

Stop and goes of traffic signals

A traffic signal auditor's perspective



 Land Transport NZ
Ikiiki Whenua Aotearoa

VIASTRADA

Stops and goes of traffic signals

*Looking backwards
and forwards*

Axel Downard-Wilke

Aug 2023

Who remembers where the 2004 SNUG workshop was held?

Hamilton, Kingsgate Hotel

Who thinks they may have attended back then?

2004 SNUG presentation (slide 1)



Stops and Goes of Traffic Signals

Axel Wilke
Christchurch City Council

Stops and Goes of Traffic Signals
Axel Wilke
Christchurch City Council

Introduction
• Commissioned by Transfund
• Objectives
• Contribution to improving the efficiency of traffic signals
• Purpose
• Axle's participation objectives

Right turn lanes
• Recommendations
• Design RT lanes for RT traffic to avoid RT lane on RT lanes
• RT lanes on RT lanes on RT lanes
• RT lanes on RT lanes on RT lanes

Signal conspicuity
• Recommendations
• Check for any existing programs for conspicuity
• Check for any existing programs for conspicuity
• Check for any existing programs for conspicuity

Turn arrow logic
• Recommendations
• Consider the following factors
• Check for any existing programs for conspicuity
• Check for any existing programs for conspicuity

Crash rate reductions
• Right turn lanes
• Signal conspicuity
• Turn arrow logic
• Availability of "Stops and Goes"

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Crash rate reductions
• Right turn lanes
• Signal conspicuity
• Turn arrow logic
• Availability of "Stops and Goes"

Common deficiencies
• Right turn lanes
• Signal conspicuity
• Turn arrow logic
• Availability of "Stops and Goes"

No design
• Recommendations
• Check for any existing programs for conspicuity
• Check for any existing programs for conspicuity

Crash rate reductions
• Right turn lanes
• Signal conspicuity
• Turn arrow logic
• Availability of "Stops and Goes"

Turn arrow operation
• Recommendations
• Check for any existing programs for conspicuity
• Check for any existing programs for conspicuity

Crash rate reductions
• Right turn lanes
• Signal conspicuity
• Turn arrow logic
• Availability of "Stops and Goes"

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Crash rate reductions
• Right turn lanes
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• Availability of "Stops and Goes"

2004 SNUG presentation (slide 5)



Background

- Representative number of existing traffic signals has been audited
 - Covering some 12 TLAs
 - Including Transit installations
- “Stops and Goes” summarises common trends and themes

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The important issue to note is that it was never a design guide.

2004 SNUG presentation (slide 6)



Content of "Stops & Goes"

- Draws attention to items frequently compromising safety and efficiency
- Presents ways how these deficiencies could be addressed
- Includes photos and illustrations showing
 - Good practice
 - Not so good practice

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First bullet: this was never a design guide but instead, it summarises major themes that came out of a number of audits

2004 SNUG presentation (slide 45)

Conclusions

- Engage competent signal engineer for the peer review of new designs
 - Road safety audit process is not sufficient
 - Signal peer review is separate
- Engage suitably experienced specialists for the auditing of SCATS set-ups

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Total crash rate reductions

- 40% for left turn
- 20% for right turn
- 40% for road RT (not 40%)
- 80% for road RT (not 80%)

Common deficiencies

- Right turn
- Turn arrow
- Signal timing
- Signal priority
- Ped phase issue
- Ped phase location
- Ped phase
- Cycle time

Left turn design

- Recommendations
- Ped phase
- Ped phase location
- Ped phase timing
- Ped phase location



Turn arrow operation

- Recommendations
- Ped phase
- Ped phase location
- Ped phase timing
- Ped phase location



Crash issue

- Consider the following factors
- Ped phase
- Ped phase location
- Ped phase timing
- Ped phase location

Availability of 'Stops and Goes'

- Get your copy here
- Contact for further information
- Contact for further information

Availability of 'Stops and Goes'

- Get your copy here
- Contact for further information
- Contact for further information

2004 SNUG presentation (slide 46)

Conclusions cont'd

- Suitably qualified engineers
 - ask SNUG committee members for a list
 - www.ipenz.org.nz/snug
- Commission audits of your existing traffic signals
- Engage competent signal engineer for the peer review of new designs

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Stops and Goes of Traffic Signals
April 2004
Christchurch City Council

Introduction
• Commissioned by Transfund
• Objectives
• Contribution to improving the efficiency of traffic signals
• Purpose
• Audit of performance

Signal turn lanes

Signal turn lanes
• Recommendations
• Signal turn lanes should be used where they are justified
• Signal turn lanes should be used where they are justified
• Signal turn lanes should be used where they are justified

Signal conspicuity

Signal conspicuity
• Recommendations
• Signal conspicuity should be maintained
• Signal conspicuity should be maintained
• Signal conspicuity should be maintained

Turn arrow logic

Turn arrow logic
• Recommendations
• Turn arrow logic should be reviewed
• Turn arrow logic should be reviewed
• Turn arrow logic should be reviewed

Availability of 'Stops and Goes'

Availability of 'Stops and Goes'
• Get your copy here
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• Contact for further information

Local crash rate reductions

Common deficiencies

Turn design

Turn design

Turn arrow operation

Turn arrow logic

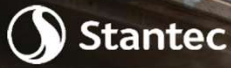
Crash data

Crash data

Availability of 'Stops and Goes'

Availability of 'Stops and Goes'

2022 SNUG presentation (Martin Huang)



Traffic Signal Safety

Recap for Stops and goes
of traffic signals booklet



2022 SNUG presentation (Martin Huang)

Next steps

Rewrite/update the document to reflect the following:

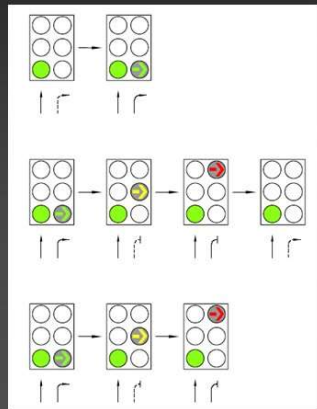
- Crash search / patterns refinement
- Cyclists / pedestrian best practice at signalised intersections
- Bus priority at signalised intersections
- A checklist for future traffic signal review / audit

2004 SNUG presentation (slide 46)



Typical crash rate reductions

- Compared to full filtering



- 30% for lag right turns
- 68% for lead RT, then filtering
- 90% for lead RT w/o filtering

Stops and Goes of Traffic Signals
April 2004
Christchurch City Council

Introduction
Commissioned by Transfund NZ
Objectives
Contribute to improving the efficiency of traffic signals
Provide
A clear policy and procedures
Signal design



Signal turn lanes
Recommendations
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes



Signal compatibility
Recommendations
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes

Turn arrow logic
Recommendations
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes



Typical crash rate reductions
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes

Common deficiencies
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes

Signal design
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes



Turn arrow operation
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes



Signal design
Signal RT lanes
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Signal design
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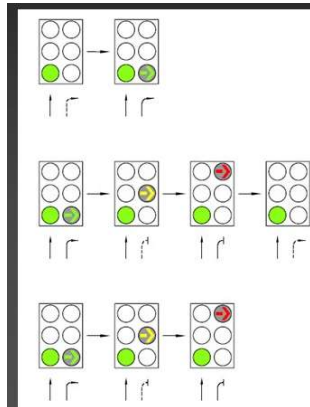
Availability of 'Stops and Goes'
Signal RT lanes
Signal RT lanes
Signal RT lanes
Signal RT lanes



Crash search / patterns refinement (2)

My thoughts

- This can be done
- Will be time-consuming
- What will we learn from it?
- Hence – is it worth it?



- 30% for lag right turns
- 68% for lead RT, then filtering
- 90% for lead RT w/o filtering

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My thoughts are: if the percentages all go down a bit, or they go up a bit, or even display somewhat differential movement, what will we learn from it? What will be do differently? Is getting these numbers updated worth the time that we'd need to put into this?

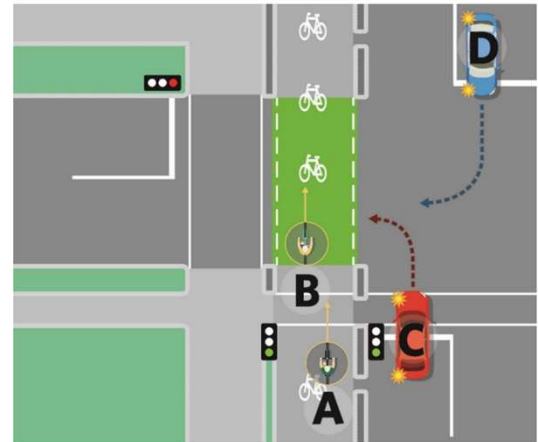
My thinking is that if we decide to update the numbers, I'll

Cyclists / pedestrian best practice

My thoughts

- Cycle best practice is useful
 - Will change completely when *Accessible Streets* package is passed
 - When will that happen?
 - [CNG info](#) is not comprehensive
- Pedestrian best practice is useful
 - Good guidance in the PNG, though
 - [Signalised crossings](#)
 - [Signalised intersections](#)

Proposal 6C). Give cycles and buses priority over turning traffic when they're travelling through an intersection in a separated lane

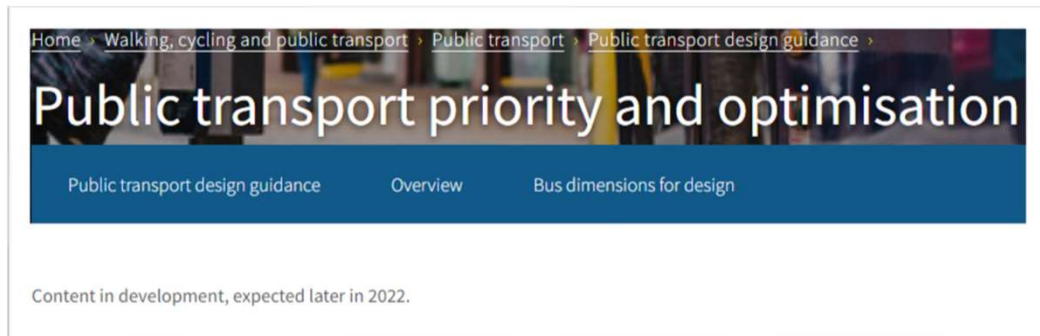


Accessible Streets consultation (Mar 2020)

Bus best practice

My thoughts

- Bus priority is super-useful
- What will be included in the upcoming PTDG?
 - Not useful to duplicate efforts



Review / audit

My thoughts

- Checklist for future traffic signal review / audit
- Should we be doing those audits?
 - Yes
 - It needs to be centrally organised, like it was 20 years ago
 - I don't expect TLAs to do that on their own
 - If there's no desire for central coordination, this is not needed

Discussion

- Crash search / patterns refinement
- Cyclists / pedestrian best practice at signalised intersections
- Bus priority at signalised intersections
- A checklist for future traffic signal review/audit

We share more knowledge on
www.viastrada.nz



TRANSPORT PLANNING AND DESIGN