LISBOA 2010 MAY 25/28 16th World Meeting

Theme n°5 : Workshop 5.4

New developments in prediction of behaviour

Moderator : B. Eckmann (USIRF)

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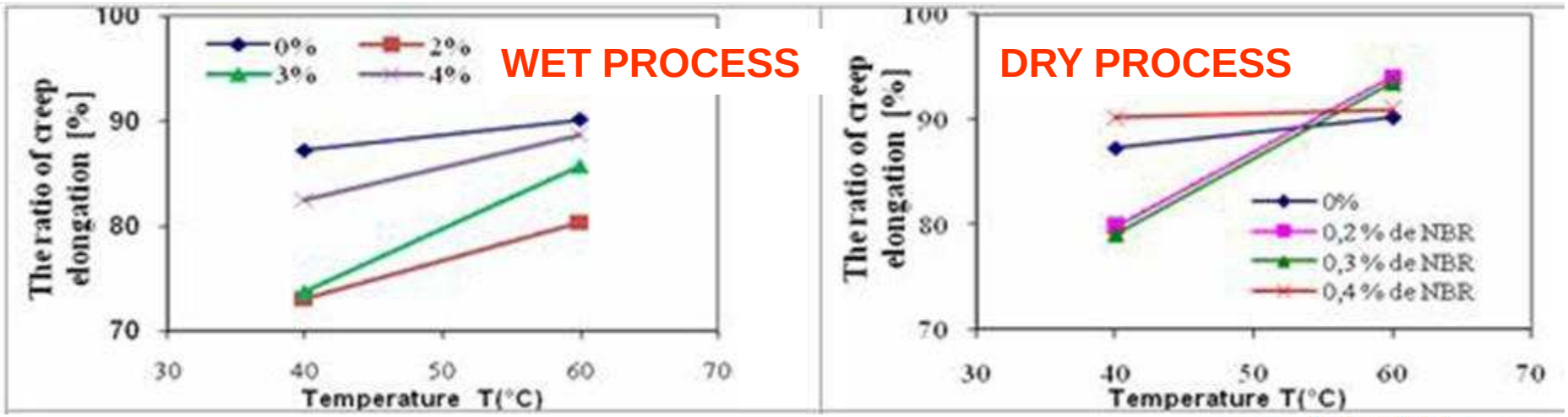
New developments in prediction of behaviour

- Papers
  - Performance of PmB : 3
    (N°265, 431, 584)
  - Permanent deformation : 2
    (N°51, 437)
  - Ageing properties : 2
    (N°514, 524)
  - Fuel resistance : 1
    (N°548)

NBR modification of bituminous concrete

Paper N°265 : SOUDANI Khedoudja , SAOULA Samia,
HADDDADI Smail, AIT MOKHTAR Khedidja

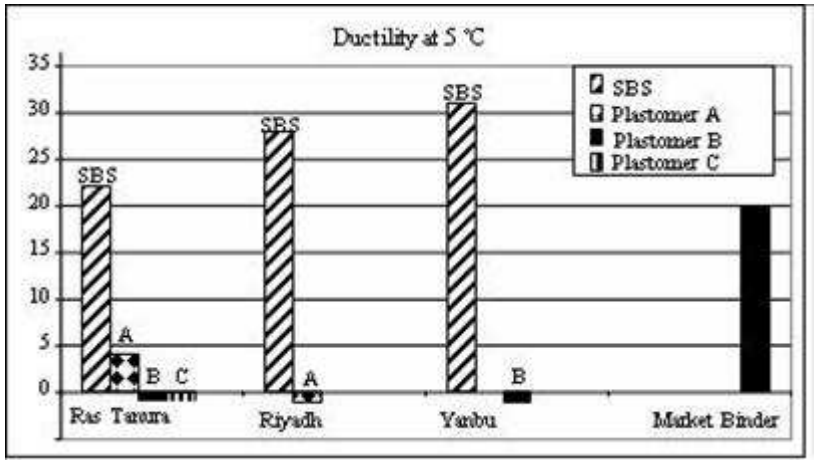
- NBR = waste rubber (crumbs < 0.8 mm)
- Added according to wet or dry process
- Marshall tests + static creep tests
- Best performance obtained with wet process



Modification of Saudi Arabian bitumen

Paper N°431 : AAZAM Mohamed S. , AL-RABIAH A.,
ALI Al-Hosain M.

- 3 bitumen of different composition
- Modification with plastomers and elastomers
- Evaluation via « conventional » tests
  (Storage stability, Ductility, Elastic Recovery, Viscosity, R&B, Fraass)
- Definite impact of bitumen origin
- SBS thought to be more performing than plastomers for KSA conditions



Dynamic modulus – Characterization of HMA containing various polymer types

Paper N°584 : AAZAM Mohamed S. , ALOMRAN Mohamed A., ALI Al-Hosain M.

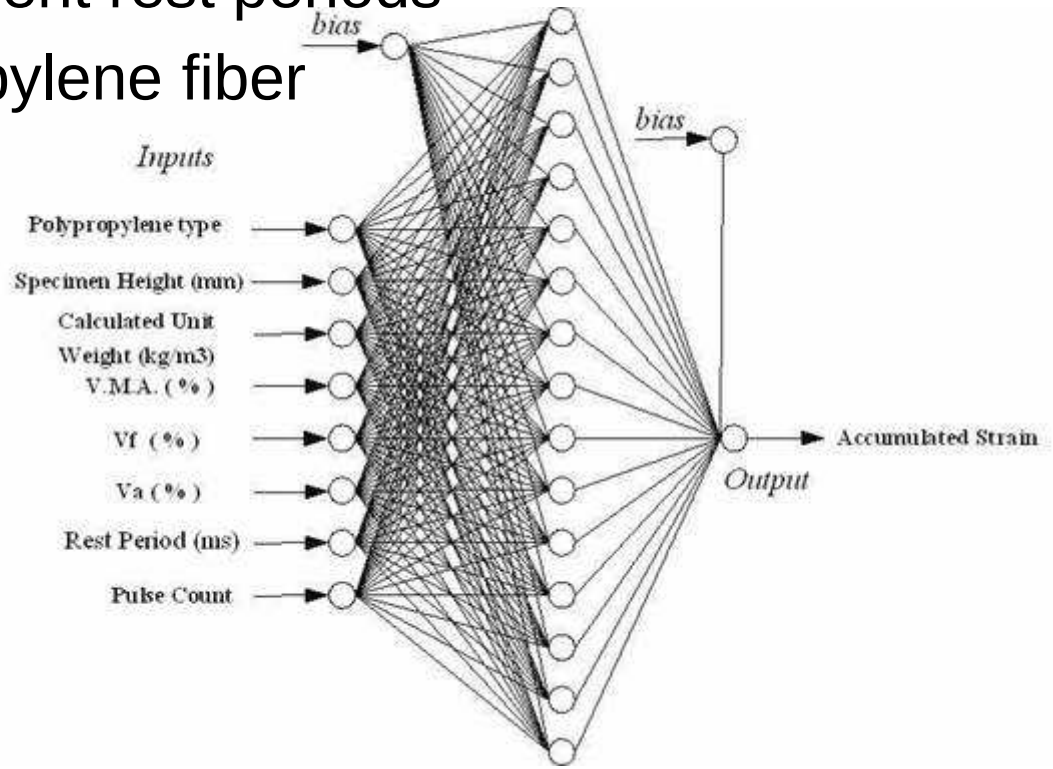
- SBS, wax and CRM modified binders
- Differences in behaviour are seen after RTFOT and PAV, as well as on BBR characteristics
- Dynamic modulus measuring with SPT (Simple Performance Test) on Superpave HMA mixture
- Lower stiffness at higher temperatures for SBS and CRM modified mixes ?

New developments in prediction of behaviour

Artificial Neural Networks (ANN) for the prediction of accumulated strains

Paper N°51 : TAPKIN Serkan , CEVIK Abdulkadir, USAR Un

- Static creep tests on Marshall test samples (1 mix type)
- 50℃, 500 kPa load, different rest periods
- Neat bitumen vs polypropylene fiber modified binder
- ANN Model parameters :
  - Mix parameters
  - Loading parameters
  - Binder type



Predicting rutting of asphalt mixtures from binder rheological characteristics

Paper N°437 : PLANCHE Jean Pascal

- MSCRT : Multiple Stress Creep Recovery Test (DSR equipt.)
  60℃, 11 stress levels from 25 to 25600 Pa, 10x(1s loading + 9s rest)
- Non-recoverable compliance : $J_{nr} = \gamma_u/\sigma$ (low J_{nr} = less creep)
- Large range of bitumens and PmBs (cross-linked elast.) tested
- Results compared to WTT results at 60℃
- Far better correlations than with G*/sinδ and R&B (higher stress levels)

Jnr [Pa-1]	Cycles of French Rutting tester at 60 °C			
	1000	3000	10000	30000
100	0,2186	0,1857	0,1074	0,3604
1600	0,3441	0,3468	0,2925	0,3028
3200	0,6358	0,6374	0,4916	0,4453
6400	0,8498	0,9025	0,8483	0,5674
12800	0,8787	0,9008	0,8050	0,7149
25600	0,8475	0,8859	0,6410	0,7711

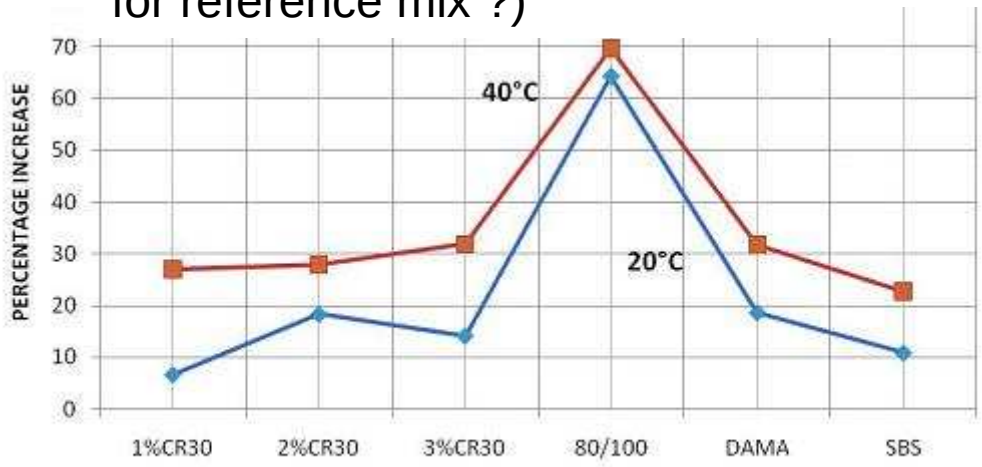
AGEING OF ASPHALTIC MIXTURES AND ITS ANTIOXIDANT MODIFIER

Paper N°524 : MOHAMED Abdullah Ali , HAMZAH M.O., ISMAIL H.

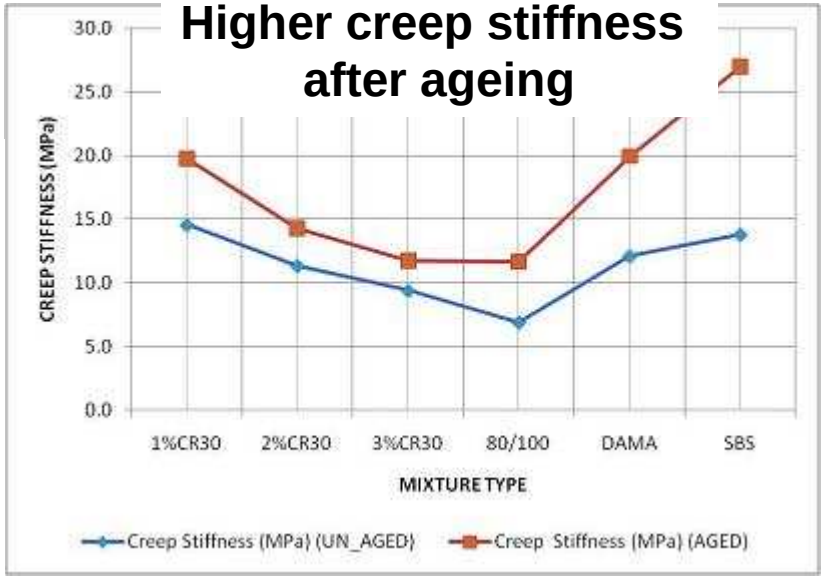
- Crumb Rubber + Zinc Dithiocarbamate (CR30)
- Bituminous mix tested for resilient modulus (Ind.Tens.Mode) and dynamic creep before and after ageing

Lower increase in stiffness

(but no change in T susceptibility for reference mix ?)



Higher creep stiffness after ageing

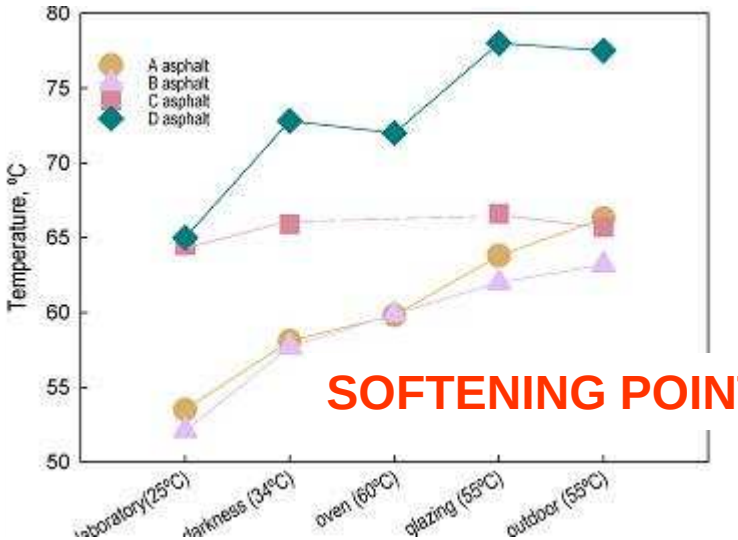


New developments in prediction of behaviour

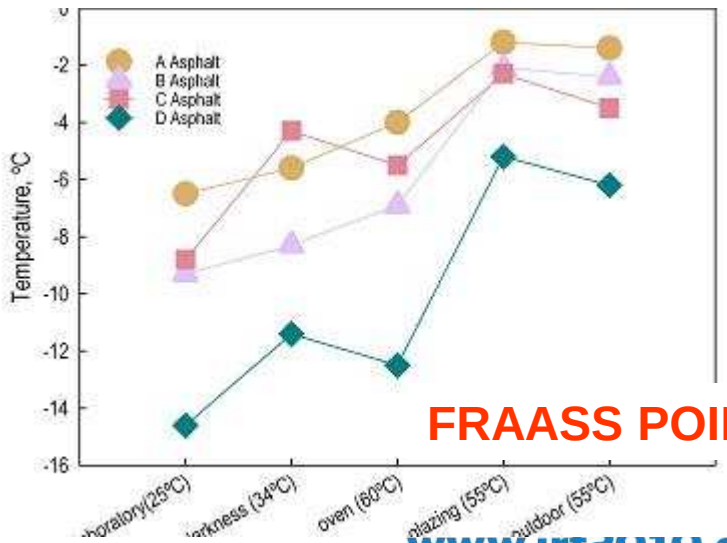
Asphalt behavior under solar radiation

Paper N°514 : TADEO RICO Ana Isabel ,
TORRES PEREZ Alfredo

- 2 neat 60/70 bitumen + 2 PmB's (BM-3b)
- 4 different exposure conditions
- Solar radiation has an impact (in addition to temperature) on the ageing of bitumen



SOFTENING POINT



FRAASS POINT

Study of the behaviour of bituminous mixtures resistant to fuel

Paper N°548 : **FREIRE Ana Cristina,** MOURA Jorge,
DE LURDES ANTUNES Maria, MARICATO Susana

- Fuel resistance according to EN 12697-43
- 3 types of binder : 35/50, PB 1.5 (35/50), 35/50 Kero
- 3 types of fuel : Jet A1, Diesel, Gasoline 95
- Most damaging : Gasoline 95
- Most significant : « Brushing phase »