed at the end of this brochure.



Constructional and Building Timbers
Timber used externally or in contact with the ground or embedded in concrete, Piles (land or water), Floor joists, Wall plates, Timber cladding, and Shingles.

Fencing
for Railways, Roadsides, Motorways, Estates, Farms, Gardens (including interwoven), Racing Establishments and special fencing such as snow fencing and markers.

Poles
Telephone, Electricity, Radio, Hop, Pergolas and Pole type buildings.

Sleepers and Crossing Timbers
Railway Permanent Way, Sidings.
Temporary roadways.

Farm and Estate Timbers
Animal and Poultry houses, Barns and other Farm Buildings, Silos, Sheep shelters, Fencing and Gates.

Factory Timbers
Constructional timber in contact with the ground or in concrete. Wood block flooring, especially for foundry work.

Water cooling Towers
Structural and filling timbers.

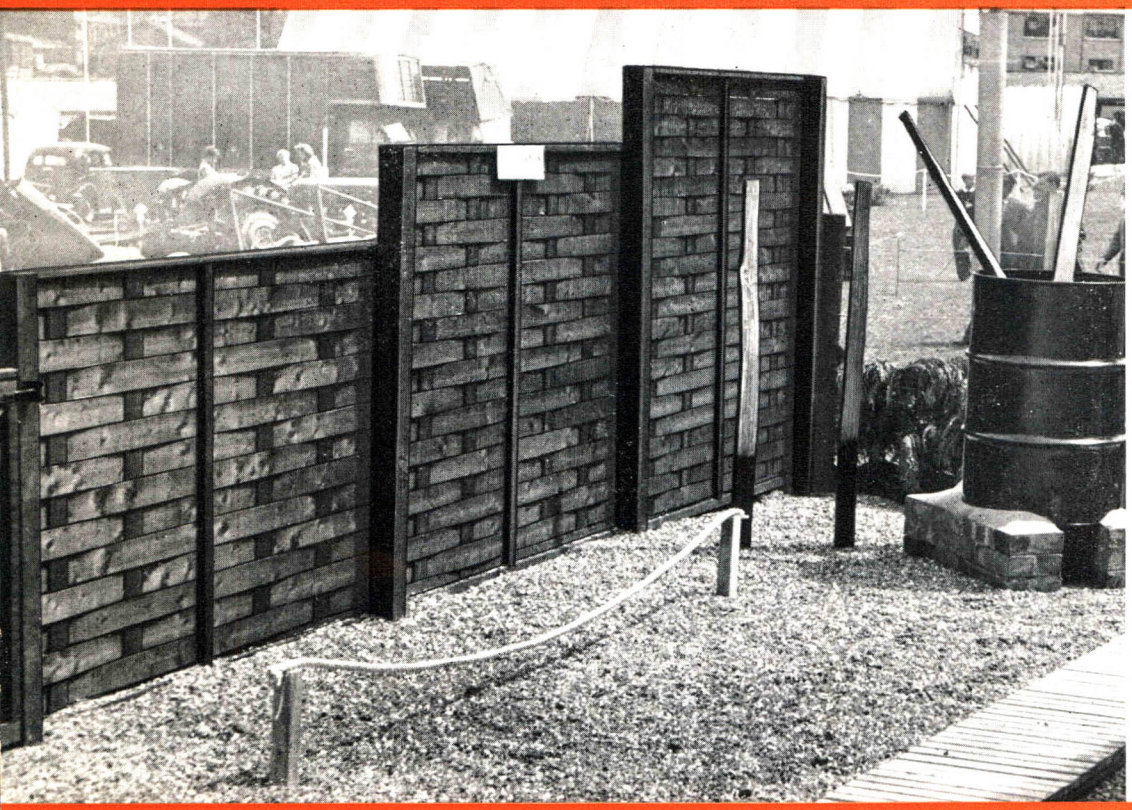
Harbour Works
Piles, Piers and Jetty timbers, Pontoons, Berthing catamarans, Fenders, Dolphins, Walings, Bracings and Stringers.

River and Canal Work
Piles, Revetment timbers, Lock timbers.

Miscellaneous
Level crossings, Bridge timbers. Motorway crash barriers, Footpath edging, Cable troughing and boxes, and Mushroom boards.

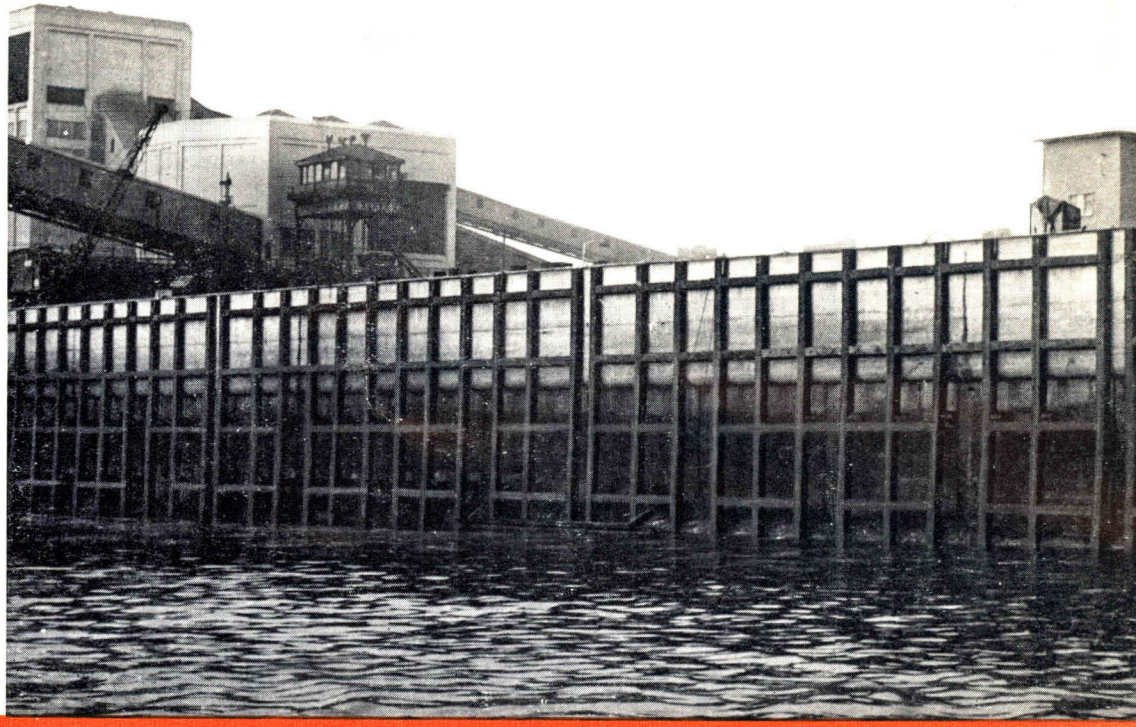
The following photographs illustrate some typical examples of creosoted timber in service. The main benefits obtained from the use of creosoted timber are long life virtual elimination of maintenance costs.

Farm and estate fencing

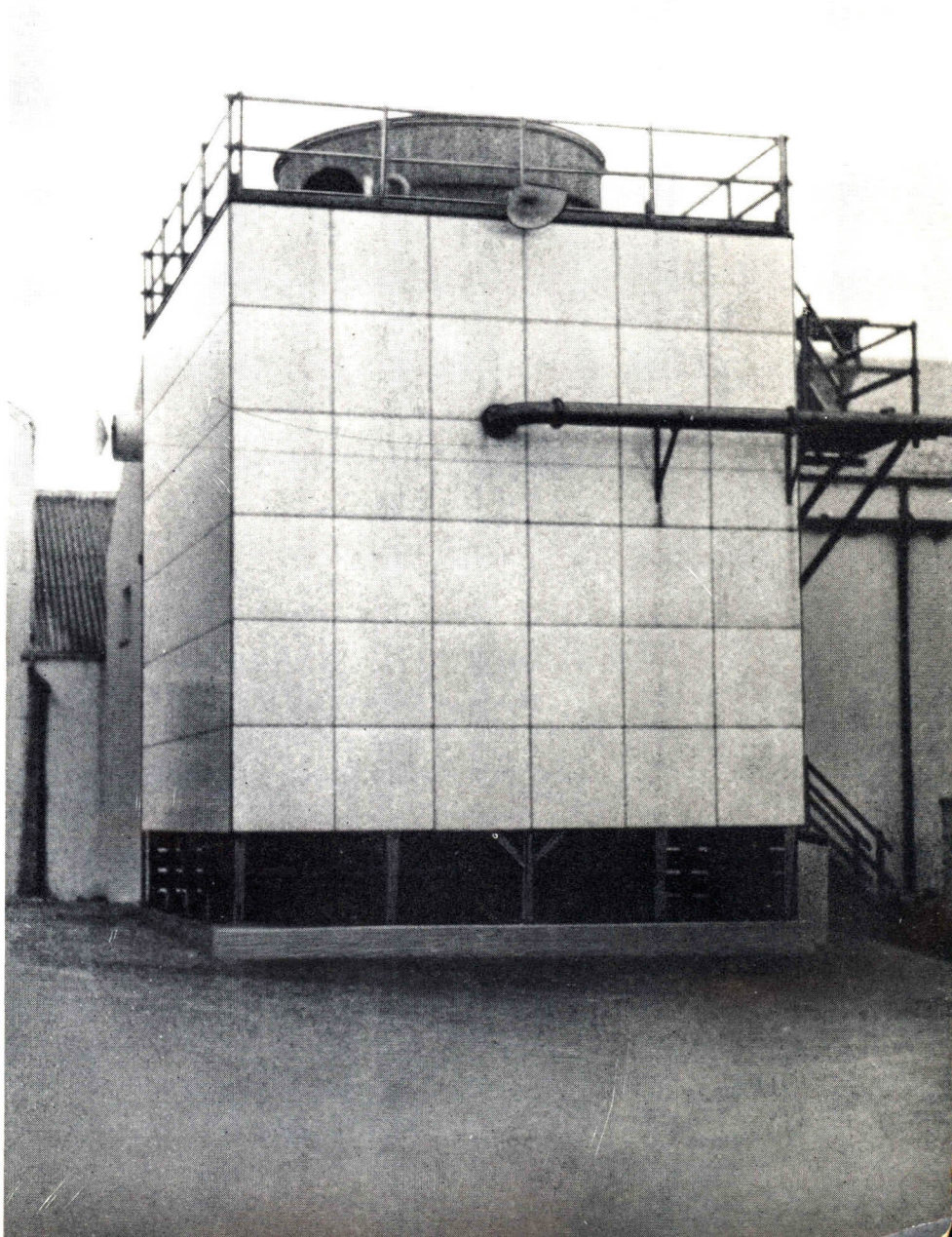


Interwoven fencing

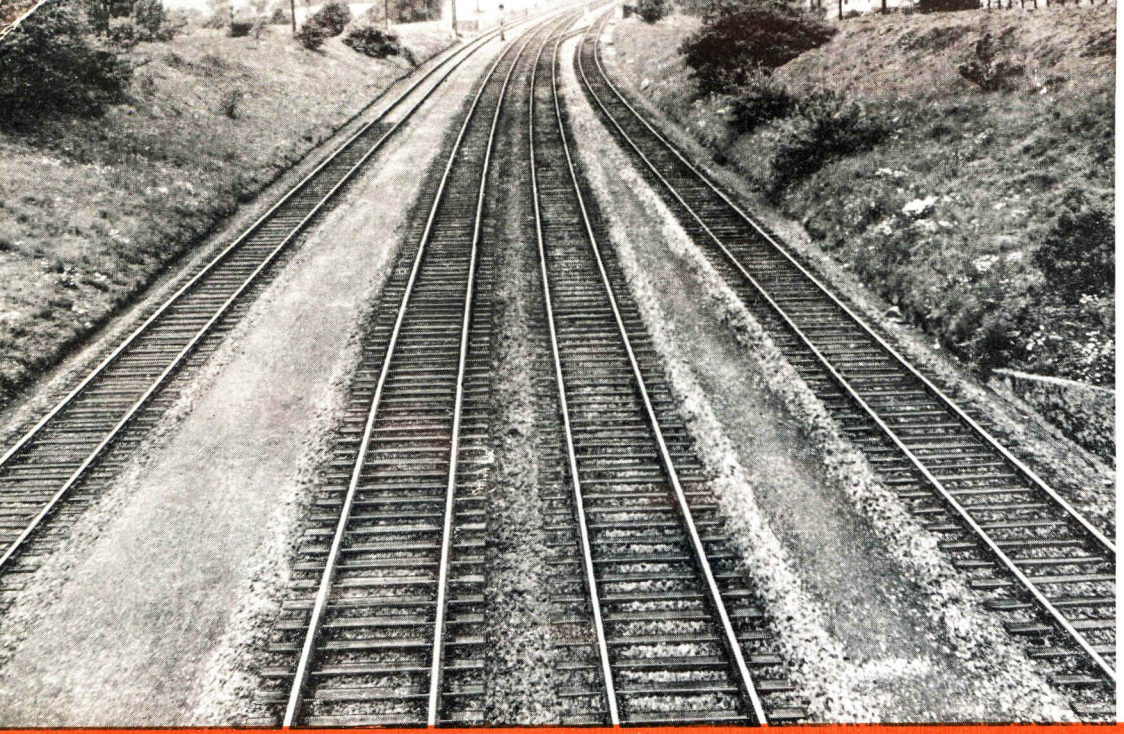
Motorway fencing



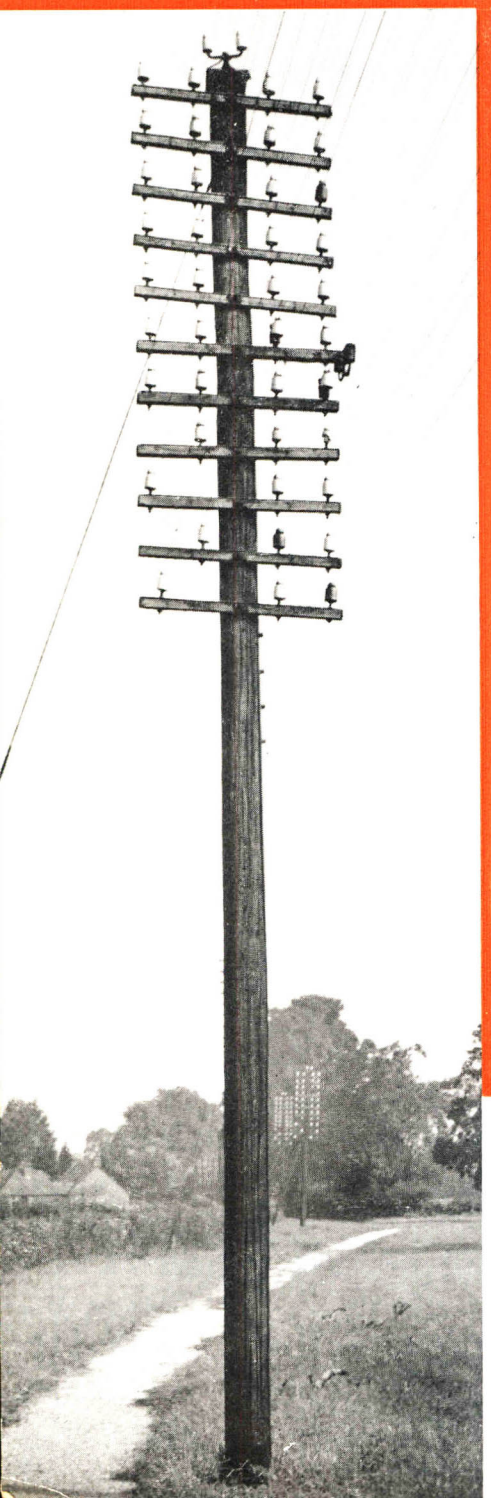
Pressure creosoted timber used in reconstruction of River Wall at Beckton.
(Photo by courtesy of the North Thames Gas Board)



Water cooling tower with structural and filling timber pressure creosoted

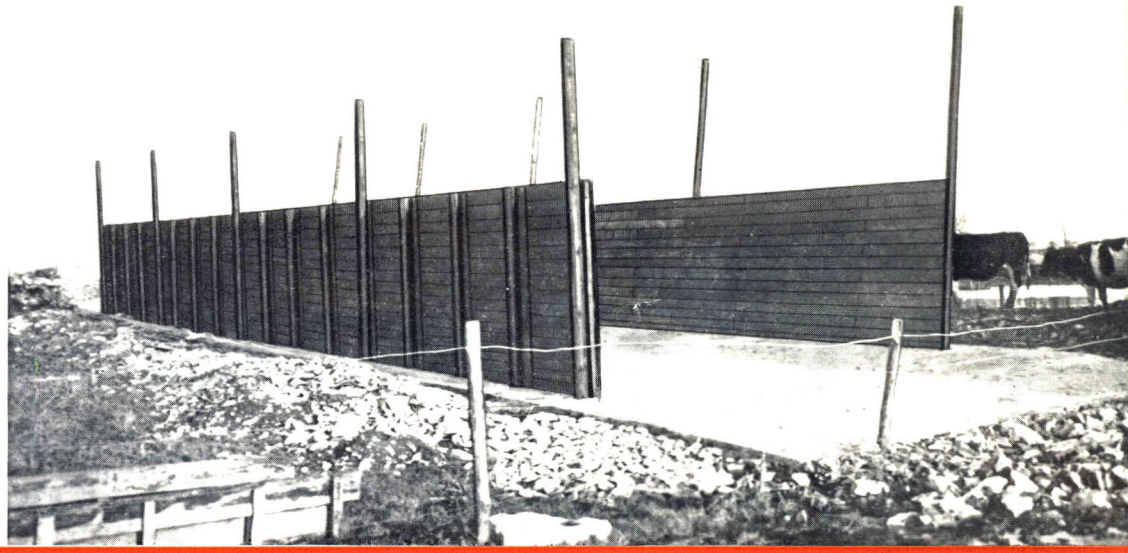


Creosoted wooden railway sleepers in the track.



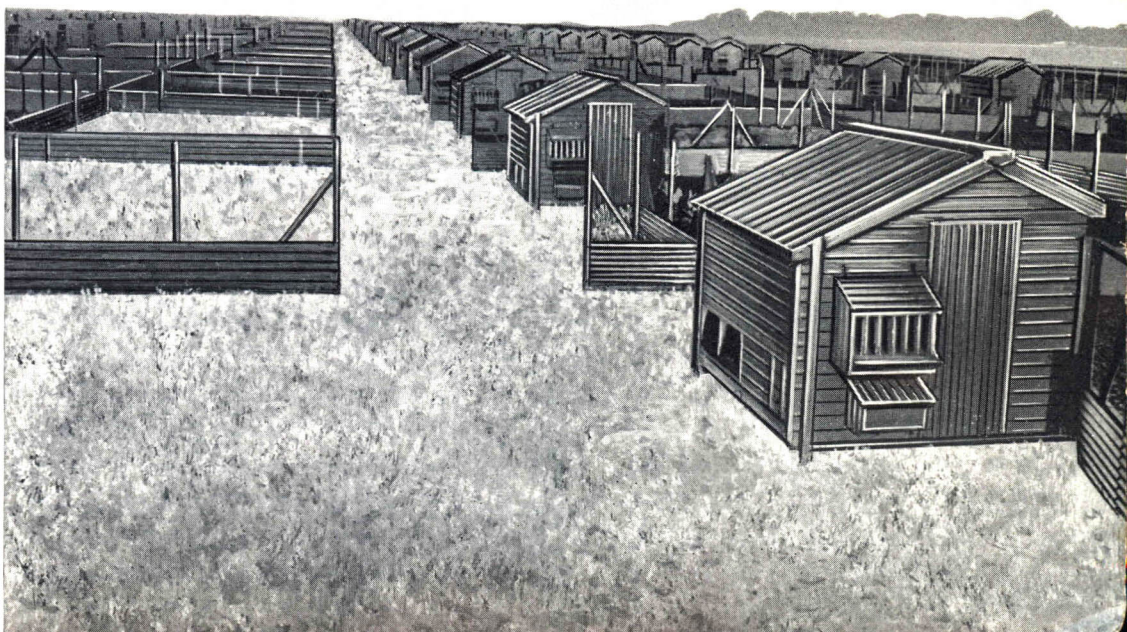
Creosoted wooden railway bridge constructed in 1894 and still in service on British Rail.

Creosoted telegraph poles in sound condition after 65 years in the line.



Horizontal silo constructed of pressure creosoted timber.

Barn constructed in 1880 of pressure creosoted timber. Still in good condition 85 years later.
(Photo by courtesy of Armstrong Addison & Co. Ltd).

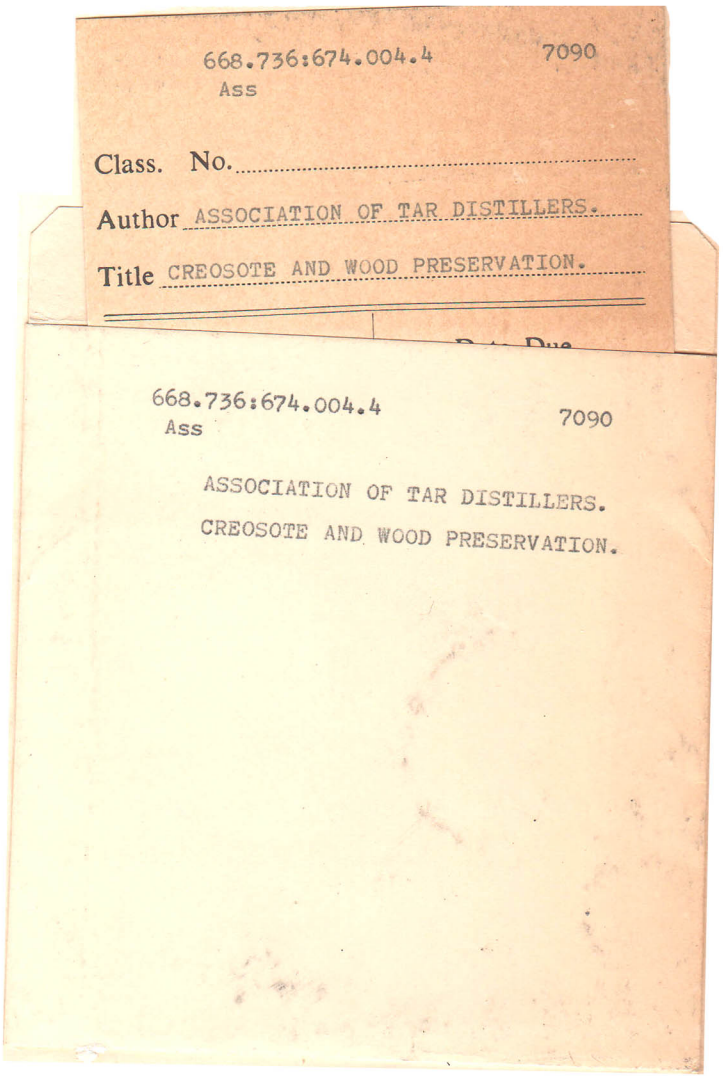


Creosoted poultry rearing fold units at a Government Poultry Produce Testing Station.

Pole type barn with pressure creosoted softwood poles as the main supporting timbers.

Silo constructed of pressure creosoted timber.

Date Due		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ASSOCIATION OF TAR DISTILLERS.
CREOSOTE AND WOOD PRESERVATION.

List of Creosote Producers

Belfast Corporation Gas Works,
Riley's Place, Belfast. Belfast 20015

Bitmac Ltd., Dawes Lane,
Scunthorpe, Lincs. Scunthorpe 2252/3

Bristol & West Tar Distillers Ltd.,
St. Philips, Bristol 2. Bristol 77081

Coalite & Chemical Products Ltd.,
P.O. Box No. 21, Chesterfield,
Derbyshire. Bolsover 2281

Dorman Long (Chemicals) Ltd.,
P.O. Box No. 8, Port Clarence,
Middlesbrough. Middlesbrough 57331

Gas Boards

North Eastern Gas Board,
Leeds Group, Bridge Street,
Leeds 2. Leeds 36292

North Thames Gas Board,
Tar and Ammonia Products Works,
Beckton, East Ham, E.6.
Albert Dock 2944

Northern Gas Board,
P.O. Box 123
Newcastle-on-Tyne, 1.
Newcastle 26101

South Eastern Gas Board,
Corn Exchange Building,
52/57 Mark Lane, London, E.C.3.
Royal 8066

Hardman E. Son & Co. Ltd.,
Bedford Street, Hull. Hull 23902

Lancashire Tar Distillers Ltd.,
P.O. Box No. 453,
74 Corporation Street, Manchester, 4.
Blackfriars 2652

London Tar and Chemical Co. Ltd.,
Corn Exchange Building, 52/57 Mark
Lane, London, E.C.3. Royal 8066

The Midland Tar Distillers Ltd.,
Oldbury, Birmingham.
Birmingham, Broadwell 1530

National Coal Board

Coal Products:
(A Division of the National
Coal Board)
Headquarters:—
26/28 Dorset Square, London, N.W.1.
Ambassador 3266

Scotland:
Marketing Department,
135 Buchanan Street, Glasgow, C.1.
Glasgow Central 8750

Northern Region:
Akenside House,
Side,
Newcastle-on-Tyne, 1.
Newcastle 28577

Midlands Region:
Wingerworth, P.O. Box 16,
Chesterfield, Derbyshire.
Chesterfield 77001

South Western Region:
Powell Duffryn House, Docks,
Cardiff. Cardiff 31011

Thomas Ness Ltd.,
Akenside House,
Newcastle-on-Tyne, 1.
Newcastle 28577

Normanby Park Tar Supply Co. Ltd.,
Forster House, Hatherton Road,
Walsall, Staffs. Walsall 28222

Plymouth Tar Distilleries Ltd.,
Cattedown, Plymouth, Devon.
Plymouth 63161/2

Printar Industries Ltd.,
Brettenham House, Lancaster Place,
Strand, London, W.C.2.
Temple Bar 5801/8

Salamon & Co. Ltd.,
Ferry Road, Rainham, Essex.
Rainham 52184

Scottish Tar Distillers Ltd.,
Falkirk, Scotland
Falkirk 21411

South Eastern Tar Distillers Ltd.,
Vale Road, Tonbridge, Kent.
Tonbridge 3271

South Western Tar Distilleries Ltd.,
Eling House, Totton,
Southampton.
Totton 2444/9

Tennants Tar Distillers &
Engineering Supplies Ltd.,
P.O. Box No. 70, 94 Royal Avenue,
Belfast.
Belfast 26256

United Coke & Chemicals Co. Ltd.,
P.O. Box No. 136,
Handsworth, Sheffield, 13.
Sheffield Woodhouse 3211

West Cumberland By-Products Co.
Ltd., Flimby, nr. Maryport.
Maryport 8

Yorkshire Tar Distillers Ltd.,
P.O. Box No. 1, Cleckheaton, Yorks.
Cleckheaton 4222

Some of the above firms have other addresses from which creosote may be obtained. There are numerous local suppliers of small quantities of creosote and advice as to their location should be sought from one of the above firms.

The Association of Tar Distillers, the sponsor of this brochure, is a member of the official organisation concerned with timber preservation in the U.K., namely, the British Wood Preserving Association, 6 Southampton Place, London, W.C.1. The B.W.P.A. issues many publications on the subject and, in collaboration with the B.S.I., is actively engaged in the standardisation of wood preservatives.

Enquiries on the application of creosote should be addressed to the Technical Adviser,

ASSOCIATION OF TAR DISTILLERS

9 HARLEY STREET · LONDON · W.1.

TELEPHONE MUSEUM 3833

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