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BICYCLE RESEARCH REPORT NR. 16

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Jan Ploeger et al: Signposts for Cycle Planning

Dutch specialists recommend "Bottle-neck plans" for cycle networks

The Key Facts

What these Dutch "signposts for cycle planning" have in mind is a number of purpose-built networks, including special features at the "bottle-necks" of each network. These features are determined both by the mechanical properties of the bicycles and the abilities and attitudes of the cyclists.

Contents

"Signposts for Cycle Planning", published by the Dutch research foundation C.R.O.W., an organization corresponding to the British Transport and Road Research Laboratory, shows that the mechanical properties of bicycles and the ergonomics of cycling form important criteria for cycle planning.

The Dutch specialists have picked out 5 distinct stages in the planning process (see Fig 1): an initial stage, planning the network, a "bottle-neck plan", drawing up priorities, and an action stage.

The initial stage consists primarily of a decision on general principles for the plan. In stage 2 (see Figures 2 and 3) a draft of the structure of the future cycle network is worked out, based partly on the routes desired. Cycleways or other features are designed for the “bottle-necks” of each section of the network, and may include special traffic regulations, distinctive paving at junctions, or improved road surfaces. Thus a cycle traffic plan should achieve more than a mere cycleway plan.

At the priorities stage, all measures have to be costed and decisions made on the order in which they are to be carried out, depending on how effective and practicable they are likely to be. During the final action stage, checks have to be made from time to time to see if each point in the plan is still relevant to present conditions.

Cycle networks have to take into account the range of physical and mental ability among cyclists. The cyclist's speed, for instance, depends on his own ability, the topography and on the weather. Fig 4 shows that cyclists reaching a speed of 30kph (19mph) in flat, calm conditions can reach only 15kph (9mph) on a 3% gradient against a headwind of 3 metres per second.

Cycle use is influenced by traffic conditions and environmental factors such as the impressions given by a journey. A Dutch survey found that 82% of people interviewed thought cycling was "relaxing and healthy", and 35% claimed that this was why they cycled. 56% thought cycling was dangerous, and 10% gave this as their reason for not cycling.

Source	Dutch title: "Wegwijzer Fietsvoorzieningen. Uitgangspunten en planvorming" by J Ploeger, assisted by Dr C C Bosselaar, R Godefrooij, A Pettinga, and Dr I C Slebos. Published by the Stichting Centrum voor Regelgeving en Onderzoek in de Grond-, Water- en Wegenbouw en de Verkeerstechniek (C.R.O.W.), November 1990
Further Information from	Stichting C.R.O.W., Postbus 37, NL-6710 BA Ede. Copies available for Dfl. 15 plus postage and packing from: ENFB, Postbus 2150, NL-3440 Woerden.

Fig 1: Contextualized outline of cycle planning measures

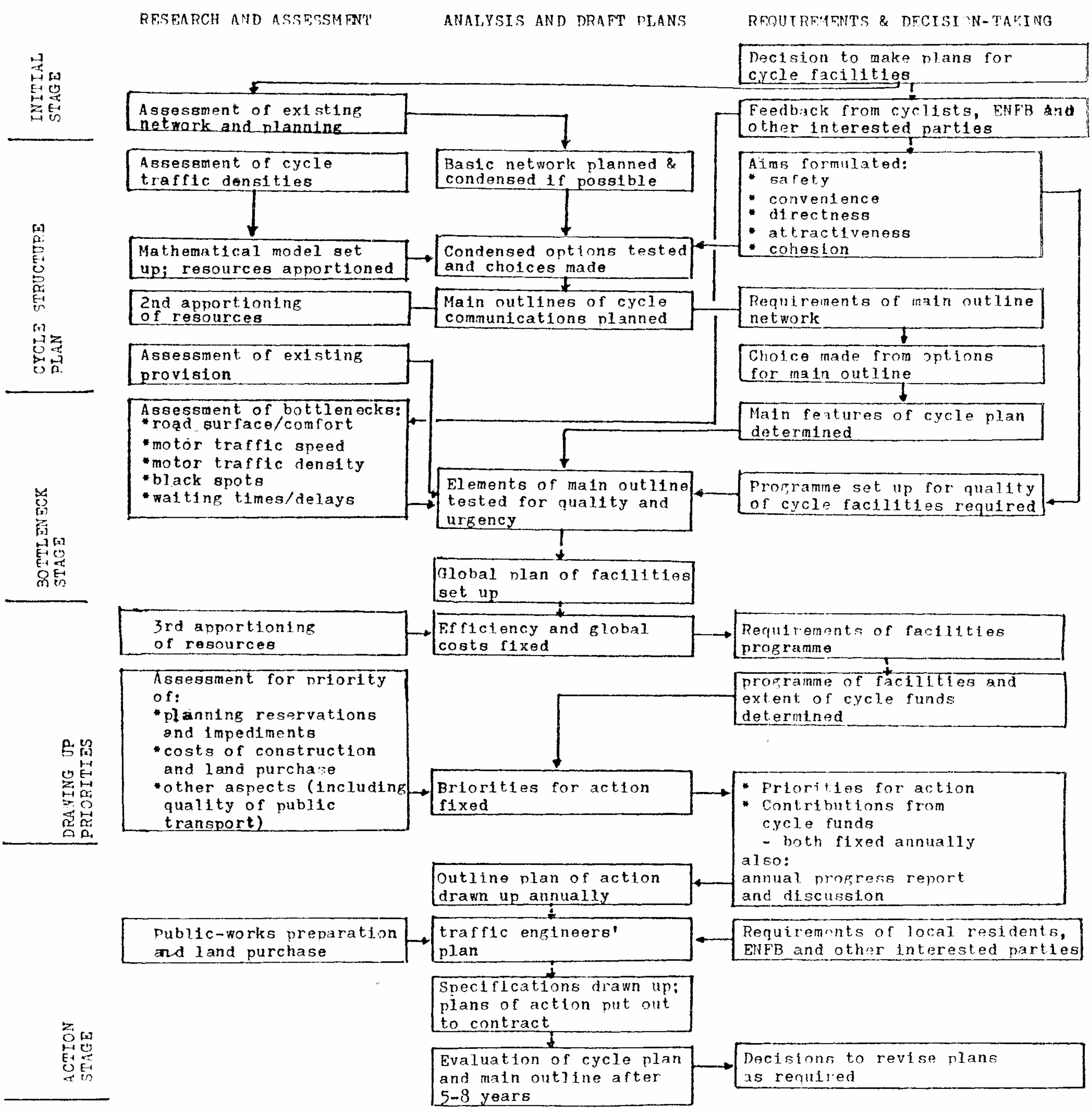


Fig 2: Example of desired routes for cycle traffic in Barnerveld. (Source: quoted in Ploeger et al)

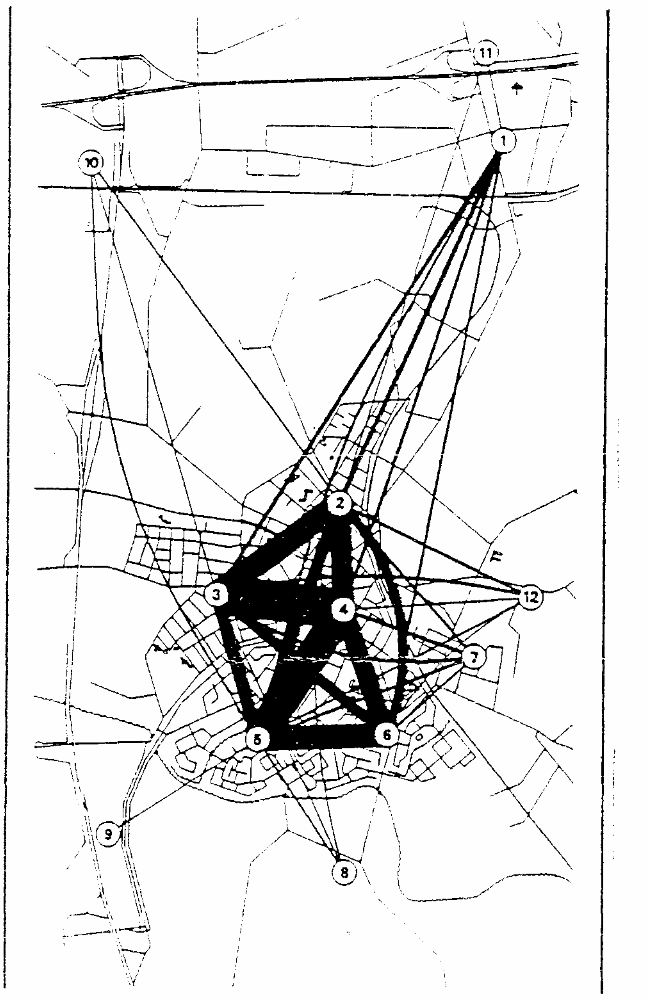


Fig 3: Moped traffic Groot - Tilburg: example of a spider network based on desired routes, 1985. (Source: quoted in Ploeger et al)

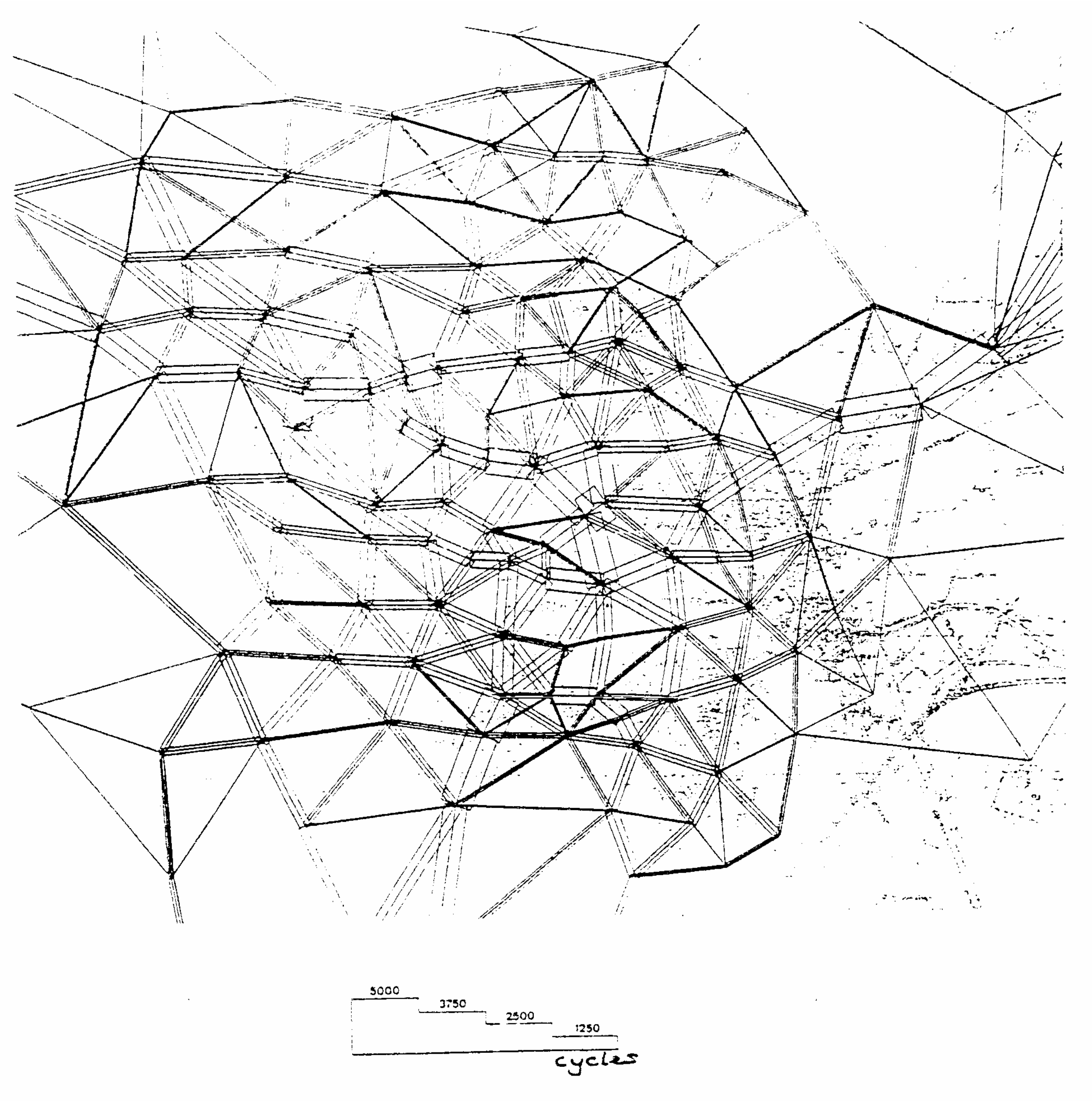
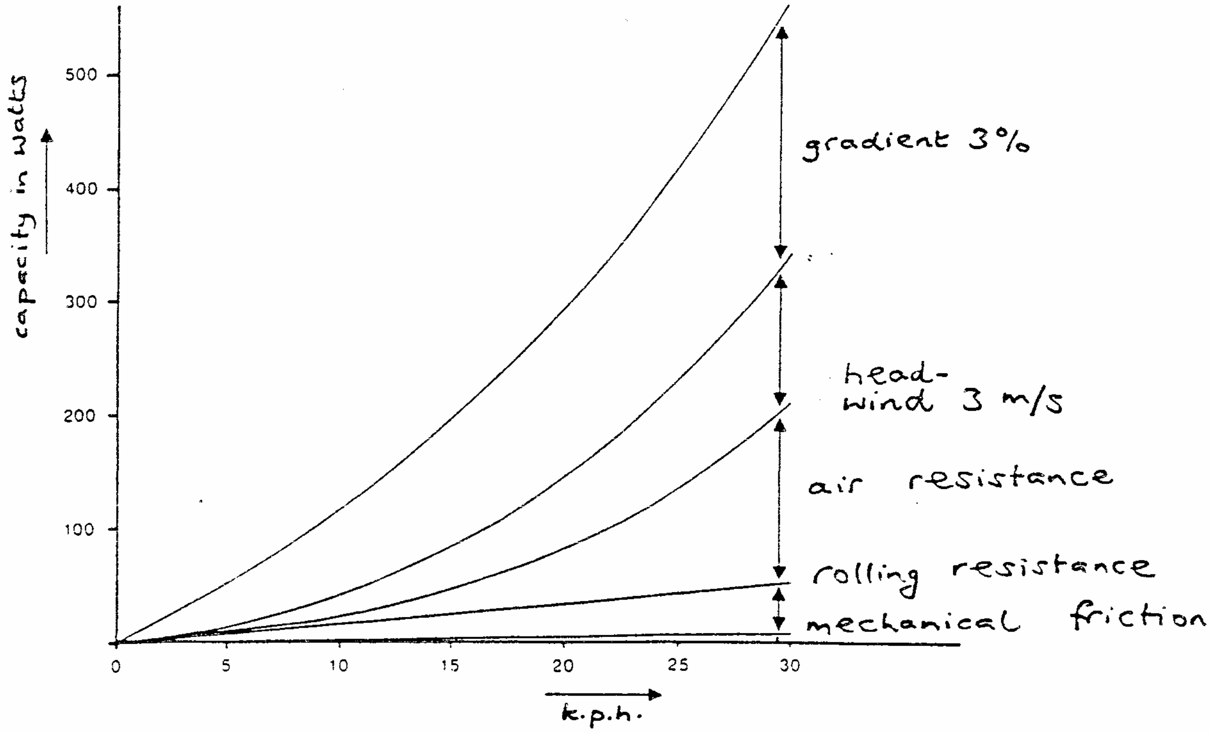


Fig 4: Influence of gradient and headwind resistance, air, rolling and frictional resistance at various speeds.

$P_{effect} = (0.981.i.m + 0.0721.m + 0.374.v \quad).v$
where:

P_{effect} = capacity required (in Watts) to ride at constant speed v (in metres per second)
i = average gradient %
m = total mass of cycle and rider in kg.
v_{rel} = relative speed of cyclist in relation to surrounding air, in metres per second
$v_{rel} = v + v_w . \cos\tau$
v_w = wind speed in metres per second
$\cos\tau$ = angle of wheel in relation to direction from which wind is blowing

External capacity required by a cyclist to overcome the various resistant forces, depending on speed of travel.



Rolling resistance and loss through vibration are caused mainly by the road surface and the unevennesses in it. Provisional guidelines for the maintenance of cycleways were quantified in 1986. The most important criteria are:

- lengthwise flatness
- crosswise flatness
- roughness
- texture
- seams in road surface