

# Ramp Metering – New experiences in NRW



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**Length of  
motorway network  
in NRW: ~ 2.200 km**

**Very high traffic load**  
Ø ADT 60.000 vpd  
max ADT 180.000 vpd  
(Cologne ringroad)



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- **Five pilots on A 40 in 1999, first ramp metering systems in Germany**
- **Results of evaluation:**
  - **congestion: more than 50 % reduction**
  - **traffic safety: 40 % less accidents**
  - **average speed increases for more than 10 km/h during peak hours**
  - **quite simple, but very restrictive and efficient way to improve traffic flow on our motorways**
  - **appropriate especially for commuter motorways in conurbation areas**
  - **the good results of the pilots were confirmed at most of our following systems**



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- **Telematics-Programme for NRW, financed by the Federal Ministry:**  
until middle 2008 nearly 100 running ramp metering systems
- up to now 75 systems running, among these 5 systems at double junctions where ramp and parallel lane are metered
- **CENTRICO agreement: one cycle – one car!**
  - 2 s red + 1 s red/yellow + 1 s green + 1 s yellow = 5 s / cycle
  - 12 cycles / min = 12 cars / min = 720 cars / h as maximum academic capacity by continuous operation (in practice there are higher capacities because of not continuously operation)



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**NRW.**

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**NRW.**

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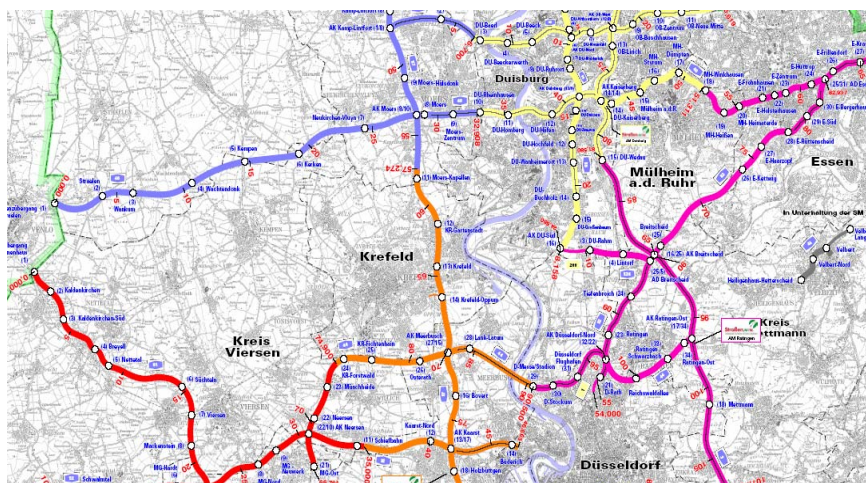
- in fact traffic loads of > 1000 cars / h on some ramps
- i. e. notable difference between capacity and traffic load
- solution after intense discussion: paradigm shift
  - replacing of the additional sign „one car on green“ by „two cars on green“
- systems must run during peak hours continuously!
- NO CUT OFF!!!**



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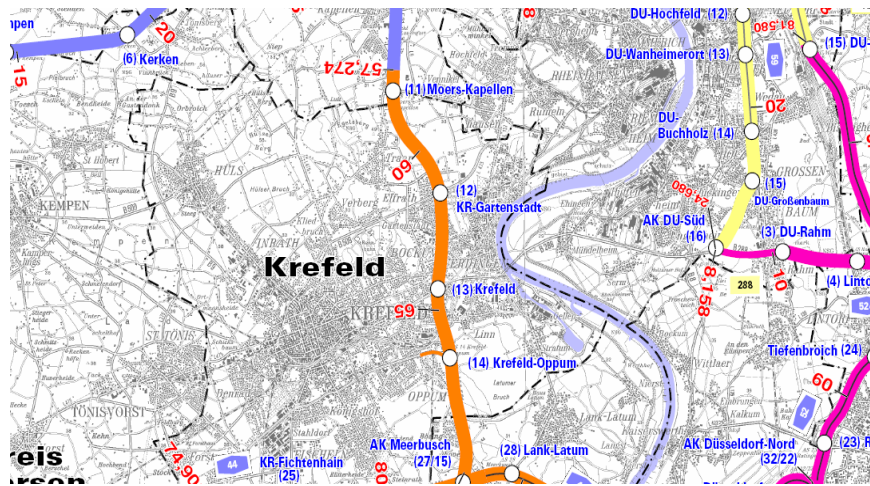
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  - notable difference between capacity and traffic load
  - solution after intense discussion: paradigm shift
    - removal of the additional sign „one car on green“ by „two cars on green“
  - systems must run during peak hours continuously!  
**NO CUT OFF!!!**
- Krefeld-Zentrum, slight rise in the ramp:  
 $3 \text{ s red} + 1 \text{ s red/yellow} + 3 \text{ s green} + 1 \text{ yellow} = 8 \text{ s / cycle}$   
capacity 900 cars / h



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- in fact traffic loads of > 1000 vehicles / h on some ramps  
→ notable difference between capacity and traffic load  
→ solution after intense discussion: paradigm shift  
– removal of the additional sign „one car on green“  
→ systems must run during peak hours continuously! No switch off!
- Krefeld-Zentrum, slight rise in the ramp:  
3 s red + 1 s red/yellow + 3 s green + 1 yellow = 8 s / cycle  
capacity 900 vehicles / h (two vehicles per cycle)
- Köln-Dellbrück, slight slope in the ramp:  
3 s red + 1 s red/yellow + 2 s green + 1 yellow = 7 s / cycle  
capacity 1020 vehicles / h (two vehicles per cycle)

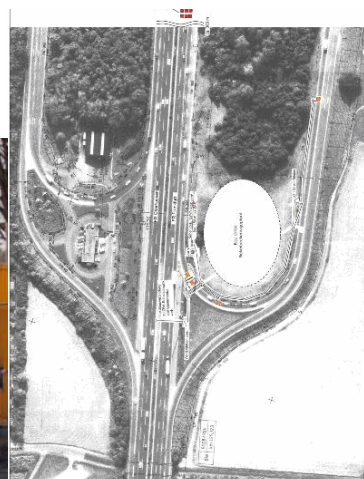


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**Köln-Dellbrück:**  
slight slope, construction site in the  
„ear“ (rain containment basin,  
preparing 8-lane-extension)



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In general good experiences, similar to the results of the study

- BUT:**
- a few systems nearly have no effect on traffic flow on main lanes
  - some systems seem to work too inert
  - several ramps still congested (by one car per cycle)

**Reasons / Solutions:**

- ALINEA-algorithm could be inappropriate
- loops/detection are situated at wrong locations
- communication between detection, sub-centre and control unit sometimes slow, more intelligence locally
- coordination of traffic lights with ramp metering



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Thank you for your attention, for further questions:

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