Præsentation af NMF og NMF's arbejde med vejafmærkning

Kai Sørensen, DELTA

NMF er et nordisk samarbejde om at koordinere forsknings- og udviklingsindsatsen om vejudstyr.

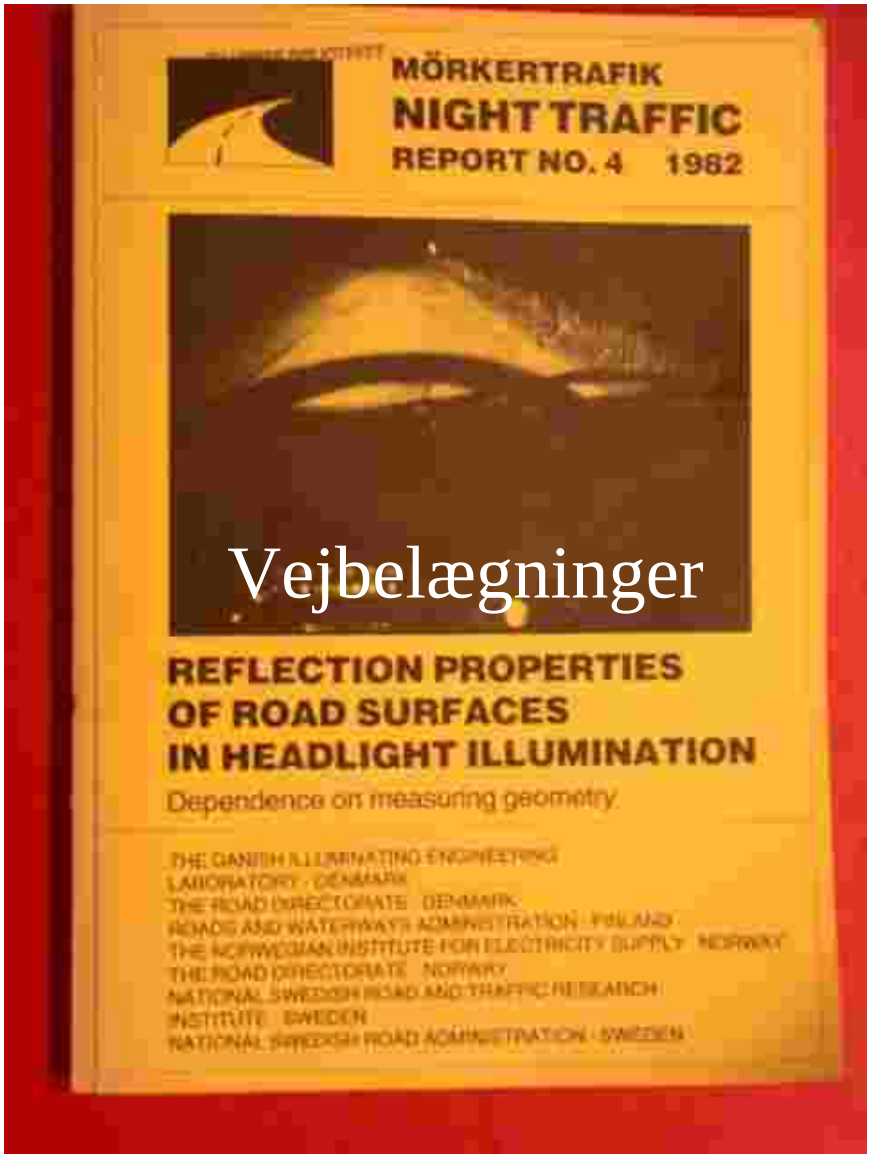
Formålet er blandt andet at optimere ressourcerne fordi landene, hver især næppe vil have penge til selv at teste og udvikle over hele linien af vejudstyr.

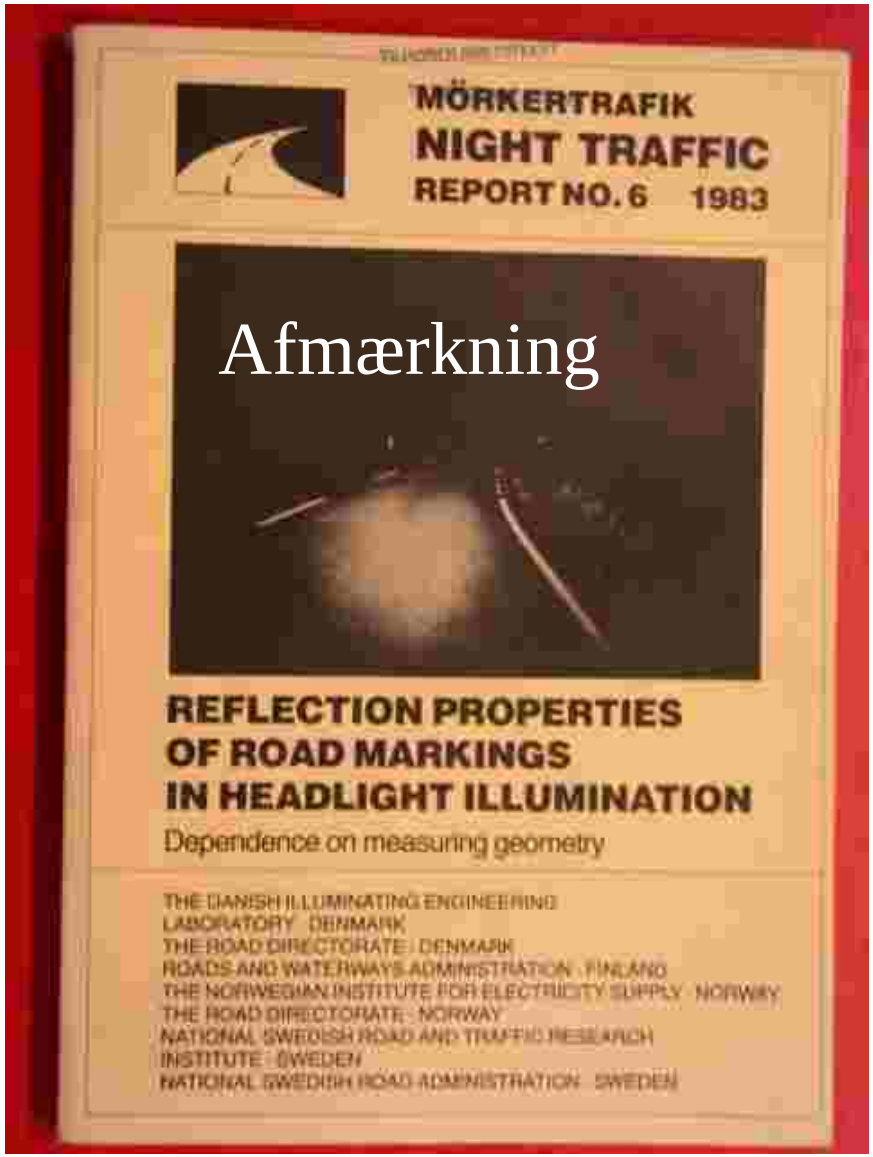
NMF's historie

- Startet i 1973 som et svensk-dansk samarbejde af på initiativ af Erik Frederiksen og Kåre Rumar
- Senere tilkom Norge ved Hans Henrik Bjørset og Finland ved Pentti Hautala
- Island er også med
- Der er stadig to aktive deltagere fra 1973 !

Hvad har NMF udrettet inden for kørebaneafmærkning ?

Refleksion i billygtebelysning

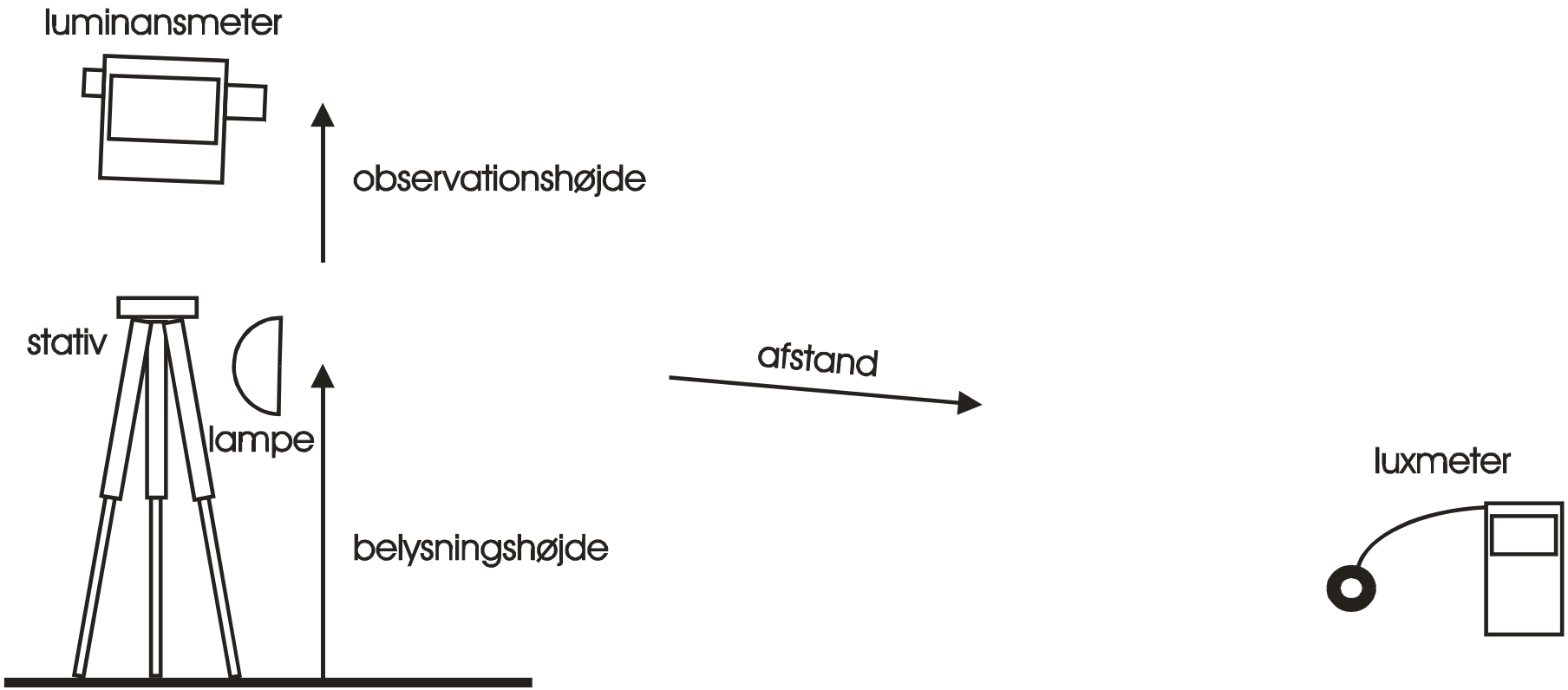


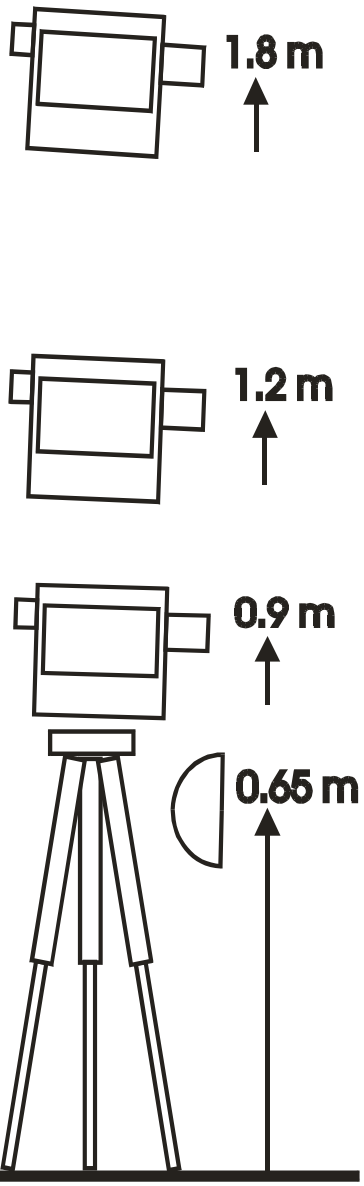


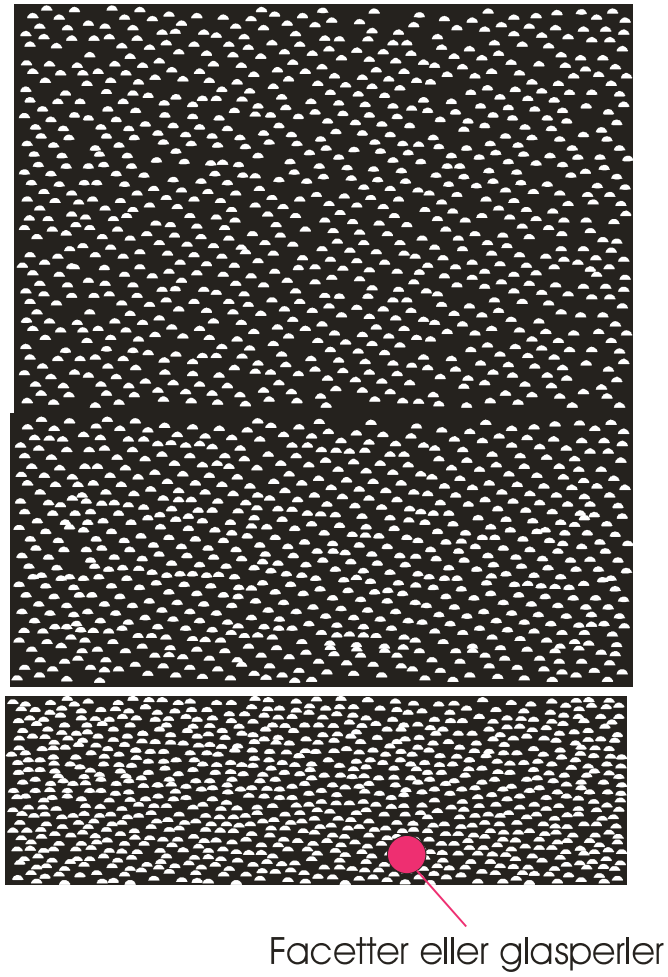

Koefficienten for retroreflekteret luminans: RL = L/E
luxmeter, E
luminansmeter, L

Optagning af prøver

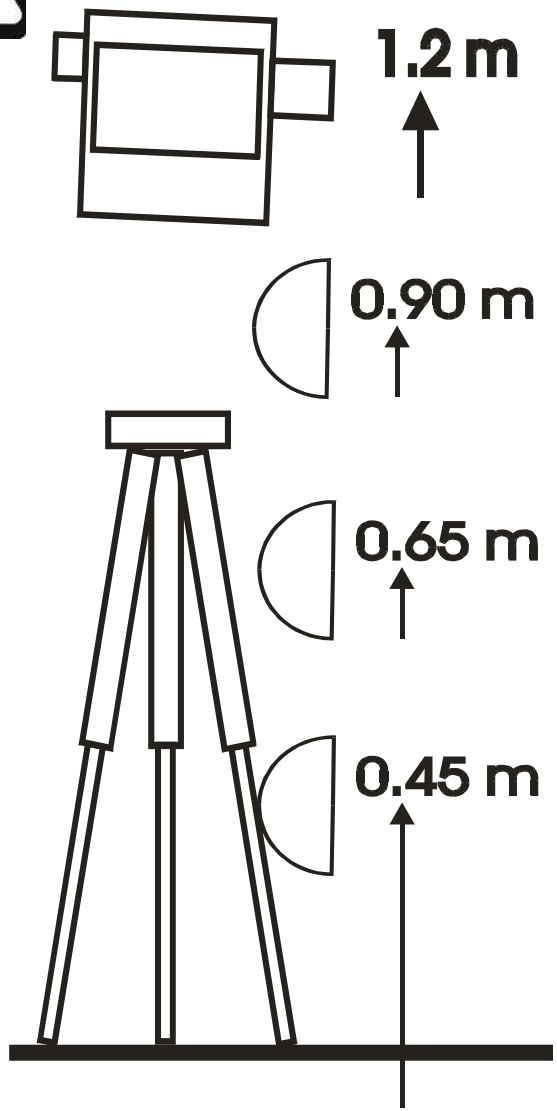
Måling i laboratoriet



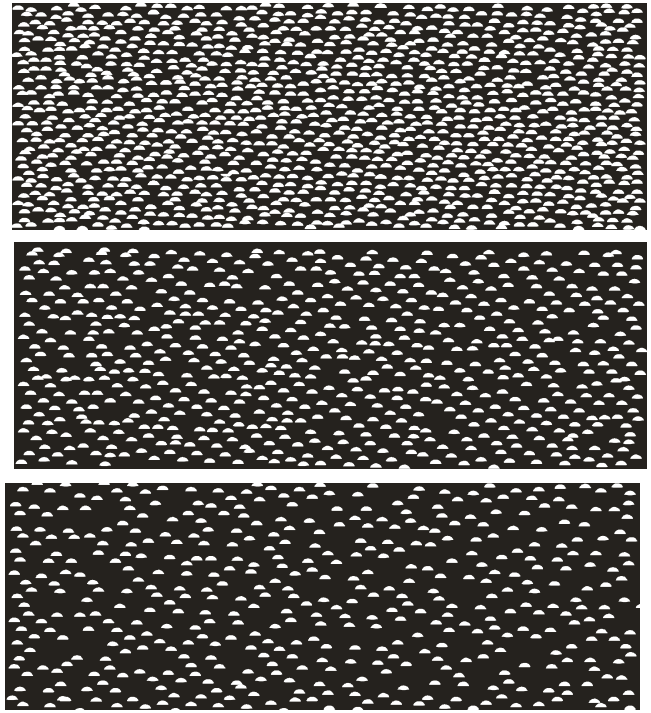




Når man kommer højere op, fylder skyggerne mere og RL aftager.

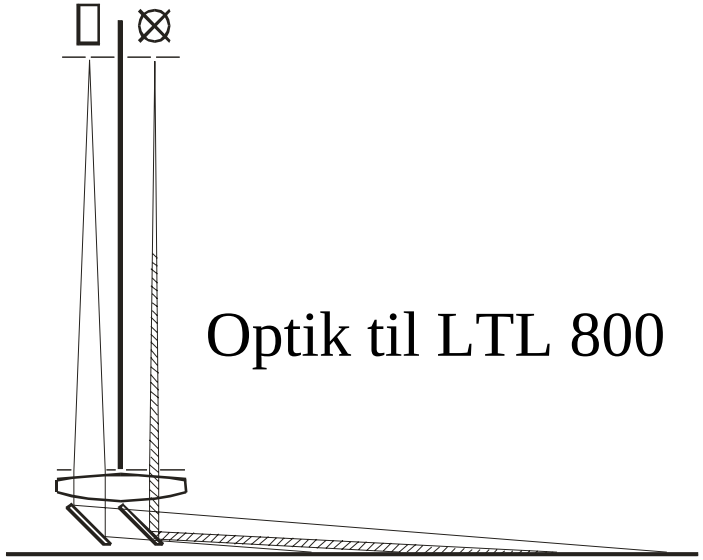


Når lygten kommer højere op, lyser den mere af overfladen op, og RL vokser.

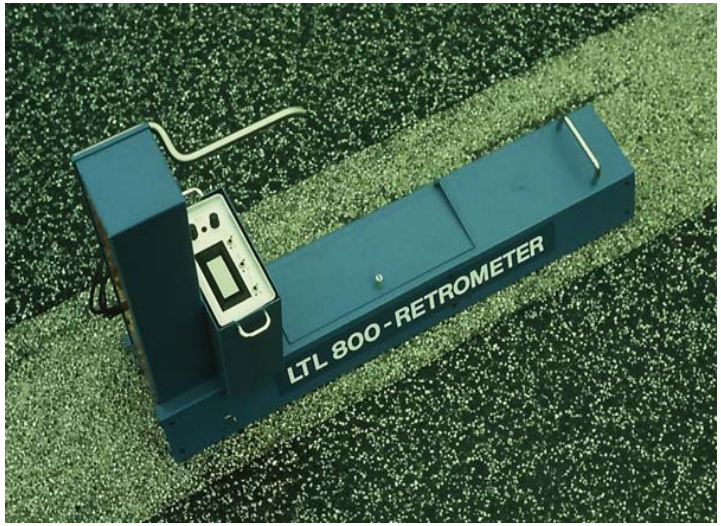


Projekternes nytteværdi

- RL varierer på en simpel måde med geometrien
- var det indlysende ?
- Det er tilstrækkeligt at måle ved én geometri, når den blot svarer til en rimelig afstand
- Denne viden muliggør robuste målinger, når blot man har lidt forstand på optik

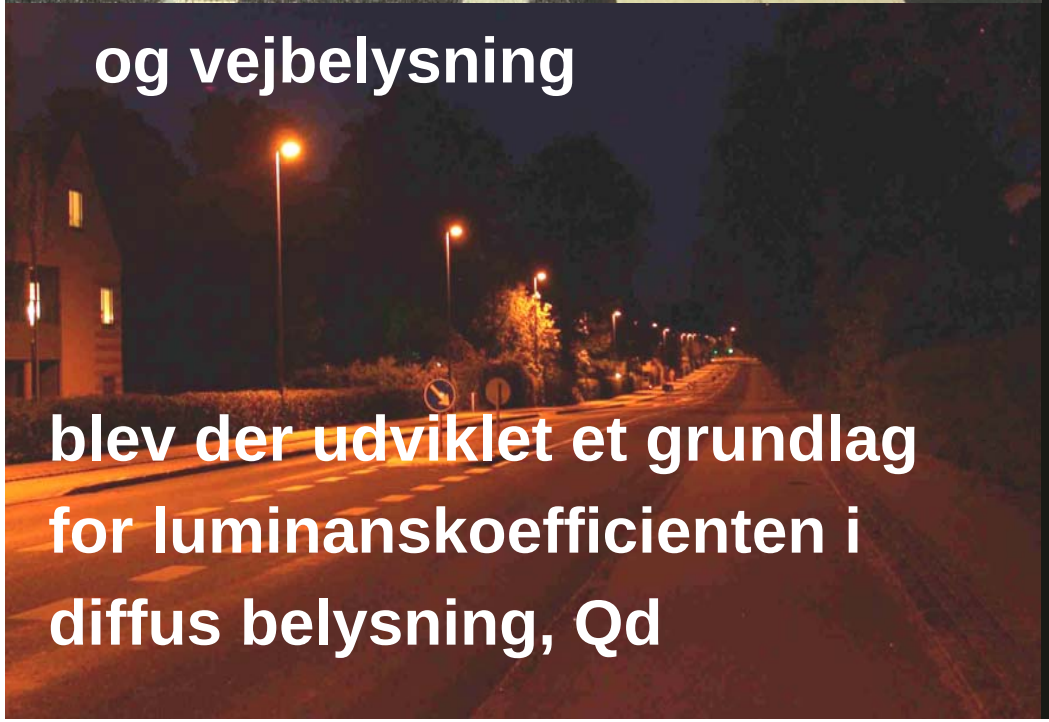


Optik til LTL 800



til at repræsentere dagslys

og vejbelysning



blev der udviklet et grundlag for luminanskoefficienten i diffus belysning, Qd

og et måleapparat

der har været en kraftig deltagelse i CEN TC/226 WG2, her et møde i 'Ekspertpanelet'

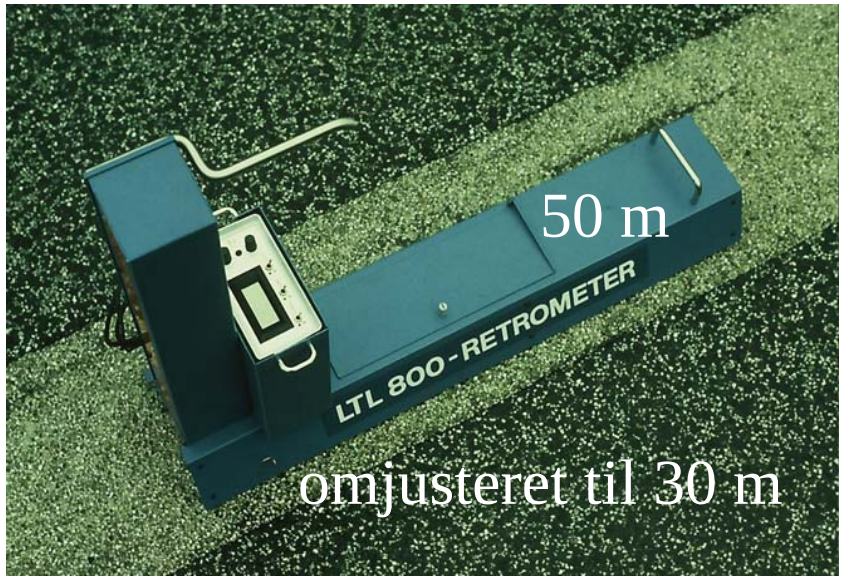
hvor vi blandt andet afprøvede spandemetoden

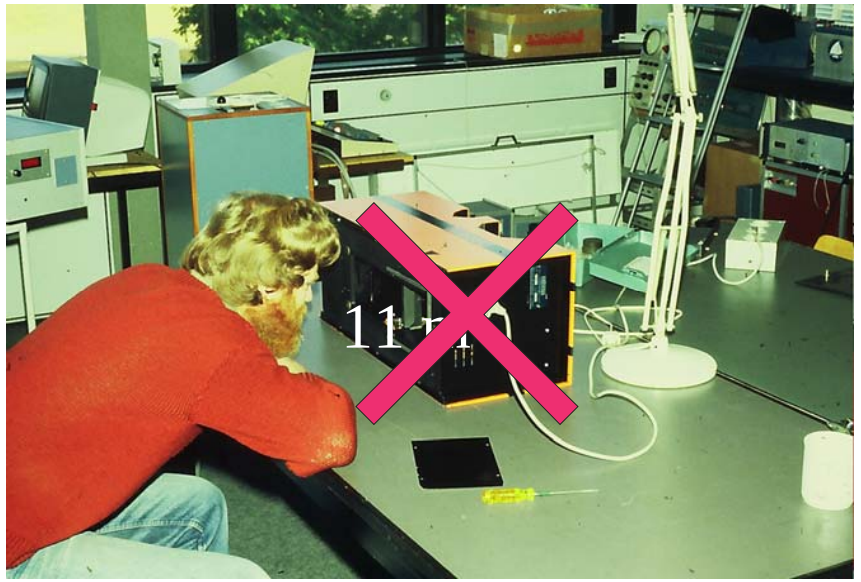
som var mere praktisk end regnvejrssimulatoren

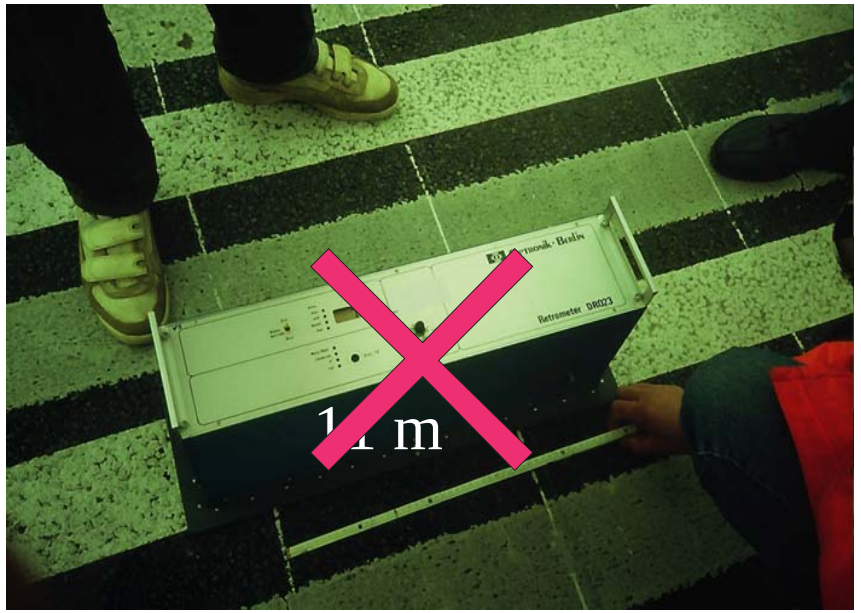

der blev også studeret
et 'sprøjteregnvejr',
som svarer til 500 mm
regn i timen !

desuden blev der studeret metoder til måling af friktion

30 m geometrien blev til som et gennemsnit mellem 11 m og 50 m







EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

EN 1436:1997 D — Ratifizierter Text der Europäischen Norm
EN 1436:1997 E — Ratified text of the European Standard
EN 1436:1997 F — Texte ratifié de la Norme Européenne

ICS: 93.080.20

Deskriptoren: Straßenausstattung, Straßenmarkierung, Reflexion, Retroflexion, Markierungs-Glasperlen, Heißplasitikmassen, Kaltplasitikmassen
Descriptors: roads, signalling, marking, characteristics, reflection, sunlight, road lighting, motor vehicle head lamps, life:durability, colours, adhesion, quality classes
Descripteurs: route, signalisation, marquage, caractéristique, réflexion, lumière du jour, éclairage des voies publiques, projecteur de véhicule, durée de vie, couleur, adhérence, classe de qualité

Straßenmarkierungsmaterialien - Anforderungen an Markierungen auf Straßen

Road marking materials - Road marking performance for road users

Produits de marquage routier - Performances des marques appliquées sur la route

Anmerkung: Frankreich, Griechenland, Irland, Island, Italien, Luxemburg, den Niederlanden, Norwegen, Österreich, Portugal, Schweden, der Schweiz, Spanien, der Tschechischen Republik, und dem Vereinigten Königreich beziehen.

Notice: Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Avertissement: Belgique, du Danemark, d'Espagne, de Finlande, de France, de Grèce, d'Irlande, d'Islande, d'Italie, du Luxembourg, de Norvège, des Pays-Bas, du Portugal, de la République Tchèque, du Royaume-Uni, de Suède, et de Suisse.

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EN 1436 med klasser og målemetoder for:
- refleksion i billygtelys
- refleksion I dagslys
- farve af hvid og gul afmærkning
- friktion.

Designation: E 1710 – 97

Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer[1]

This standard is issued under the fixed designation E 1710; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers measurement of the retroreflective properties of horizontal pavement marking materials containing retroreflecting beads, such as traffic stripes and surface symbols, using a portable retroreflectometer that can be placed on the road delineation to measure the retroreflection at a prescribed geometry.

NOTE 1—The restriction to bead based materials is for the purpose of ensuring a sufficiently gradual optical response function (from points of the source aperture to points of the receiver aperture) to allow generous sized instrument source and receiver apertures.

1.2 The entrance and observation angles of the retroreflectometer affect the readings. As specified by the European Committee [illegible] vation angl

1.3 This measureme measure th placing the

1.4 *This safety conc responsibili priate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*
D 4061 Test Method for Retroreflectance of Horizontal Coatings[2]
E 284 Terminology of Appearance[2]
E 809 Practice for Measuring Photometric Characteristics of Retroreflectors[2]
2.2 *Other Standard:*
CEN EN 1436 Road Marking Materials—Road Marking Performance for Road Users[3]

3. Terminology

3.1 The terminology used in this test method generally agrees with that used in Terminology E 284.

3.2 *Definitions*—The delimiting phrase "in retroreflection" applies to each of the following definitions when used outside the context of this or other retroreflection test methods:

3.2.1 *coefficient of retroreflected luminance, R_L, n*—the ratio of the luminance, L, of a projected surface to the normal illuminance, $E_\perp$, at the surface on a plane normal to the incident light, expressed in candelas per square metre per lux ($cd \cdot m^{-2} \cdot lx^{-1}$).

3.2.1.1 *Discussion*—Because of the low luminance of pave- [illegible] ndelas per

[illegible] nt of the

[illegible] nt of the

[illegible] he illumi-

[illegible] the illumination axis and the observation axis.

3.2.6 *portable retroreflectometer, n*—a hand-held instrument that can be used in the field or laboratory for measurement of retroreflectance.

3.2.6.1 *Discussion*—In this test method, "portable retroreflectometer" refers to a hand-held instrument that can be placed over roadway delineation to measure the coefficient of retroreflected luminance with a prescribed geometry.

3.2.7 *presentation angle, γ, n*—the angle between the observation half-plane and the half-plane that originates on the illumination axis and that contains the retroreflector axis.

3.2.8 *instrument standard, n*—working standard used to standardize the portable retroreflectometer.

3.2.9 *retroreflection, n*—a reflection in which the reflected rays are returned preferentially in directions close to the opposite of the direction of the incident rays, this property

[1] This test method is under the jurisdiction of ASTM Committee E-12 on Appearance and is the direct responsibility of Subcommittee E12.10 on Retroreflection.
Current edition approved Dec. 10, 1997. Published September 1998. Originally published as E 1710 – 95. Last previous edition E 1710 – 95a.

[2] *Annual Book of ASTM Standards*, Vol 06.01.

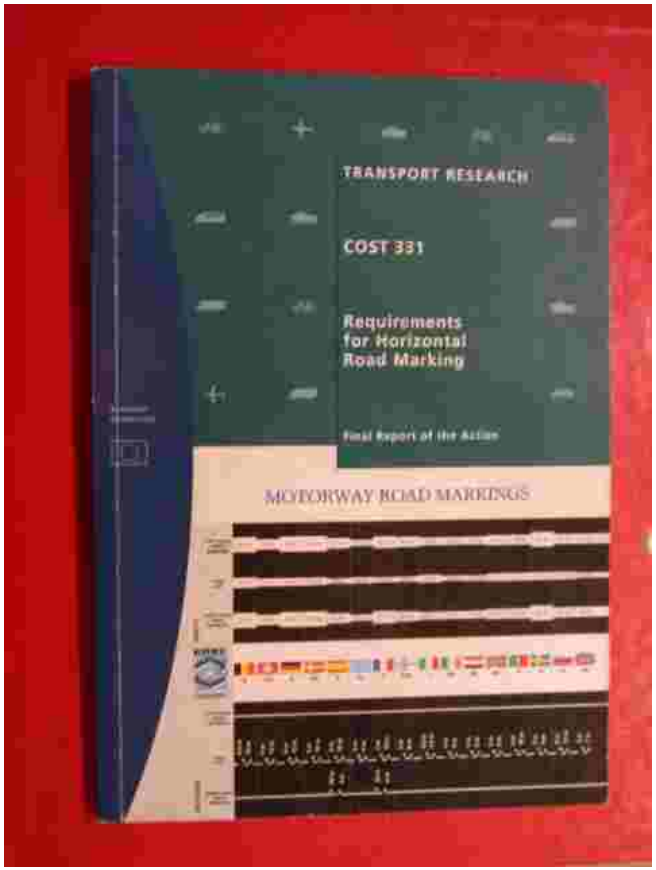
[3] Available from European Committee for Standardization, Central Secretariat (CEN), rue de Stassart 36, B1050 Brussels, Belgium.

Der foregik en lignende udvikling i USA, hvor de europæiske metoder blev kopieret i denne og andre ASTM standarder.

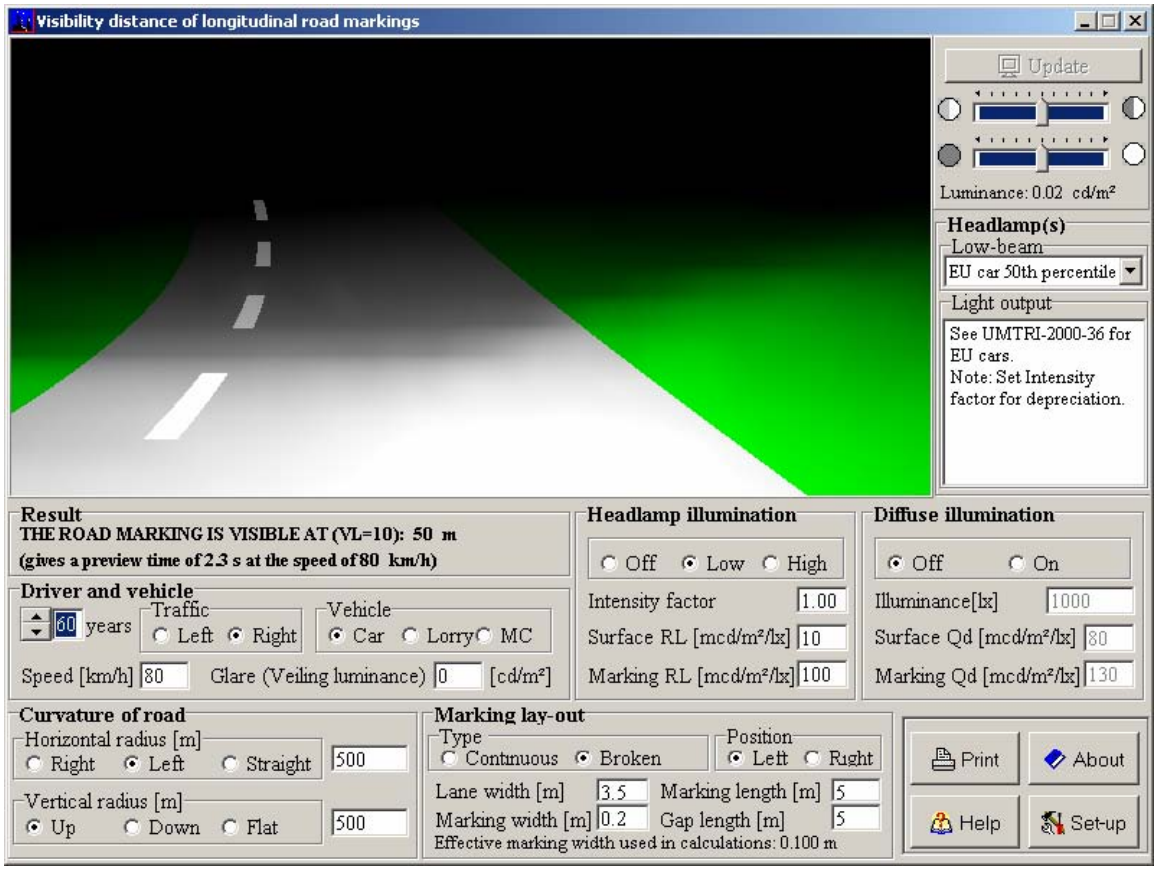
COST Action 331 ’Requirements for road marking’

Projektet blev i det væsentlige udført af de nordiske lande (omtales senere)

rapport

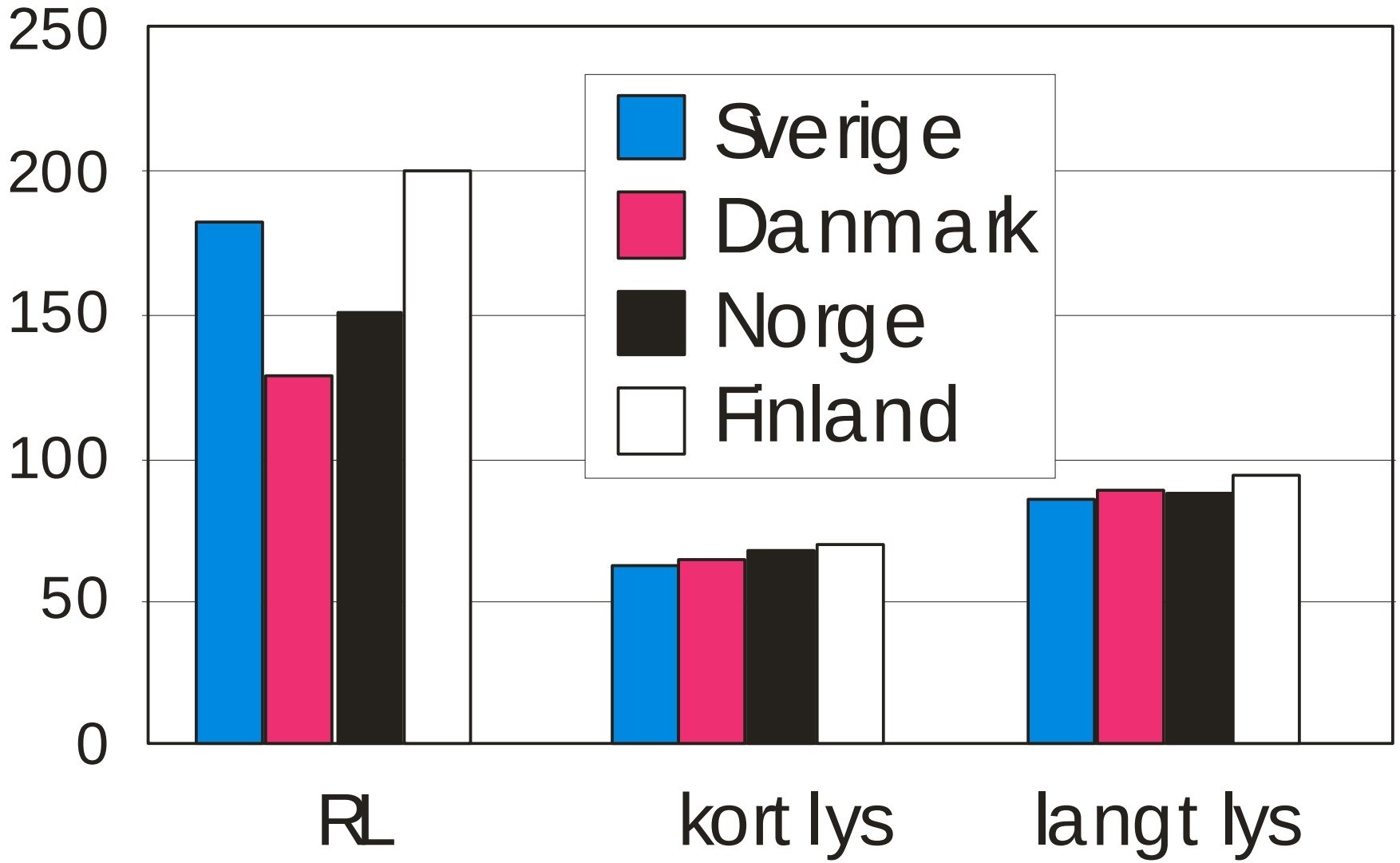


EDB program

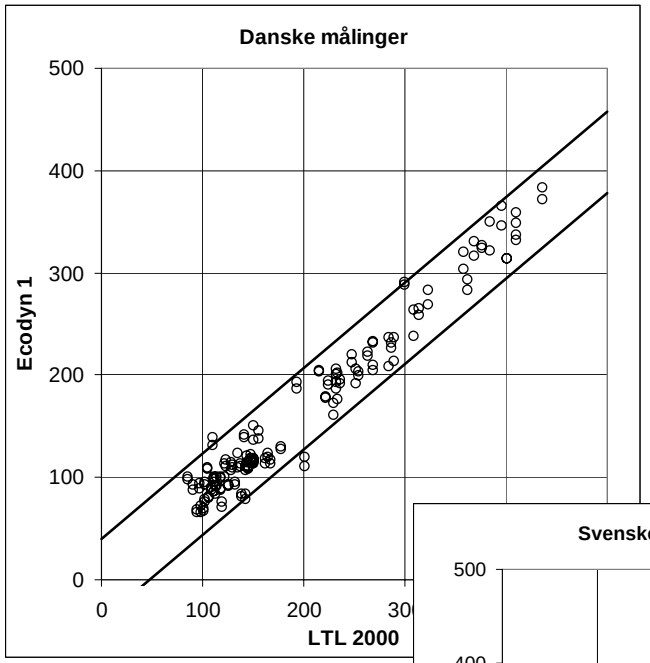


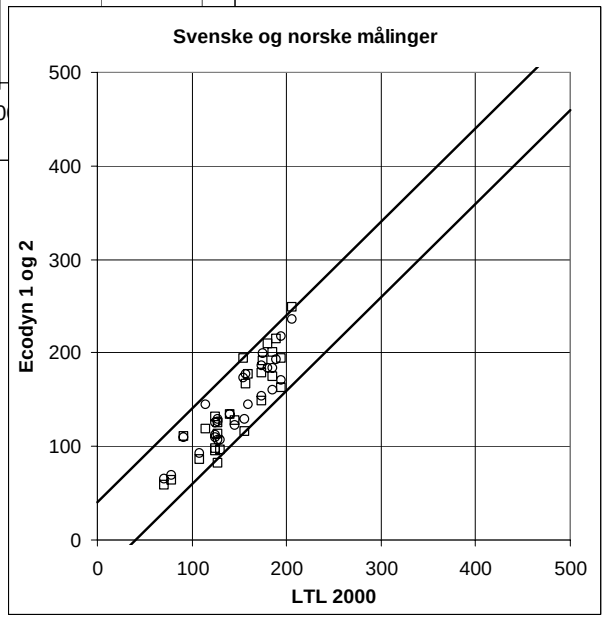
Vådsynbar vejmarkering

Bench marking



Vurdering/forbedring af Ecodyn





Kraftig deltagelse i ’durability’ projektet

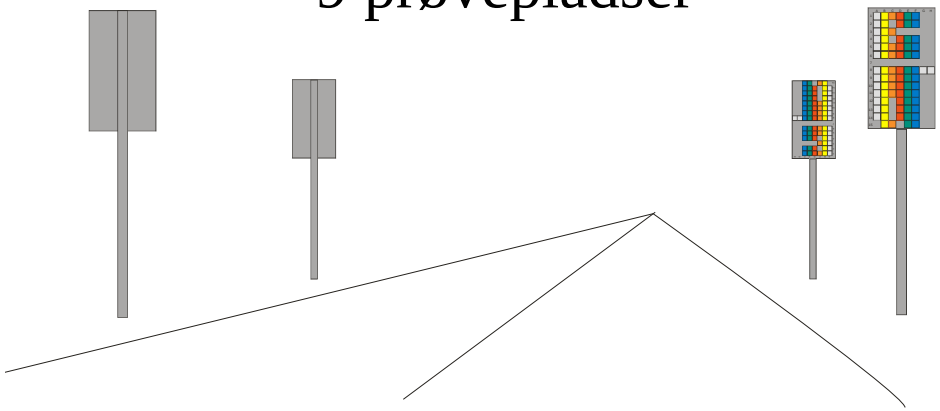
NMF og vejmarkering

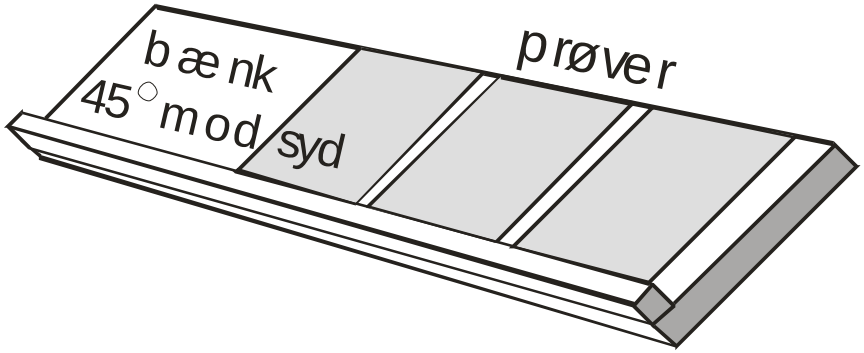
NMF har haft en kraftig indflydelse på nationalt og internationalt plan

NMF arbejder også på andre områder

Ældning af refleksfolier

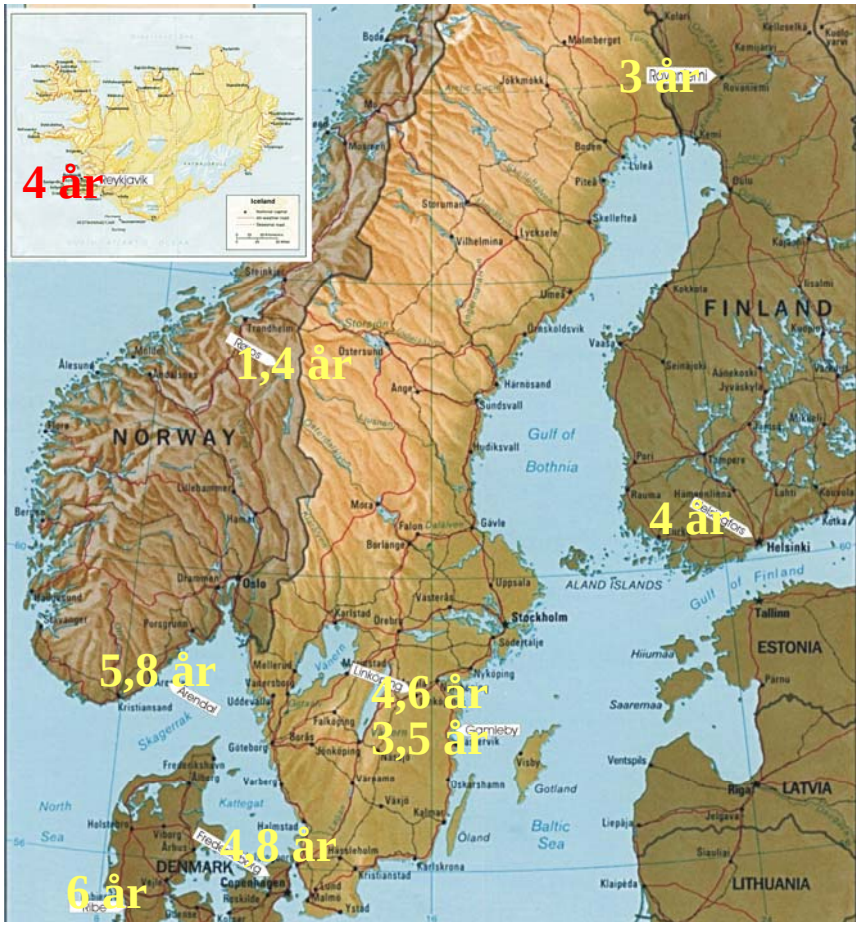
9 prøvepladser





Mulighed for simpel over-vågning af markedet

Resultat:



Se mere på: www.nmfv.dk

Mange tak