

TORONTO TRAM NETWORK

and COLD WEATHER OPERATIONS

by Mike Zaytsoff, MRAeS, MAS, BBA



Copyright Brad O'Brien (1999)

Photo credit: Frank Gunn, Canadian Press

PRESENTER

- ✈ Full introduction in my presentation
Aviation Lessons for Tram Operations
- 🚍 Lived in Toronto for a year while growing up and rode trams to school
- 🚍 Thanks to MOTAT, especially James Duncan, now I get to drive them



**San
Francisco**

LA

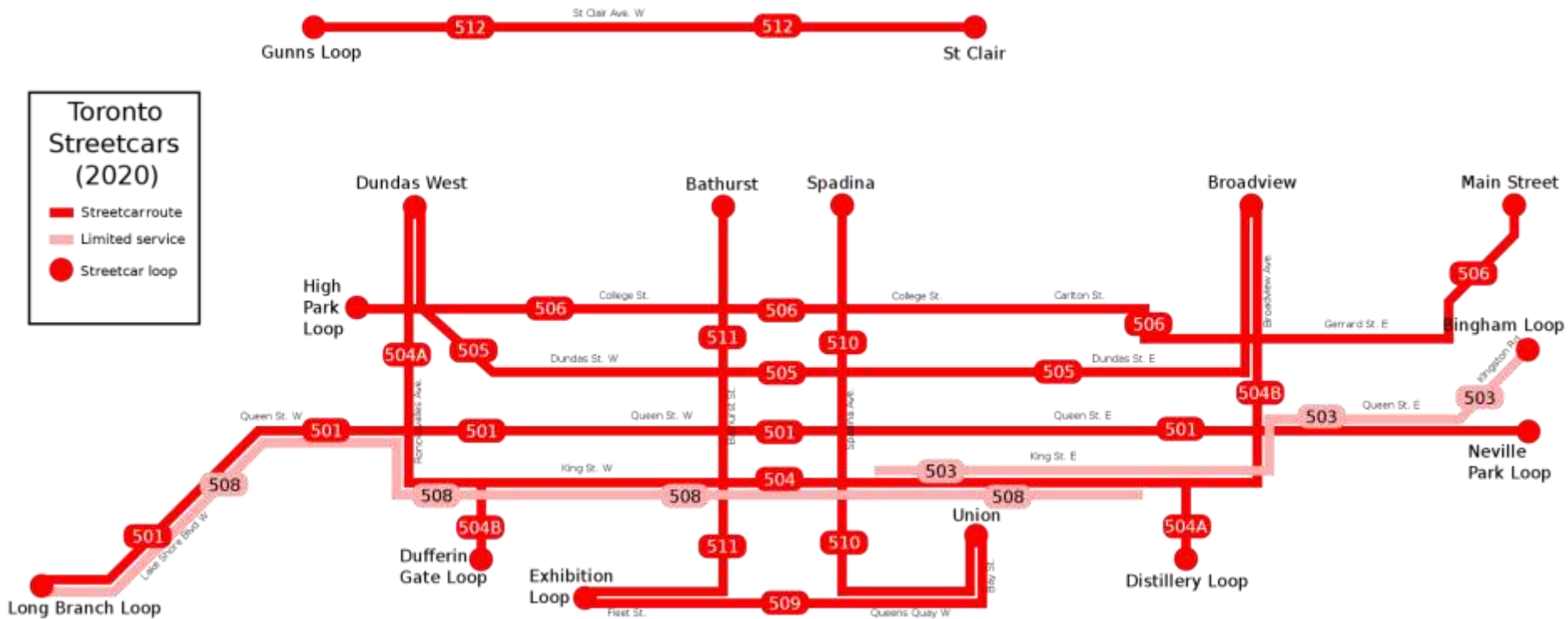
Toronto

Chicago

STREETCAR (TRAM) MAP with SUBWAYS INCLUDED



STREETCAR (TRAM) MAP with SUBWAYS REMOVED



OVERVIEW

TORONTO:

- 🚊 Busiest tram network in North America
- 🚊 9 lines
- 🚊 82 km of routes
- 🚊 Annual ridership = 64 million (2018)
- 🚊 Population of 6 million
- 🚊 Electric trams since 1892

MELBOURNE:

- 🚊 Largest tram network in the world
- 🚊 24 lines
- 🚊 250 km of routes
- 🚊 Annual ridership = 206 million (2018)
- 🚊 Population of 5 million
- 🚊 Electric trams since 1906

WHY DID THEY KEEP TRAMS?

MELBOURNE:

- 🚌 Saving trams led by Commissioner Sir Robert Risson arguing in 1970s cost of removing tracks prohibitive
- 🚌 Plus union support for keeping them


TORONTO:


- 🚌 Commissioner William Allen wanted to get rid of trams in 1966:
“streetcars are as obsolete as the horse and buggy”
- 🚌 STREETCARS FOR TORONTO lobbied trams cheaper in long run
- 🚌 General public preferred trams over buses

HISTORY of TRACK

 Odd gauge only used in Toronto

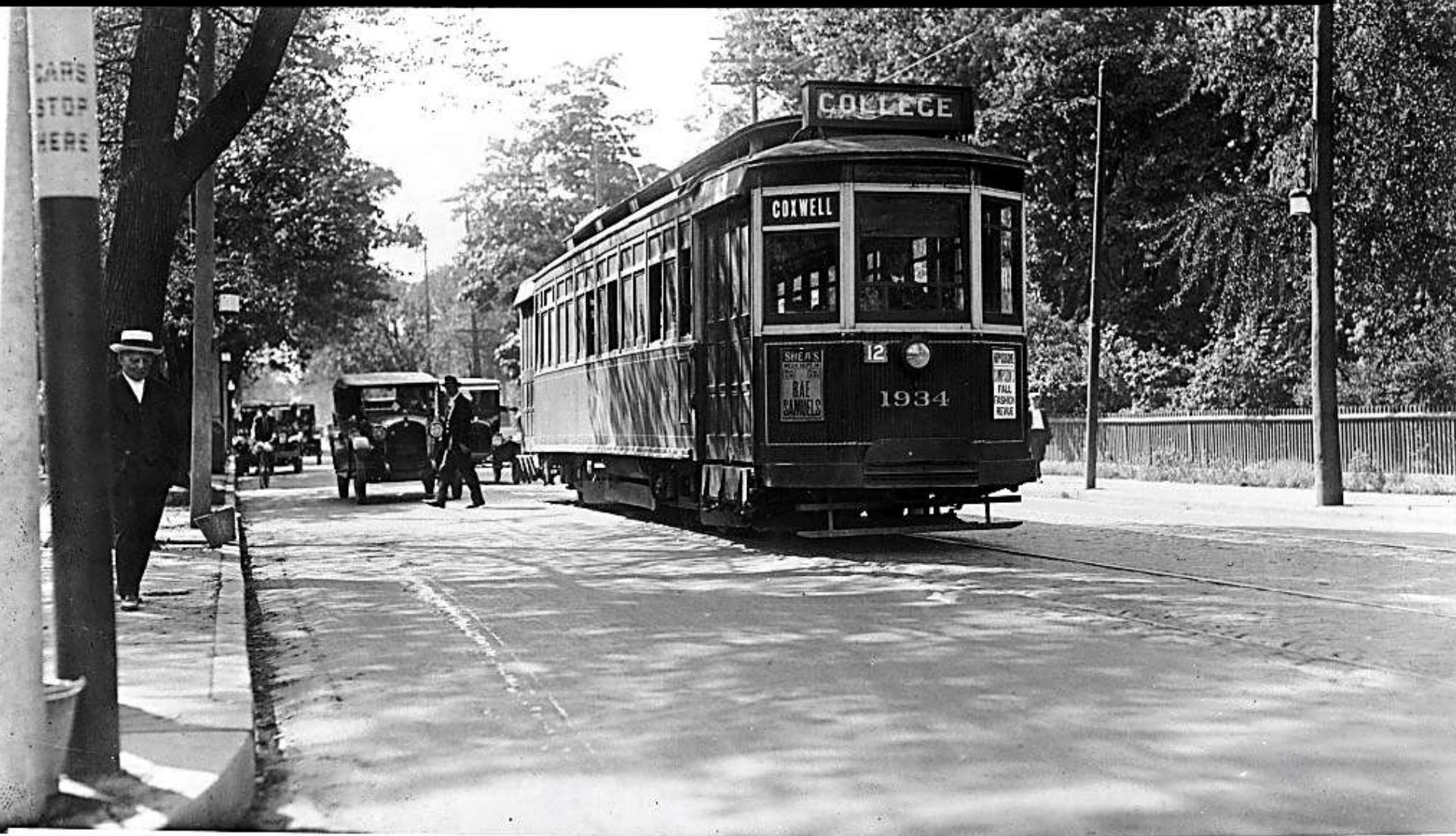
 1495 mm vs. 1435 mm for Standard Gauge

 Odd thing about odd gauge is no one really knows 100% why it's used. But there are 2 theories:

1. Horse & cart/buggy use standard gauge. Using wider gauge allowed cart to use inside of track during muddy conditions
2. Prevent regular trains from rolling through streets
 -  Happened in NYC, Syracuse, NY, Hamilton, ON, etc.

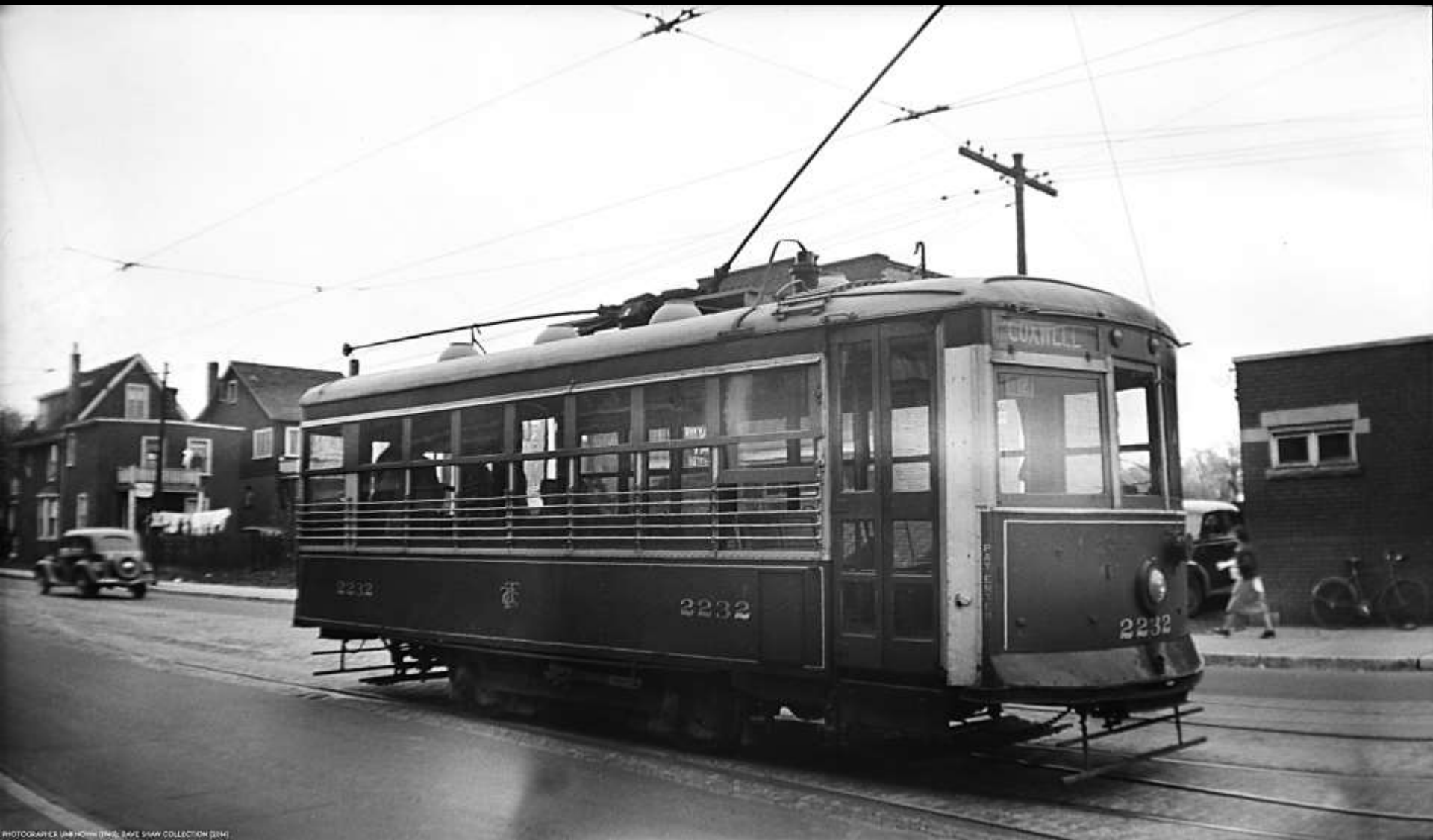
HISTORY of ROLLING STOCK

- 🚌 Various before TTC formed in 1921
- 🚌 Peter Witts from 1921 – 1965
- 🚌 PCCs from 1938 – 1995
- 🚌 CLRVs from 1979 – 2019
- 🚌 ALRVs from 1988 – 2019
- 🚌 Flexity Outlooks from 2014 – present

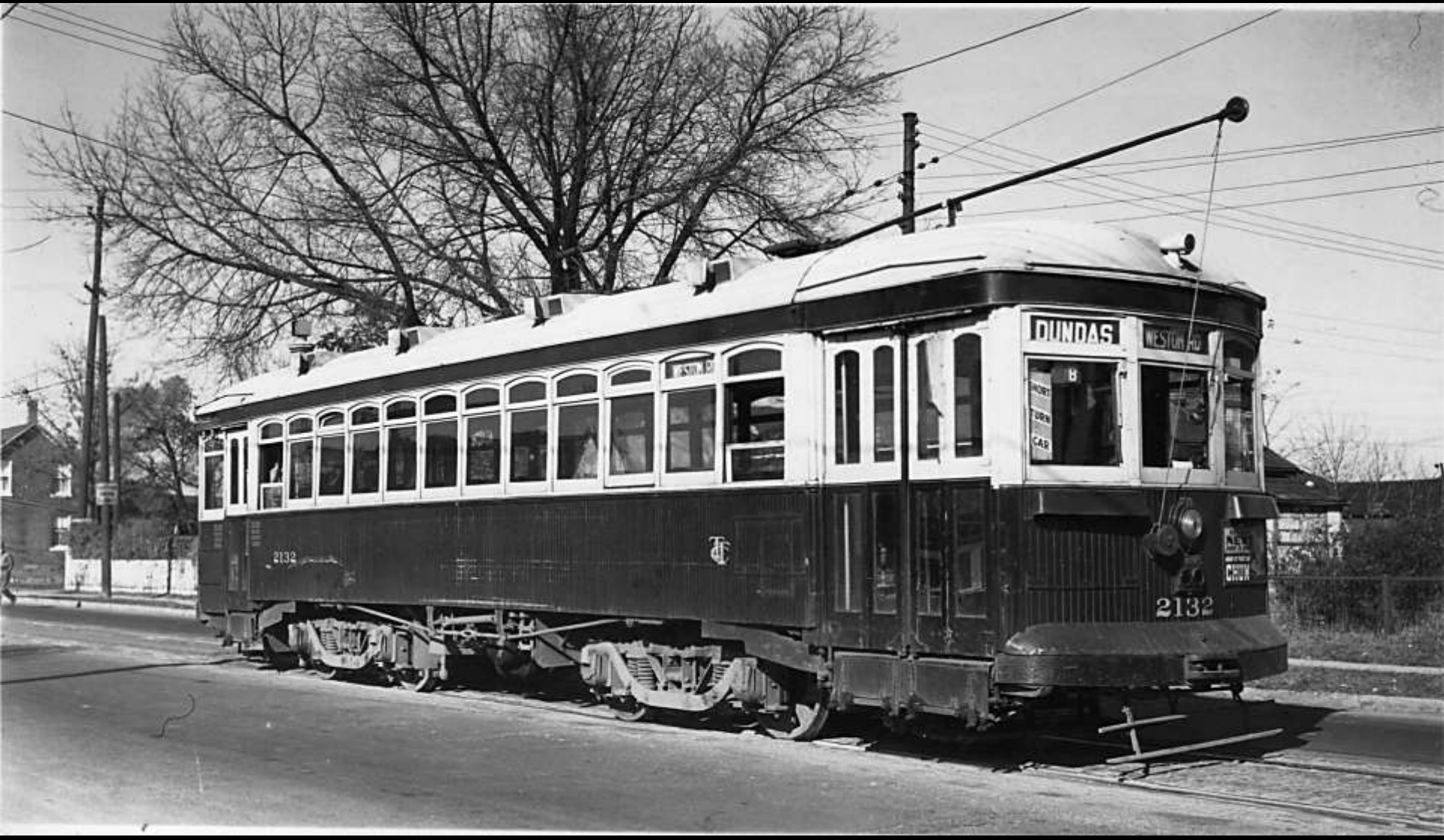


4042 College Street and Spadina Avenue (Ontario Safety League) September 14, 1925.

“G” CLASS BIRNEY



“H” CLASS



“J” CLASS



HISTORY of ROLLING STOCK

PETER WITTs:

- 🚌 Named after Cleveland Railway Commissioner Peter Witt
- 🚌 Defined by interior pay system, not so much exterior or equipment in actual tram (streetcar)
- 🚌 In service 1921 – 1965
- 🚌 350 trams + 225 trailers total
- 🚌 600V DC driving 4 traction motors at 50 hp each



Photo credit: David Arthur



CHARTER

EXHIBITION

TORONTO TRANSPORTATION

This Peter Witt Streetcar has been part of Toronto's heritage since 1923

2766

This Peter Witt Streetcar has been part of Toronto's heritage since 1923

This Peter Witt Streetcar has been part of Toronto's heritage since 1923

2766

Photo credit: Danielle Scott



6401 Trol. Car, interior. (Commercial) (Adv.) Oct. 30/28.


HISTORY of ROLLING STOCK

PCCs:

 President's Conference Committee

 Design committee formed in 1929 to standardize tram (streetcar) design

 In service 1938 – 1995

 Toronto operated more than any other city in North America (745 total)

 Lots available when cities scrapped tram networks:

 E.g. Cincinnati, Birmingham, K. City, Cleveland, Louisville

HISTORY of ROLLING STOCK

PCCs:

 Toronto operated more PCCs than any other type

 745 PCCs total compared to:

 575 Peter Witts

 248 CLRV and ALRVs

 204 Flexity Outlooks (Flexities)







 600V DC driving 4 traction motors at 55 hp each



Photo credit: Reverend Edward Brain

HISTORY of ROLLING STOCK

CLRVs:

-  Canadian Light Rail Vehicle
-  Toronto exclusive design not used elsewhere
 -  Parts became difficult to source
-  In service 1979 – 2019
-  196 total units
-  600V DC driving 2 traction motors at 182 hp each

HISTORY of ROLLING STOCK

ALRVs:

 Articulated Light Rail Vehicle

 Articulated bus version of the CLRV

 In service 1988 – 2019

 52 total units








 600V DC driving 4 traction motors at 87 hp each



Photo credit: Secondarywaltz

HISTORY of ROLLING STOCK

FLEXITY OUTLOOKs:

-  (Flexities)
-  Made by Bombardier
 -  (also makes CRJ aircraft)
-  In service from 2014 – present
-  204 currently in service, 60 under construction
-  Handle cold weather better than CLRVs/ALRVs
-  600V DC driving 4 traction motors at 134 hp each



4403

510 SPADINA
Dundas St W

Scotiabank

Albion St W



RECORD OF THE YEAR
AVAILABLE
NOW



WHAT DO THEY DO WHEN THIS HAPPENS?



Photo credit: Aitor Rodriguez Claro

COLD WEATHER OPERATIONS

OVERVIEW:

- 🚌 Overhead wires:
 - 🚋 Different shoes on some trolley poles
 - 🚋 2nd pantograph raised to clear ice / frost
- 🚌 Storm cars organized
- 🚌 Maintenance crews (city and transit are different)
- 🚌 Buses replace some routes in larger storms
 - 🚋 Concentrate efforts on maintaining service in CBD
 - 🚋 Replacement buses do not use snow tires

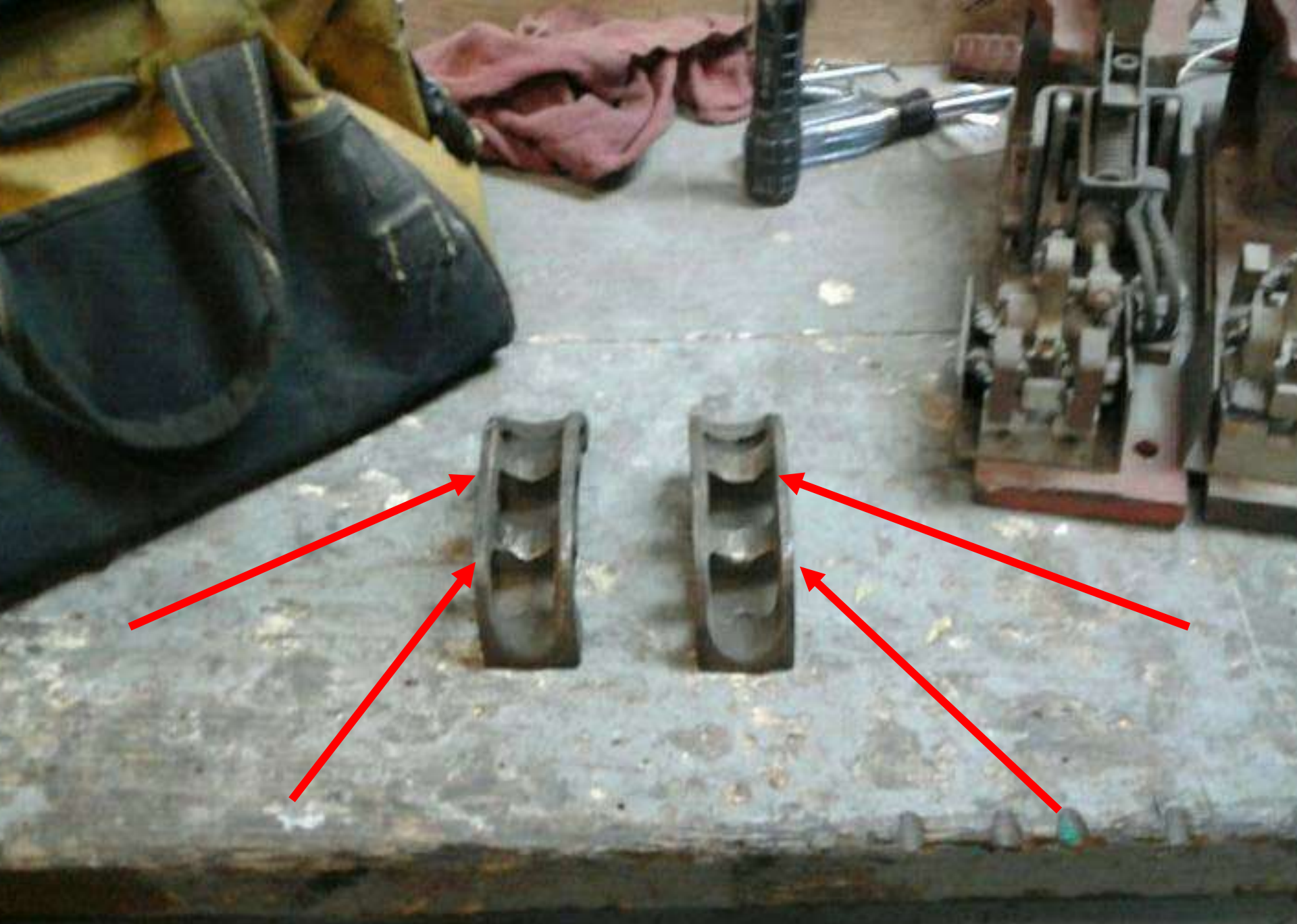


Photo credit: [traindude70](#) on Railway Preservation News








Photo credit: F40PHR231 on Railway Preservation News



FUSSELL

COLD WEATHER OPERATIONS

STORM CARS:

-  Not a different type of tram
-  6 of them
-  Follow circuitous or serpentine route continually going over problem areas to prevent failure:
 -  Points (switches)
 -  Sections of track
-  Sometimes run all night long
 -  Staffed by volunteers (overtime \$\$\$!!!)



1

2

3

2

3

TP-10

S-34

S-34

Photo credit: Marty Bernard






Photo credit: Frank Gunn, Canadian Press





COLD WEATHER OPERATIONS

MAINTENANCE CREWS:

 City crews apply saline solution to roads to prevent ice buildup

 Side benefit is it helps keep tracks clear

 Transit-specific trucks apply glycol to overhead

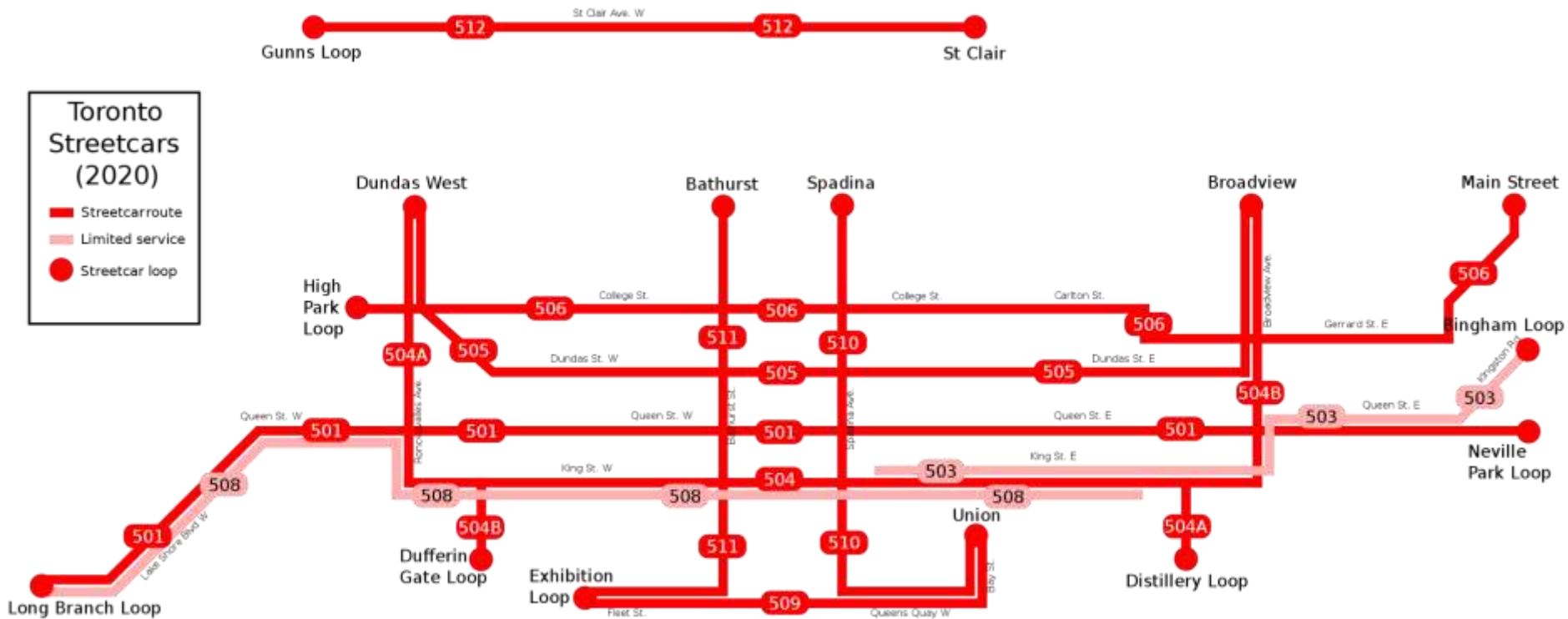
➔ Similar to fluid used to deice aircraft

 Frozen switches (points):

 Special type of broom used to clear

 Pour solution into round heel where rotating pivot is

STREETCAR (TRAM) MAP with SUBWAYS REMOVED

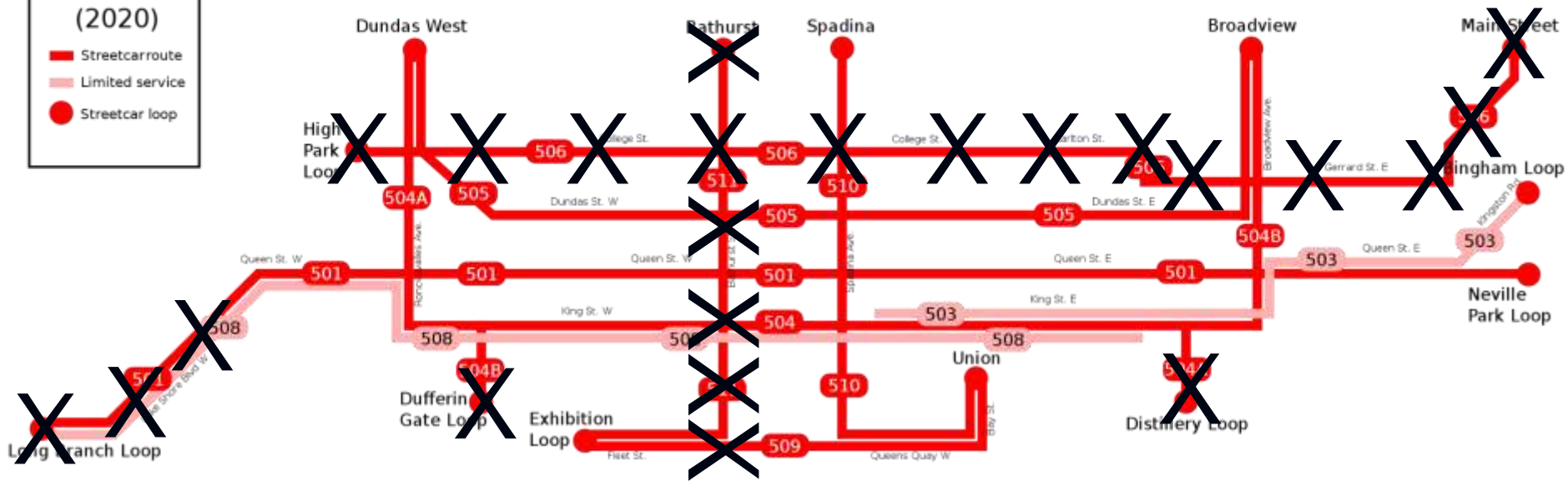


STREETCAR (TRAM) MAP with REPLACEMENT BUSES

~~Gunns Loop~~ ~~12~~ ~~512~~ ~~S. Clair~~ 1st thing to go in snow

Toronto Streetcars (2020)

- Streetcar route
- Limited service
- Streetcar loop



REPLACEMENT BUSES SOMETIMES STRUGGLE TOO



Photo credit: Nick Westoll, City News



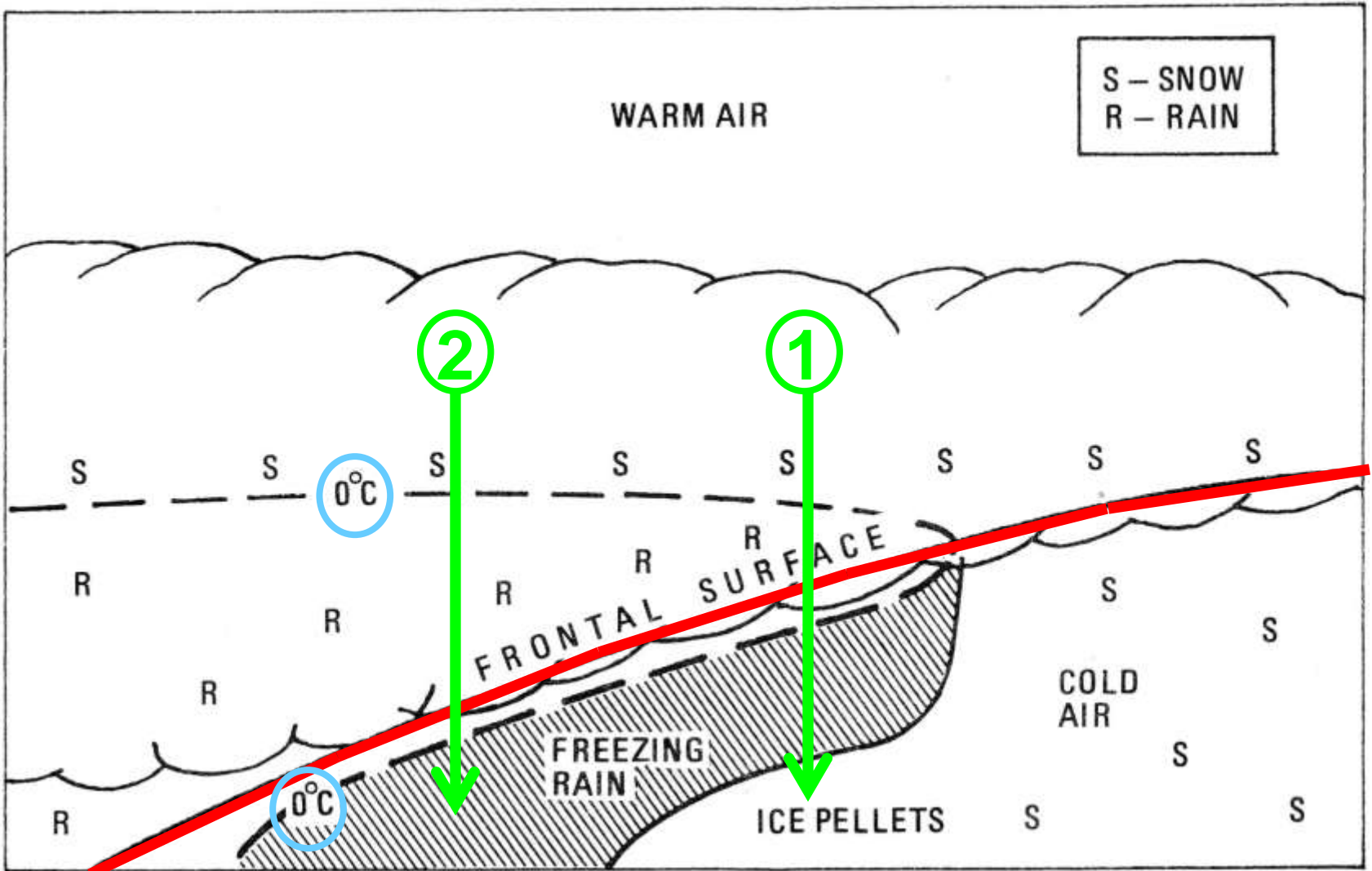
**San
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WARM FRONTS & FREEZING RAIN



WARM FRONTS & FREEZING RAIN



Photo credit: INMR

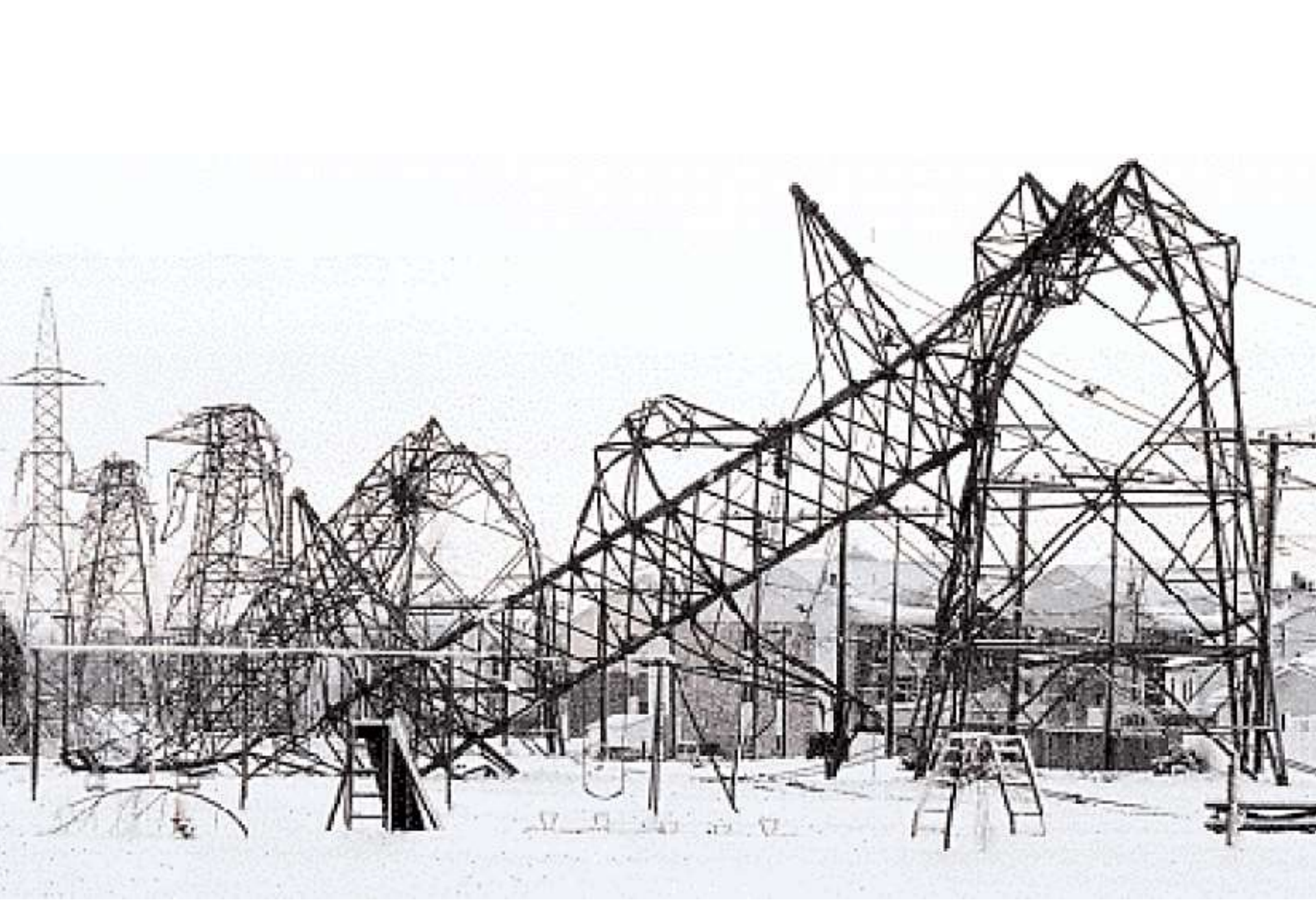


Photo credit: INMR



Photo credit: Power Grid International

FINAL THOUGHTS

🚌 To learn more about Toronto trams:

🚋 Steve Munro's website: www.stevemunro.ca

🚌 To see more Toronto trams:

🚋 Halton County Railway Museum: www.hcry.org

🚌 Big thank you to:

🚋 Robert Lubinski, Archivist at the Ontario Electric Railway Historical Association (OERHA) for his support and assistance

QUESTIONS?

