

**Strategy to Improve the Safety for Cyclists on Streets with
Decommissioned Streetcar Tracks**

Date:	May 15, 2014
To:	Public Works and Infrastructure Committee
From:	General Manager, Transportation Services
Wards:	Ward 6 (Etobicoke-Lakeshore) Ward 21 (St Paul's) Ward 31 (Beaches-East York)
Reference Number:	P:\2014\Cluster B\TRA\TIM\pw14009tim.docx

SUMMARY

The Toronto Transit Commission (TTC) has approximately 300 km of active streetcar tracks and 3.2 km of unused (or "decommissioned") streetcar tracks in the city. These streetcar tracks, whether active or inactive, present a challenge and hazard to cyclists particularly when riding parallel to these tracks or crossing these tracks at an angle, and especially during wet weather conditions.

Although the complete removal of inactive streetcar tracks is the most effective way of addressing the hazard created by these tracks to cyclists, it is very costly. Transportation Services examined alternative ways to address the hazards associated with these decommissioned tracks as an interim measure. A pilot project was undertaken that involved the use of various materials to fill the streetcar track flanges (i.e. grooves) of those decommissioned tracks that are not planned for removal by the TTC in the near future as part of their capital works program or in conjunction with a road rehabilitation.

This report provides the findings of the pilot project, which was carried out on the inactive tracks on Wychwood Avenue just south of St Clair Avenue West. The test results indicate that of the alternate materials used to fill the grooves (concrete, asphalt, thermoplastic paint and epoxy resin) the asphalt and the thermoplastic paint were the most durable, bonded well to the track grooves and provided good traction for cyclists.

On the basis of this pilot study, Transportation Services will proceed with the filling of the decommissioned streetcar track flanges in 2014 in order to improve the safety of cyclists on these roads as soon as possible.

RECOMMENDATION

The General Manager, Transportation Services recommends that:

1. This report be received for information.

Financial Impact

The safety initiative to fill the streetcar track flanges (i.e., grooves) of those decommissioned tracks that are not planned for removal by the TTC in the near future is estimated to cost approximately \$40,000 including materials, equipment and labour. The entire cost of this initiative can be accommodated within the 2014 Transportation Services Annual Operating Budget for Road Repair.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

City Council, at its meeting of November 27, 28 and 29, 2012, in considering a staff report titled "Streetcar Tracks and Cyclist Safety" (Item PW19.11), among other things, requested the General Manager of Transportation Services to report to the Public Works and Infrastructure Committee on a plan to remove or cover decommissioned streetcar tracks on Wychwood Avenue and Kipling Avenue.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PW19.11>

ISSUE BACKGROUND

As TTC streetcar service demand changes or new facilities are constructed, routes sometimes need to be altered to improve network efficiency. This may require the suspension of service on streetcar routes, which can result in sections of inactive or decommissioned tracks. In many instances, due to cost reasons, these decommissioned tracks remain in place until the road is reconstructed, which can be many years away. Streetcar tracks – active or inactive – present a potential hazard to cyclists, especially when wet. Bicycle wheels could slide or drop into the track flange, especially when the cyclist is travelling parallel to the tracks or crossing at an acute angle, which may cause the cyclist to lose control.

The most cost-effective time to remove decommissioned streetcar tracks is in conjunction with the reconstruction of the road because the concrete track allowance must be excavated in order to remove the rails. Removal of the tracks in advance of the road reconstruction is extremely costly and disruptive. As a result, Transportation Services, as an alternative to the removal of the tracks, will often employ a direct asphalt overlay on the tracks. However, the overlay does not adhere effectively to the concrete track allowance and steel rails and, as a result, has a limited

life span. It may be necessary, therefore, to repeat the overlay several times before the road is eventually reconstructed.

There are currently 3.2 kilometres of inactive streetcar tracks in the city. Most of these decommissioned tracks will soon be removed as part of TTC's capital works program or in conjunction with Transportation Services' road rehabilitation program. There are, however, three sections of inactive streetcar tracks, totaling approximately 370 metres in length, located on roads that are in good condition (Wychwood Avenue, Kipling Avenue, and Strathmore Boulevard) and, therefore, no pavement rehabilitation is planned in the next ten years. To improve safety for cyclists travelling on these roads, a more cost-effective alternative to removing or covering of the tracks was explored by Transportation Services. A study of various materials that could be used to fill and adhere to the streetcar track flanges (i.e. grooves) of these decommissioned tracks was carried out between November 2013 and April 2014.

COMMENTS

Transportation Services examined a number of materials that could be used to fill and adhere to the streetcar track flanges (i.e. grooves) of decommissioned streetcar tracks. To ensure that the most appropriate material(s) is selected for actual application, staff evaluated the products for their durability, ease of application, ability to provide a safe riding surface for cyclists and cost.

The following four materials were identified as possible candidates for use as a filler material: concrete, asphalt, thermoplastic paint and an epoxy resin. Each of these products was applied to the decommissioned tracks on Wychwood Avenue. It is important to note that within streetcar tracks there are two types of track grooves; one that is entirely steel on all sides ('all steel') and the other with a steel flange on one side and concrete on the other ('hybrid'). Each of the four product materials was applied to the two types of track grooves in two metre strips – eight sections in total.

The materials were evaluated based on five key criteria:

1. Material properties (visibility, traction, strength)
2. Material handling/application (ease of mixing and placement in the grooves)
3. Material performance (cracking, adhesion and durability)
4. Cyclist preference and overall impressions
5. Cost (material, labour and equipment)

The evaluation results for the various materials are provided in Table 1 below.

Table 1 – Evaluation Results for Materials Tested

Criterion		Materials Tested			
		Concrete	Asphalt	Thermoplastic Paint	Epoxy Resin
Material Property	Visibility	Blends with concrete track surface	Visible in daylight; not so in dim light	Highly visible; light-blue colour	Clear in colour; very similar to colour of ice
	Traction	Good friction but lower than asphalt.	Very Good friction	Excellent friction	Slippery in general; very slippery when wet.
	Strength	Hard	Hard	Very hard	Very hard
Material Handling/Application		Easy to mix and the easiest to place in the track grooves.	Easy to mix but requires additional time to compact when compared to concrete.	Requires special equipment for mixing and placement.	Requires special equipment; temperature sensitive and requires quick placement.
Material Performance (i.e., cracking, adhesion and durability)		Held together fairly well, with some pitting at the edges and de-layering in 'hybrid' track section.	Held together and bonded well in the track groove, especially in the 'hybrid' track section.	Held together very well and bonded well in both the 'all steel' groove and 'hybrid' track groove; some reflective cracking was present within 'hybrid' track section.	Held together well, with reflective cracking present adjacent to concrete track surface.
Cyclists' Preference and Impressions		Choice # 2 Colour identical to concrete track surface (indistinguishable)	Choice # 3 Poor visibility at night; unable to distinguish from track rail	Choice # 1 Good visibility and excellent friction	Choice #4 Considered too slippery and material colour is indistinguishable in the winter

When the overall results of Table 1 were all factored together, staff found that the asphalt and thermoplastic materials were superior. The asphalt and thermoplastic were more durable, bonded well to the track grooves and provided very good traction for cyclists. However, of these two preferred materials, staff felt that each material was better suited for a particular track groove type. The asphalt was found to be best suited for the 'hybrid' track groove, while the thermoplastic was best suited for the 'all steel' track groove.

The costs for implementing these two preferred filler materials were calculated for the Wychwood Avenue, Kipling Avenue and Strathmore Boulevard locations. The costs for material, labour and equipment are summarized below in Table 2.

Table 2 – Material, Labour and Equipment Cost Summary

Location	'All Steel' Track Groove (Thermoplastic Paint)			Sub-Total	'Hybrid' Track Groove (Asphalt)			Sub-Total	Total
	Track Rail Length (m)	Material Cost (\$/m)	Labour-Equipment Cost (\$/m)		Track Rail Length (m)	Material Cost (\$/m)	Labour-Equipment Cost (\$/m)		
Wychwood Avenue	142.5	20.00	35.00	\$7,840	671.5	4.00	26.00	\$20,150	\$27,990
Strathmore Boulevard	161.5	20.00	35.00	\$8,880	0	4.00	26.00	0	\$8,880
Kipling Avenue	0	20.00	35.00	0	80	4.00	26.00	\$2,400	\$2,400
Totals	304.0	20.00	35.00	\$16,720	751.5	4.00	26.00	\$22,550	\$39,270

Based on the figures above, the total cost to fill the streetcar track flanges of the decommissioned tracks on Wychwood Avenue, Strathmore Boulevard and Kipling Avenue is estimated to be approximately \$40,000. These funds are available in the 2014 Transportation Services Operating Budget for Road Repair.

The complete removal of TTC's decommissioned streetcar tracks is still the most effective way to eliminate the hazards for cyclists riding along, near or across these tracks. All efforts should therefore be made to remove these tracks as soon as possible in conjunction with road rehabilitation work. However, on the basis of the results of this pilot study, a relatively simple, effective and affordable method has been developed to enhance safety for cyclists in the vicinity of these decommissioned streetcar tracks prior to their removal. Therefore, Transportation Services will implement these measures as soon as practicable in 2014, as outlined above, using funds currently available in the 2014 Operating Budget.

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