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# Landscape treatment of freeways in the Netherlands

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Most freeways in the Netherlands have so far been built in the western part of the country, where the population is dense and trade and industry are important means of subsistence. Besides, overseas shipping and air traffic necessitate good road communications. The landscape in the West is generally flat and open and has to be kept dry by pumping, which necessitates crossings with waterways in many places. Besides, the bearing capacity of the soil is often small, so that the laying-out of roads is expensive. These are important points in the landscape treatment of roads.

In the Netherlands trees in rows have been typical of roadside planting. In a country poor in woodland like the Netherlands wood growing along roads is of great importance, especially broad-leaved because the small woodland area is generally restricted to the poorest soils, which are planted to conifers. In areas exposed to wind action plantings are of great value to screen off the wind.

Experience has, however, shown that it is dangerous to plant trees close to highways used for high-speed traffic. The trees should be at least 5 metres from the side of the travelled way. Therefore freeways like avenues with trees are out of the question.

Rows of trees on either side of the road should be about 30 metres apart so that no closed crown roof will form. For reasons of safety no trees are planted in the median, unless it is at least 10 metres wide. In this case the distance from the row of trees in the median to those on the side strip should be at least 17 metres and here the crown roof will not close either. Existing local roads or cycle paths may be provided with row-planting. The freeway must then, however, be at a proper distance from them. At any rate, this way of planting will not give the intimacy of the traditional avenues either. Besides, the distance between

the trees in the rows will have to be greater than it used to be. The faster the traffic, the smaller the angle at which the countryside is seen. Short distance will screen off the landscape, so they should be increased, but without exaggeration because the row of trees seen from the open landscape should not be too thin.

The avenue does not, however, produce such a typical landscape picture that it should be applied as much as possible.

The road should receive such landscape treatment as to produce a harmonious relation between road and landscape.

This principle is also applied in the Netherlands.

Planting is a valuable aid in the landscape treatment of the road. It is one of the elements that draw most attention in a flat and open landscape. This does not mean, however, that it is only the planting that can make the road picture attractive. There are numerous defects in road planning that cannot be met by planting. They may relate to the place of the road in the landscape, the road plan, the alignment, the width, the altitude, the arrangement, the delimitation. Generally, these defects are hard even to tone down. To build a road that meets both technical and landscape requirements a close cooperation between road building and landscape experts is essential from the start. Fortunately, coordination in this field is growing in the Netherlands.

It may be asked why landscape treatment of roads is necessary. Will it not suffice to build a road that is technically as perfect as possible? Also in the Netherlands the belief is growing that the technically perfect road is not the safest and the best and is apt to slacken the attention of the drivers and to make them tired. So, if rural scenery is to the benefit of traffic, there



Fig. 1. Freeway with double rows of trees along the cycle paths. The way on the right was recently transformed into a three-lane road to increase capacity. On the wide median a freely growing hedge.



Fig. 2. View from the landscape on a freeway with plantings along an approach to a viaduct over a railway. The whole gives the impression of a strip of forest while the high approach is no longer conspicuous.

is all the more reason for basing road planning on the cultural interest of the well-designed landscape.

When road and landscape harmonize, the planting forms the link between the road as a technical construction and the landscape. The planting should match the landscape through which the road leads. This does not mean that planting and landscape should in all respects be in keeping with each other, but there should to a certain extent be harmony. According as the landscape is less attractive the road planting may have a character of its own. Several

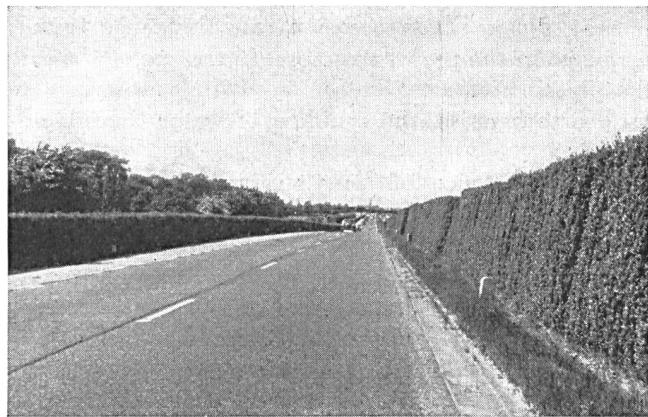


Fig. 3. The median planting and the hedge between the roadway and the cycle path form a sort of "gully."



Fig. 4. Freeway of which only one of the two lanes has been built. The planting on the unused part of the road lot gives a pleasant accent to the open landscape. The space for the future second lane is on the left. The absence of median planting favourably affects the space picture. The parking lane has not yet been built, which promotes the symmetry of the road.

elements are here distinguished such as the place, the form, the density, the height of the planting, but also the sort of wood, the soil condition and the available space. Of importance is also the interrelation between the elements composing the landscape.

Generally, it is easier to find adaptation in a varied landscape with many wood stands in the form of avenues, woods, woodwalls, tree groups, shrubbery, separate trees than in an extensive, open landscape, where the planting has an influence of its own. In the latter case a more or less independent landscape has

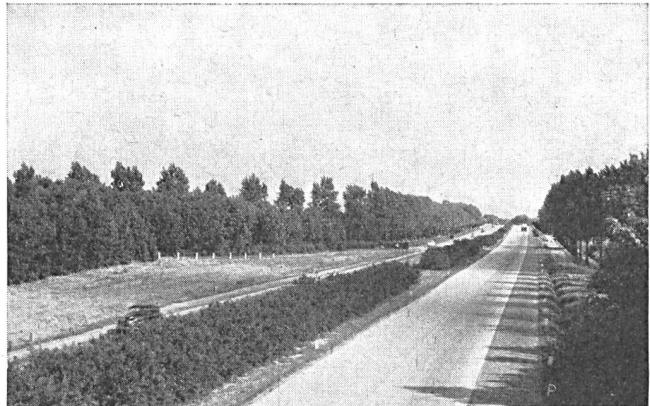


Fig. 5. Freeway with continuous shoulder and heavy planting near an intersection. A strip of grass between the median hedge and the roadway disguises the asymmetry of the road half.

to be created unless the openness of the landscape is so attractive that a thin planting, or no planting at all, will promote the harmony between road and landscape.

As has already been said most freeways are found in the west, an area with a flat and open landscape. Now it is generally considered that the road can be best adapted to the surrounding landscape if both are approximately on a level, though an elevation in the landscape may be attractive. It may afford a view of the country which is exceptional in a flat landscape. The elevation should not be continued too long because it may accentuate the natural separation between road and landscape. A raised freeway in a flat landscape is more striking than a dike serving as a defence against the water. Seen from the landscape, such a road often forms an unwarranted visual separation which can hardly be softened by planting. Owing to the high building costs these elevations are rarely made. Yet there are parts of roads raised over great lengths without the road user being aware why this is desirable. The reason may be that some inconspicuous agricultural road, a polder water or approach have to be crossed at such short distances that the road builder could not every time lower the road to its original level. As a rule these elevations are

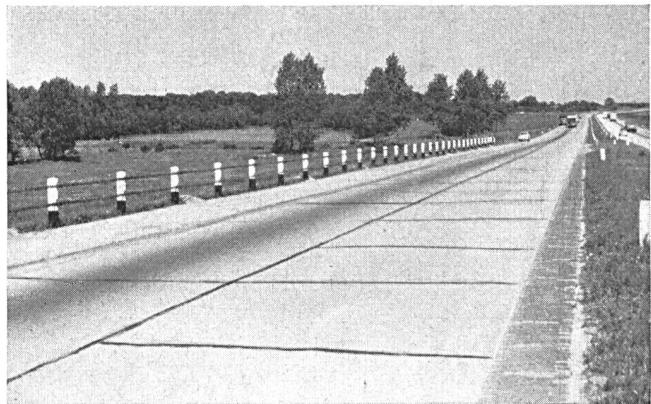


Fig. 6. View of a pool resulting from sand winning for road building. Planting has brought it into harmony with the landscape.

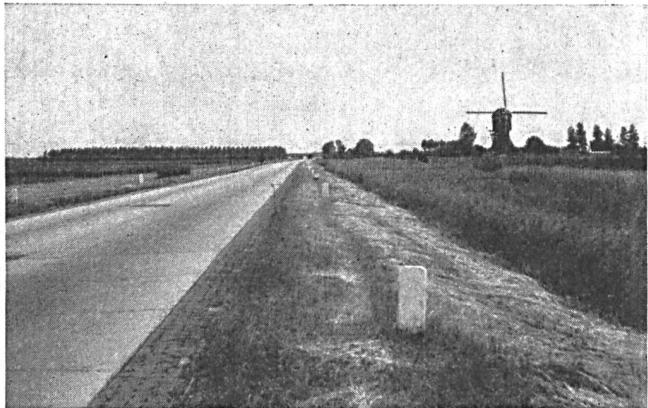


Fig. 7. Unplanted freeway in keeping with the structure of the landscape. Only one roadway has been built. The space on the right is intended for the second roadway.

expensive in a flat landscape owing to the high transport costs of sand and the small bearing capacity of the soil so that it is necessary to plan the cross section of the road as small as possible. As a rule this diminishes the attractiveness of the road. A large cross section may, compared with the longitudinal profile, help to give an agreeable space picture to the road.

The longitudinal profile is very important and deserves full attention. In the course of time much experience has been gained in this field also from abroad. The size of a freeway is so different from that of a main road where mixed traffic is admitted that the longitudinal profile should be adapted to it. The great speed of driving requires a very gradual design both horizontally and vertically. The rounding-radii that have to be applied should, therefore, be far greater than was originally considered sufficient. Also with regard to straights views have gradually changed. Ex-

perience has shown that as a rule straights should not exceed 2.5 or 3 km. if they lie in one plane. If this distance is greater, there is a danger that the attention of the driver will slacken with all possible consequences.

It is difficult to give general standards, for in a varied landscape of a limited structure straights of 3 km. will soon have a disturbing effect on the picture of the landscape. On the other hand bends should not be made arbitrarily. If the presence of a bend is not understood, it will disturb the harmony of the whole.

When there is a need for a bend or curve for scenery purposes, an occasion can always be found; a change in the parcel structure, in the use of the soil, the presence of a difference in altitude, whether natural or otherwise, the avoiding of water, a bridge or a viaduct.

The avoidance of long straights is also to the interest of traffic. There is even a tendency to avoid long straights in order to keep the attention of the driver going and because a car is better controllable in a succession of bends and curves. In landscapes with a straight pattern, which is usual in Dutch polders straights are preferable for scenery purposes. The abandonment of straights would for the same reason be out of place here.

So in order to fit the freeway into the landscape the longitudinal profile, the cross section and the altitude of the road are of great importance. The determination of these elements covers all the possibilities of planting so that in this initial stage reasonable wishes of the landscape architect should be complied with.

Tree planting requires a wide cross section over a sufficient length. In a flat open landscape these big roads will generally call for robust plantings. A single row of trees will not be sufficient, particularly when there are great distances between the trees.

Quite a different picture is obtained if double rows can be placed on either side of the road. Such a planting may assume a monumental character if young trees of a robust type are planted over a sufficient length of the road. It is remarkable that there seems to be some shrinking from this way of planting. Robust plantings of some extent are too often thought to have a dull effect. Variation in planting is so much considered an axiom that it is thought necessary to apply it in places where it will produce disquiet rather than variation. This does not mean that freeways should always have a monumental road picture. The road itself and its surroundings should call for it. In certain conditions variation will certainly be necessary to make road and landscape harmonize, but it should always be borne in mind that a quiet picture is essential. The road user should unconsciously get a pleasant impression which does not divert him from the traffic in which he is participating.

The necessary construction of local roads or cycling paths or a combination of the two may present

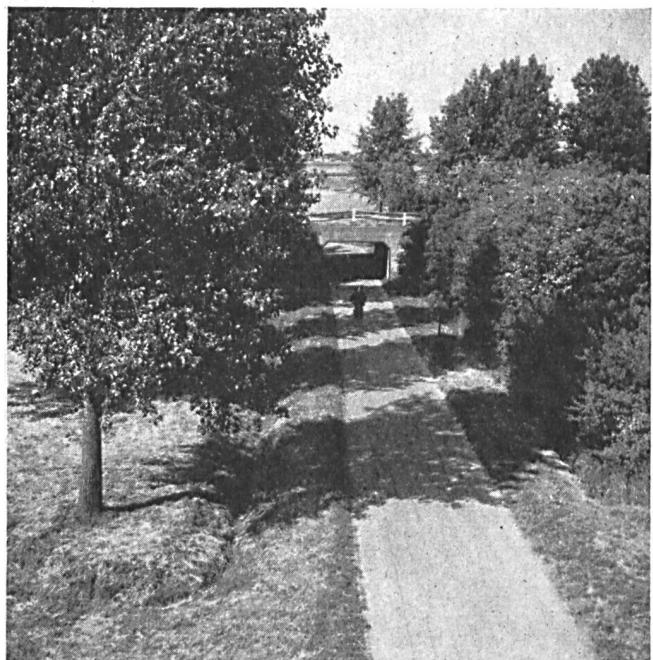


Fig. 8. Cycle path continued at an intersection of two freeways under the freeway and ramps. The planting of this path was designed as an independent element.

an opportunity for making plantations. If the borders of these accompanying roads afford enough room, this plantation may be robust and have the character of belonging to the plantation of the freeways. Experience has shown that this may produce a satisfactory road picture. As such roads are only found locally, they cannot serve as a general means for landscape treatment.

Many freeways are built in coastal areas which are heavily exposed to the wind and this restricts the choice of the sort of wood to be used. The property to stand up against wind in an open space is a primary requirement so that only a few species are eligible. It is to be regretted that Dutch elm, which bears wind well, and yields excellent wood into the bargain, has fallen out on account of the incidence of Dutch elm disease. Though much work has been done in the Netherlands on elm disease and many elm crosses have been carried out, all attempts at selecting an elm resistant to the fatal disease have failed.

Therefore, the poplar is much used. There are several species of poplar that are eminently suited to be planted in open places exposed to wind. Though there are several species of poplar, they do not afford enough variation in the landscape picture. A greater disadvantage, however, is that the poplar cannot be maintained along a freeway for many years because a strong wind often tears off the branches, which impedes the traffic. Therefore, poplar plantings have to be rejuvenated after some years. But the search for a sort of wood more resistant than the poplar is continuing. The use of the poplar is rather a transition towards the time when a fully resistant elm can be planted.

Further, it is a general rule to use only species of wood naturally occurring in, or at any rate fitting in with, the landscape. This results from the principle that planting and surroundings should harmonize. Natural conditions provide a good directive in the choice of species. It will, however, not be possible to observe this rule too strictly because road buildings, is usually attended with "soil improvement," which means exactly the reverse for many species of plantations.

The use of sand for increasing the bearing capacity of the soil and raising the level of the soil for bridges, viaducts, exit turns, etc. may thoroughly change the natural conditions for plantings. To prevent the choice of plantings from having to be made in accordance with the conditions to be created by the road builder, road and landscape planners should agree beforehand.

Apart from soil improvement it is also for practical reasons desirable to adapt the choice of plantings to existing soil conditions. Plantings often extend over great distances and large areas so that also the initial costs make it desirable to choose only such species as will locally develop well.

In the choice of planting also median planting should be considered with regard to light screening. An ideal median planting should extend over the whole length of the road. Landscape treatment does

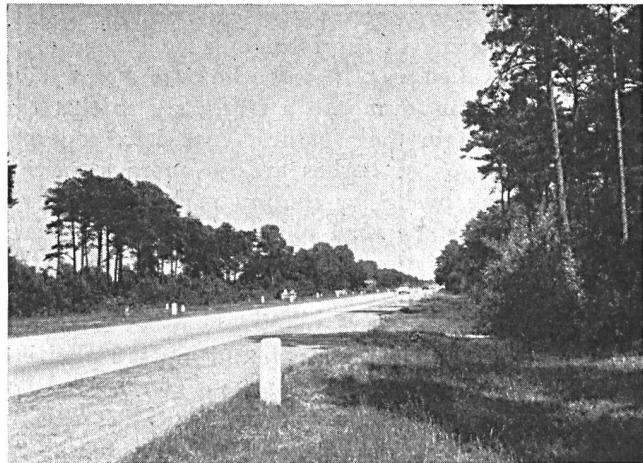


Fig. 9. Freeway through fir-wood. The natural border of the wood was used. On the median are groups of bushes of indigenous oak planted in the spring. They serve to screen off the light.

not require such planting. It is hardly possible for the landscape architect to find a harmonious solution here. Besides, the desired light-screening action of this planting imposes such a restriction on the choice of species that it impairs the aesthetic element. Therefore, median planting is only an attempt at controlling the danger of dazzling. This is in essence a technical traffic problem. The end in view might as well and even better be attained with purely technical means but for economical, road-technical or aesthetic reasons the solution is not sought in this direction. The ideal solution to this problem has not yet been found and, in fact, it will be hardly possible to find one that satisfies the requirements of rural scenery.

So rural scenery does not require median road planting and, besides, it screens off the light and obstructs the view on the side of the hedge. The narrower the median, the smaller the distance from the planting to the roadway.

The presence of shoulders gives each of the double lanes an asymmetrical appearance, which by no means improves the aesthetic aspect of the road. This effect is accentuated when there is no space between hedge and roadway. In wide medians a strip of grass of some width may remain along the travelled way,

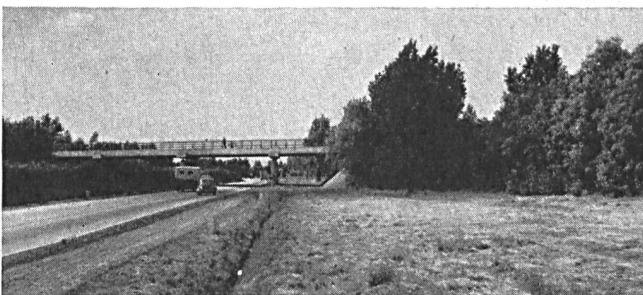


Fig. 10. The intersection of two freeways has been treated as a separate element in the landscape.

which gives a much more agreeable space effect than a median planting in the form of a cut hedge close along the travelled way. Besides, the bushes on a wide median need not form into a stiff wall, so that the bushes may retain their natural character. Separate bushes or groups of bushes are far more attractive than adjoining bushes or continuous hedges. It considerably widens the road picture and besides, there can be some variation in the distance between the groups. To keep the road picture quiet, bush groups should be built up out of the same species of bushes over great distances. Neither should median planting be applied as an ornamental element of the road for traffic purposes. With separate groups there may be strong gusts of wind through the openings when there is a side wind. This may impede the traffic because it is very troublesome to light vehicles. Trees can only be planted in very wide medians. A tree planting should, however, be very dense in order to produce the desired light screening. For this purpose bushes are more effective.

Light screening is also desirable when there are cycle paths along the freeways, which is often the case with other roads. Generally a combination of a freeway with a cycle-path is not recommendable. The cyclist makes other demands on landscape treatment than the motorist does. The cyclist needs shelter, which means a plantation that obstructs the view of the landscape on the side of the cycle path. For reasons of effectiveness the outside of the road will be allotted to the cyclist, which means for the motorist that his view is obstructed both on the side of the median and on the outside of the road. As a result of this the motorist will ride in a sort of "gully" of bushes, which is not very pleasant.

A difficulty presents itself in hilly terrain and with approaches to viaducts and bridges, because the hedges should be higher than normal. In some places the median plantation must then reach a greater height than ordinary bushes can attain. If bushes attained the necessary height, they would become too dangerous as they would be obstacles that may kill the motorist. To meet this disadvantage a combination of young trees and bushes is made. The trees are so pruned that they form a close crown. These trees are afterwards removed and gradually replaced by new ones when the trunks are becoming too thick.

Finally, a few words may be said about such special points as junctions, crossings, plantings near viaducts, etc.

In a flat open landscape junctions generally are of such a size that they constitute an altogether strange element in that landscape, which is also partly due to the differences in height necessary to lead to the junctions only in one direction of the traffic. It is then difficult to make road and landscape harmonize. Therefore, it is preferable to deal with these points as separate independent elements so far as the landscape is concerned. If not contrary to traffic requirements, a heavy planting of the more or less complicated road system is fully justified. When seen from a distance the road system has the appearance of a heavy plantation which might represent a wood. The strange element is in a way camouflaged.

Also with intersections, whether grade separation or rotary intersection, the independent treatment of these extraneous elements often gives a satisfactory solution. To leave a clear view the rotary intersection will get little if any plantation, but in the vicinity of the intersection a heavy plantation screen may be made.

Median planting is applied for reasons of effectiveness. Plantings may also serve the traffic for other than aesthetic reasons, namely to guide the traffic, particularly in darkness and fog. It may, however, also in normal weather conditions be agreeable to the motorist to be imperceptibly guided through a bend by means of the planting. On freeways, however, the trees are placed farther from the travelled way than on smaller roads so that for freeways optical guidance, though an appreciable advantage, is not of the same value as for smaller roads.

The question arises if the inclusion of freeways in the Dutch landscape has been satisfactory in every respect. This question should be answered in the negative though some freeways serve their purpose well. Experience gained has been of great value, especially when errors made gave rise to constructive criticism. Besides, it should be borne in mind that the freeway brought an extraneous element into the Dutch landscape. Because of the special size of this type of road and the great speed with which the landscape can be crossed it has required some time before a definite judgement could be formed.

#### Bildlegenden zum Artikel Overdijkink

Abb. 1. Autobahn mit doppelter Baumreihe längs der Fahrradstreifen. Lebhag im Mittelstreifen.

Abb. 2. Autobahn mit Baumbepflanzung bei einem Viadukt über eine Eisenbahnlinie. Die Erhöhung tritt nicht in Erscheinung.

Abb. 3. Die Bepflanzung auf dem Mittelstreifen und die Hecke zwischen Fahrbahn und Rechtsfahrtstreifen bilden sehr betonte Scheidewände.

Abb. 4. Autobahn, bei welcher erst eine Fahrbahn erstellt wurde. Die Bepflanzung auf der ungenützten Strassenseite fügt sich gut ein.

Abb. 5. Autobahn, deren eine Fahrbahn stets höher liegt als die andere. Ein Rasenband zwischen der mittleren Trennhecke und der Strasse lässt die Asymmetrie verschwinden.

Abb. 6. Anblick einer Bodensenke, wo Sand für den Strassenbau ausgebeutet wurde. Die Bepflanzung stellt die Harmonie mit dem Umgelände wieder her.

Abb. 7. Autobahn ohne Bepflanzung, jedoch trotzdem in Harmonie mit der Umgebung.

Abb. 8. Fahrradweg, welcher unter Autobahn und Anfahrtsrampe hindurchführt.

Abb. 9. Autobahn beim Durchqueren eines Waldes. Benützung des natürlichen Waldrandes. Auf dem Mittelstreifen Eichgebüsch als Lichtfilter.

Abb. 10. Kreuzung zweier Autobahnen als selbständiges landschaftliches Element.