Studded tyres and air quality in Norway

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Regulations studded tyres

**Norway**
- 2011: Public hearing new regulations:
  - Maximum of 50 studs per meter rolling circumference.
  - Main object: Harmonized regulations.
- September 2012: We were informed about the Swedish/Finnish exception rule.
- October 2013: Dispensation for tyres approved through the Swedish/Finnish exception rule.
  - valid for tyres produced until end of September 2017.

**Sweden and Finland**
- 2009: Exception rule (over-run).
- 2013: Maximum of 50 studs per meter rolling circumference.
Aim of studded tyre testing

Harmonized regulations for studded tires in Norway, Sweden and Finland

- Get a better understanding of what a changed regulations for studded tires will have on local air quality in Norway

- Especially the exception rule with testing method (over-run) gave cause for concern

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Historical trend in Oslo

- Number of daily mean concentration PM10 > 50 µg/m³
- Red line is the EU–limit value
- 5 monitoring station in Oslo
Successful abatements was executed

- Less use of studded tyres
  - Tax on using studded tyres
  - Funding for switching from studded to non-studded tyres
- Road maintenance
  - Removal of dust
  - Dust binding by MgCl\(_2\)
- Lower speed limits
- Also other abatements in non-road sectors
Use of studded tyres in Norway in 2015

- Oslo: 14%
- Bergen: 14%
- Trondheim: 35%
- Stavanger: 28%
- Tromsø: 87%
- Medium towns in south: ≈ 50%
Policy for studded tyres

- There is tax for using studded tyre in Oslo and Bergen
- Tax is about € 150 per year
- In future:
  - Most likely still tax in 2–4 cities for the next decades
  - Most likely never tax in smaller towns
  - Studded tyre will never be banned in Norway
Why is this important?

- PM2,5 gives negative health effects:
  - Ca. 450.00 causes of early death in Europe, ca. 1.500 in Norway
  - Even more become ill or troubled

- In Sweden the social cost is estimated to 35 billion SEK

- Norway risk being fined by the ESA if the limits are broken
  - Stockholm is already fined due to high concentrations of PM

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Air quality – stricter requirements in Norway from 2016?

<table>
<thead>
<tr>
<th>Component</th>
<th>Averaging period</th>
<th>Current limit</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM10</td>
<td>Daily average value</td>
<td>50 µg/m³</td>
<td>50 µg/m³</td>
</tr>
<tr>
<td></td>
<td>Max days with exceed</td>
<td>35 days</td>
<td>30 days</td>
</tr>
<tr>
<td>PM10</td>
<td>Annual mean</td>
<td>40 µg/m³</td>
<td>25 µg/m³</td>
</tr>
<tr>
<td>PM2,5</td>
<td>Annual mean</td>
<td>25 µg/m³</td>
<td>15 µg/m³</td>
</tr>
</tbody>
</table>
Status

- Tests conducted at VTI, collaboration between Trafikverket and Statens vegvesen
  - VTI rapport 867A published

- Dispersion calculation done by the Norwegian Institute for Air Research (NILU)

- News item on www.vegvesen.no:
  - Flere pigger gir mer svevestøv (More studs gives more particulate matter)

- ETRMA has initiated a follow-up project
Studded tyres tested (205/55 R16)

1. Regulation in Sweden/Finland (96 studs/tyre)
   - Michelin X-Ice North
   - Gislaved Nord Frost 100

2. Regulation in Norway (130 studs/tyre)
   - Pirelli Ice Zero
   - Goodyear Ultra grip Ice Arctic
   - Continental Ice Contact

3. Previous generation (130 studs/tyre)
   - Nokian Hakkapeliitta 5

4. Exception rule in Sweden/Finland (190 studs/tyre)
   - Nokian Hakkapeliitta 8
Results

Gislaved (96 studs)
Michelin (96 studs)
Goodyear (130 studs)
Continental (130 studs)
Pirelli (130 studs)
Nokian Hakka 5 (130 studs)
Nokian Hakka 8 (190 studs)

PM10 compared to Nokian Hakka 8

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Emission of PM10 for different regulations

- Current regulation in Sweden/Finland: 73%
- Current regulation in Norway: 100%
- Exception rule in Sweden/Finland: 141%

PM10 compared to current regulation in Norway
Over-run compared to PM10

Wear estimated with exception rule

Over-run:
- Hakka 8
- Pirelli
- Goodyear
- Continental

$R^2 = 0.0378$
Regulations and future directions

- **Temporary exemption** for studded tyres according to regulations in Sweden/Finland (including the exception rule) for tyres produced through September 2017

- Results from study conducted by ETRMA

- What considerations do the Swedish and Finnish road authorities?

- Tyre manufacturers need for predictability

- Any change in regulation must be open for comments before it can be introduced

- It is desirable to have a **harmonized Nordic legislation** on studded tyres ensuring good air quality and road safety while it promotes technological development in the industry

- Focus on **test method for the exception rule**
  - Further development of the over-run method or find a new method?
Thank you for the attention!

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