

An aerial photograph of a city street, likely in a European city, showing a mix of old and new buildings, a river, and a road with a roundabout. The image is used as a background for the presentation slide.

TYRES AND TRAFFIC SAFETY

Mattias Hjort

Nordisk Trafiksikkerhedsforum 13-14 Oct 2022

vti

TYRES AND TRAFFIC SAFETY – VTI RESEARCH

General

- ❑ VTI Notat 29 - 2012 – Safety risks connected to tyres, rims and wheels – a literature study

Passenger cars

- ❑ VTI Report 849 – 2015 - Comparison of winter and summer tyres during summer time
- ❑ VTI Report 875 – 2015 – Test of ice and snow grip for worn winter tyres
- ❑ VTI Report 901 – 2016 – Road grip on wet asphalt for worn winter tyres

Bicycles

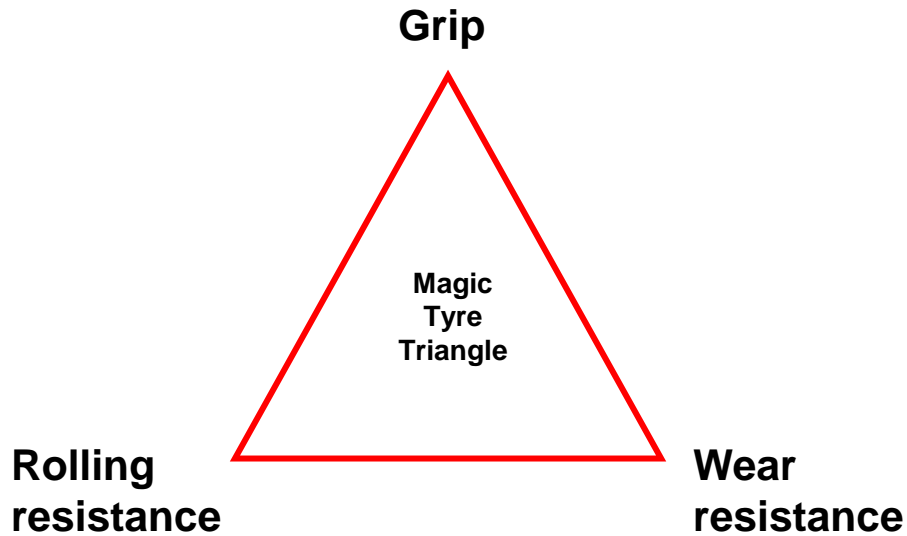
- ❑ VTI Report 862 – 2015 – Friction tests of bicycle tyres in VTI's Tyre Test Facility
- ❑ VTI Notat 20 - 2018 – Winter tyres for bicycles – a test
- ❑ VTI Report 93 – 2018 – Friction of bicycle lanes

Heavy trucks and buses

- ❑ VTI Rapport 618 - 2008 – Traffic safety of buses during winter
- ❑ VTI Notat 23 - 2012 – Winter tyres on the drive axle of heavy vehicles - a road grip study
- ❑ VTI Notat 14 - 2017 – Heavy vehicles use of tyres and accident risk during winter
- ❑ VTI Notat 3 – 2019 – The influence of tread depth on the ice grip of heavy truck trailer tyres – a test



WHY SHOULD WE BE CONCERNED ABOUT TYRES?



- Strong incentives to lower rolling resistance
- Will be future focus on wear resistance
- Heavier vehicles (SUVs, electric cars) makes it harder to make tyres with good grip

Specifically for winter tyres:

- Wet grip and snow/ice grip are conflicting
- Cheaper winter tyres made for non-Nordic winter conditions are introduced on the Nordic market
- New winter tyre definition allows tyre types that has previously been forbidden: **All Season tyres**



Establish the “Swedish Tyre Safety Council”,
Svenska Däcksäkerhetsrådet

- Members from Universities and research institutes, tyre/rim manufacturers, vehicle manufacturers, Insurance companies, Bilprovningen, Swedish Transport Agency, Swedish Transport Administration
- First report in June 2022 about tyre blowouts on caravans

Free download:

<https://www.dackinfo.se/fakta-category/undersokningar/>



Test of
allseason tyres
on ice and
snow

Ivalo 2022



Anderstorp 18-19 aug



Results from previous tyre tests
(tyres for Volvo v60/v70, 205/55-16)

Snow

Ice

Asphalt

Däcktest med
BV12

	Bromsprestanda	Längre bromssträcka än nya nordiska
Dubb ny	98%	2%
Dubb beg	82%	22%
Nordisk ny	100%	0%
Nordisk beg	93%	8%
Europeisk ny	94%	6%
Europeisk beg	77%	30%

Bromstest med personbil

Retardation ref:
3.6 - 4.4 m/s²

	Bromsprestanda	Längre bromssträcka än nya nordiska
Dubb ny	98%	2%
Dubb beg	91%	10%
Nordisk ny	100%	0%
Nordisk beg	93%	8%
Europeisk ny	94%	6%
Europeisk beg	80%	25%

Långa banan

Istemp -3 grader Bromsfriktion referens: 0.20

	Längre bromssträcka än nya dubbdäck	Längre bromssträcka än nya nordiska
Dubb ny	0%	-24%
Dubb beg	38%	5%
Nordisk ny	31%	0%
Nordisk beg	49%	14%
Europeisk ny	56%	19%
Europeisk beg	77%	35%

TestWorld: Bromstest inomhus med bil

Istemp -3 grader Bromsfriktion referens: 0.17

	Bromsprestanda	Längre bromssträcka än nya nordiska
Nordisk ny	101	0%
Nordisk beg	92	10%
Europeisk ny	87	16%
Europeisk beg	81	25%

Bromstest med
personbil
80 km/h

+10-14 grader
varmt

	Retardatio n	Prestanda	Längre bromssträcka än nya sommar
Våt Nordisk ny	7.2	83%	21%
Våt Sommar ny	8.7	100%	0%
Torr Nordisk ny	8.3	88%	13%
Torr Sommar ny	9.4	100%	0%

Allseason test Volvo XC60:

Braking distance compared to Nordic

- Up to 40% longer on snow
- Up to 50% longer on ice

Also for European winter tyres 45% longer on ice.

(compare with 53% for a tested summer tyre)

Braking distance compared to Summer

Wet asphalt

- Up to 50% longer for Nordic
- Upt to 35% longer for all season

Winter tyres for bicycles – a test

- Halkolyckor med cykel vintertid ligger bakom en stor del av personskadaolyckor med cyklister.
- Tidigare mätningar av dubbade cykeldäcks väggrepp på is i VTI:s däckprovsningsanläggning har visat att det kan vara stora skillnader i grepp mellan olika däckmodeller (VTI rapport 862, 2015).



Dubbäckten



Suomi Tyres
W240



Suomi Tyres
w106



Schwalbe
Marathon
Winter



Schwalbe
Winter



Biltema



Clas Ohlson
Innova



Jula Kenda
Klondike

De dubbria däcken



Suomi Tyres
dubbfritt



Continental
Top Contact
Vinter



Schwalbe
Marathon Plus

Metod

Balanserad testordning

4 testförare

Testförare	Kön	Vikt med utrustning	Is: broms	Is: handlingstest
T1	Man	75 kg	A, E	A, E, I, J
T2	Kvinna	67 kg	B, F	B, F, K, L
T3	Man	85 kg	D, H	D, H, M, M
T4	Man	125 kg	C, G	C, G, O, P

A	2	6	4	10	3	8	5
B	3	8	5	2	4	10	6
C	4	10	6	3	5	2	8
D	5	2	8	4	6	3	10
E	6	3	10	5	8	4	2
F	8	4	2	6	10	5	3
G	10	5	3	8	2	6	4
H	2	3	4	5	6	8	10

I	3	6	8	2	4	10	5
J	4	8	10	3	5	2	6
K	5	10	2	4	6	3	8
L	6	2	3	5	8	4	10
M	8	3	4	6	10	5	2
N	10	4	5	8	2	6	3
O	2	5	6	10	3	8	4
P	8	5	3	10	2	6	4

Brake test asphalt



No significant difference between tyres

Brake test ice



Bromstest is

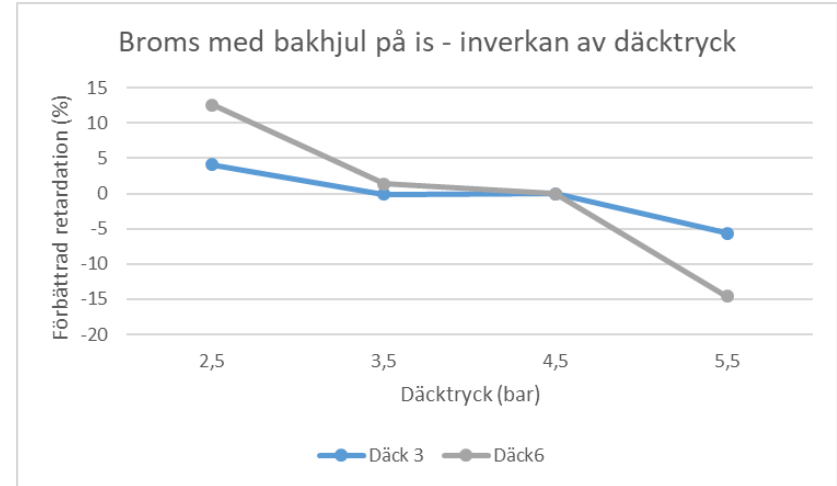
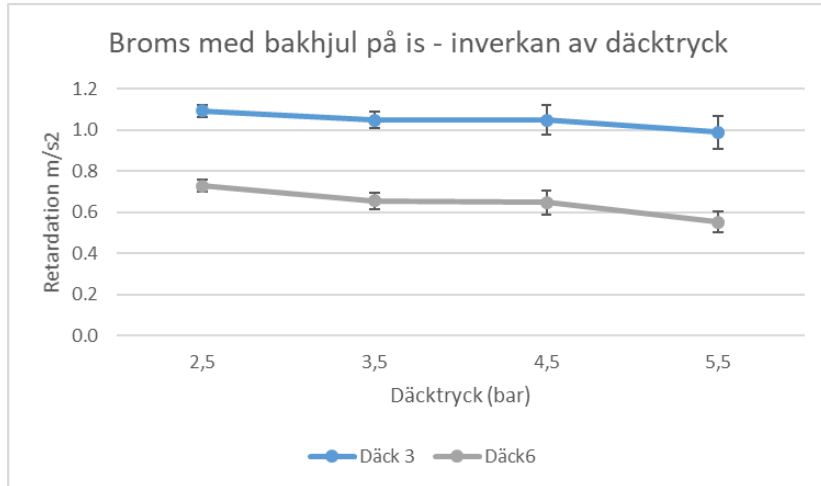
Dubbdäck

Tillverkare	Modell	Kodnr	Broms med bakhjul		Broms med framhjul	
			Retardation (m/s ²)	Ranking	Retardation (m/s ²)	Ranking
Suomi Tyres	W240	8	0,909	2	0,626	2
Suomi Tyres	W106	4	0,838	5	0,513	6
Schwalbe	Marathon Winter	3	1,007	1	0,669	1
Schwalbe	Winter	2	0,913	2	0,545	4
Biltema		6	0,715	7	0,504	6
Clas Ohlson	Innova	10	0,835	5	0,609	3
Jula	Kenda Klondike	5	0,863	4	0,543	4

Dubbfria däck

Tillverkare	Modell	Kodnr	Broms med bakhjul	
			Retardation (m/s ²)	Ranking
Dubbfritt vinterdäck				
Suomi Tyres		7	0,549	2
Continental	Top Contact Vinter	1	0,596	1
Sommarkdäck				
Schwalbe	Maraton Plus	9	0,511	3

Bromstest is – inverkan av däcktryck

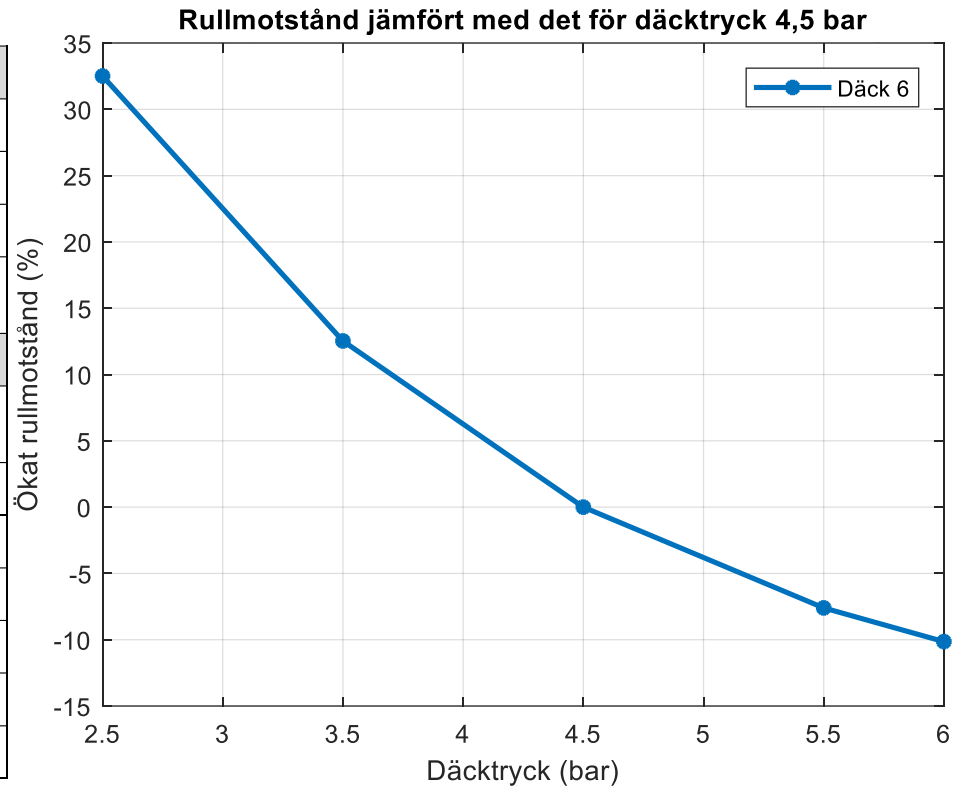


Handling tests on ice



Rolling resistance

Tillverkare	Modell	Rullmotstånd i förhållande till sommardäcket
Dubbdäck		
Suomi Tyres	W240	+30 % ± 2 %
Suomi Tyres	W106	+31 % ± 2 %
Schwalbe	Marathon Winter (Raceguard)	+16 % ± 2 %
andra mätningen		+18 % ± 2 %
Schwalbe	Winter (K-Guard 3, Active)	+39 % ± 2 %
Biltema		+40 % ± 2 %
Clas Ohlson	Innova	+34 % ± 2 %
Jula	Kenda Klondike	+42 % ± 2 %
Dubbfria vinterdäck		
Suomi Tyres	Dubbfritt	+23 % ± 2 %
Continental	Top Contact Vinter	-10 % ± 2 %



Concluding results

		Trafiksäkerhet						
Tillverkare	Modell	Broms is bak	Broms is fram	Handling is	Sammanvägt isgrepp	Broms asfalt	Rullmotstånd	Dubb-slitage
Suomi Tyres	W240	2	2	1	1	1	2	3
Suomi Tyres	W106	5	6	5	4	1	2	1
Schwalbe	Marathon Winter (Raceguard)	1	1	3	1	1	1	6
Schwalbe	Winter (K-Guard 3, Active)	2	4	7	4	1	5	1
Biltema		7	6	3	4	1	5	5
Clas Ohlson	Innova	5	3	1	3	1	4	3
Jula	Kenda Klondike	4	4	6	4	1	5	6

Stort tack till Länsförsäkringsbolagens
forskningsfond som föreslog och finansierade denna
studie.



VTI Notat 20-2018

THANKS FOR THE ATTENTION

Mattias Hjort, forskningsledare däck/väg-interaktion, VTI

mattias.hjort@vti.se

0703-204344

All VTI reports can be downloaded as pdfs for free at www.vti.se