TORONTO TRANSIT COMMISSION
REPORT NO.

MEETING DATE: February 17, 2010

SUBJECT: SUBWAY SUICIDE PREVENTION

INFORMATION ITEM

RECOMMENDATION

It is recommended that this report be received for information on efforts related to Subway Suicide Prevention, noting that:

1. Staff will continue to work with the Centre for Addiction and Mental Health (CAMH) on developing best practices for suicide prevention and the treatment of employees who have experienced emotional trauma as a result of a suicide; and

2. Staff will continue to investigate the installation of Platform Screen Doors (PSD), the most effective means of suicide prevention; and

3. Staff will include appropriate funding for Platform Screen Doors in the 2011 – 2015 Capital Budget submission.

BACKGROUND

TTC has pursued a suicide prevention strategy since the early 1970's in partnership with the Coroner's office and the local psychiatric community. An agreement was reached in 1971 with local media to adopt responsible reporting standards for subway suicides such that in the normal course of events they would not treat these incidents as newsworthy. A subsequent study by S.K. Littman of the Clarke Institute of Psychiatry demonstrated a marked decline in suicides following the adoption of this standard. Toronto media have maintained this approach since that time, so the recent publicity can be seen as a break with that approach.

With the establishment of the Arthur Sommer Rotenburg Chair of Suicide Studies (Chair) at the University of Toronto in 1997 an avenue for new approaches became available. TTC staff began a relationship with the Chair that continues to this day. In the early years our focus was on educating clinicians and interested lay people on the nature of the issues and on seeking ideas for new programs. This led to a worldwide survey of transit authorities in cooperation with APTA and UITP in 2000 to uncover what approaches other agencies were pursuing. A paper was presented to the World Health Organization's 6th World Conference on Injury Prevention and Control in 2002. It concluded that a transit

suicide prevention strategy should contain three elements:

1. Communications with the media, emergency responders, medical examiners, mental health practitioners and community support groups;

2. Operating procedures which encourage the reporting of distressed patrons and adjusting service in response; and

3. Design which permits second chances, third party interventions and restricts access to track level.

These conclusions have driven TTC's approach. In 2004 TTC entered into an agreement with the Chair to develop and implement a formal approach to recommendation two. Ultimately named the Gatekeeper Program, the agreement contained five steps:

1. Development of criteria to identify at risk passengers;
2. Development of protocols for intervention;
3. Development of procedures for the Transit Control Centre;
4. Development and delivery of employee training; and
5. Evaluation of program effectiveness.

In 2005, TTC entered into a formal agreement with the Trillium Health Network to deliver training to all subway operators, supervisors and special constables. It is now incorporated into the initial training for all new operators and supervisors. A formal evaluation found that the program was successful in improving skills and changing attitudes both immediately following the course and at a six month follow-up. In 2009, the program was extended to include collectors. The general procedure when an employee suspects a passenger is at risk, is to call Transit Control who will then institute a slow order, requiring the train to move at a walking pace through the station. Trained supervisors and constables will then be dispatched. They enter into a discussion with the passenger and take appropriate action to ensure safety.

The Gatekeeper Program has been recognized by the Canadian Council on Learning through a Sharing the Flame program for Excellence in Learning in addressing the important health and learning issues of suicide prevention. This certificate will be presented at the February 2010 Commission meeting.

In 2005, TTC, the Chair and the Centre for Addiction and Mental Health (CAMH) began collaboration on a research study to identify best practices for the prevention and treatment of employees who have experienced an acute psychological trauma (APT Study). The proposal received three year funding from the Workplace Safety and Insurance Board in 2007 and work commenced in 2008. The APT Study will track one group of workers who undergo treatment as usual and compare their return to work variables with another group who are streamed into a best practices intervention at CAMH. The knowledge learned from this study will be disseminated both through peer reviewed medical journals and through a Community Advisory Board comprising representatives from police, fire, EMS, military and transit. TTC has already introduced elements of the best practices including; onsite support by a supervisor, removal from

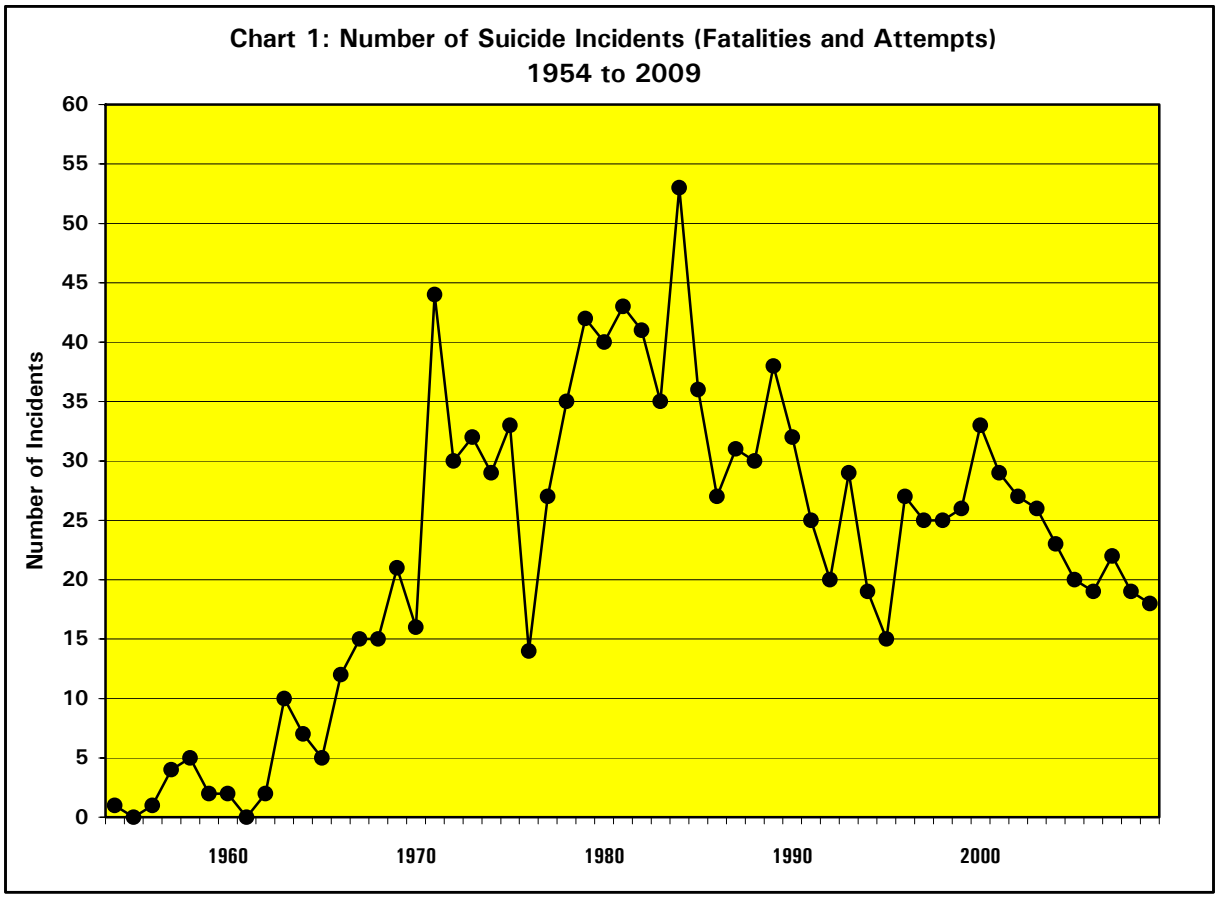
*immediate scene, expedited return to the division, availability of a peer to assist, transportation home if required, counselling, and return to work strategy. We will continue to adapt our procedures as further best practices are identified.

The third element of the strategy, i.e. engineered design, is the most effective tool for suicide prevention. The goal is to reduce/eliminate the possibility of a train contacting an individual at the train/platform interface.

DISCUSSION

SCOPE OF THE PROBLEM

As can be seen from the Chart 1, there has been a significant reduction in suicides since 1984. The TTC experienced 18 suicide incidents for 1364 minutes of delay in 2009.



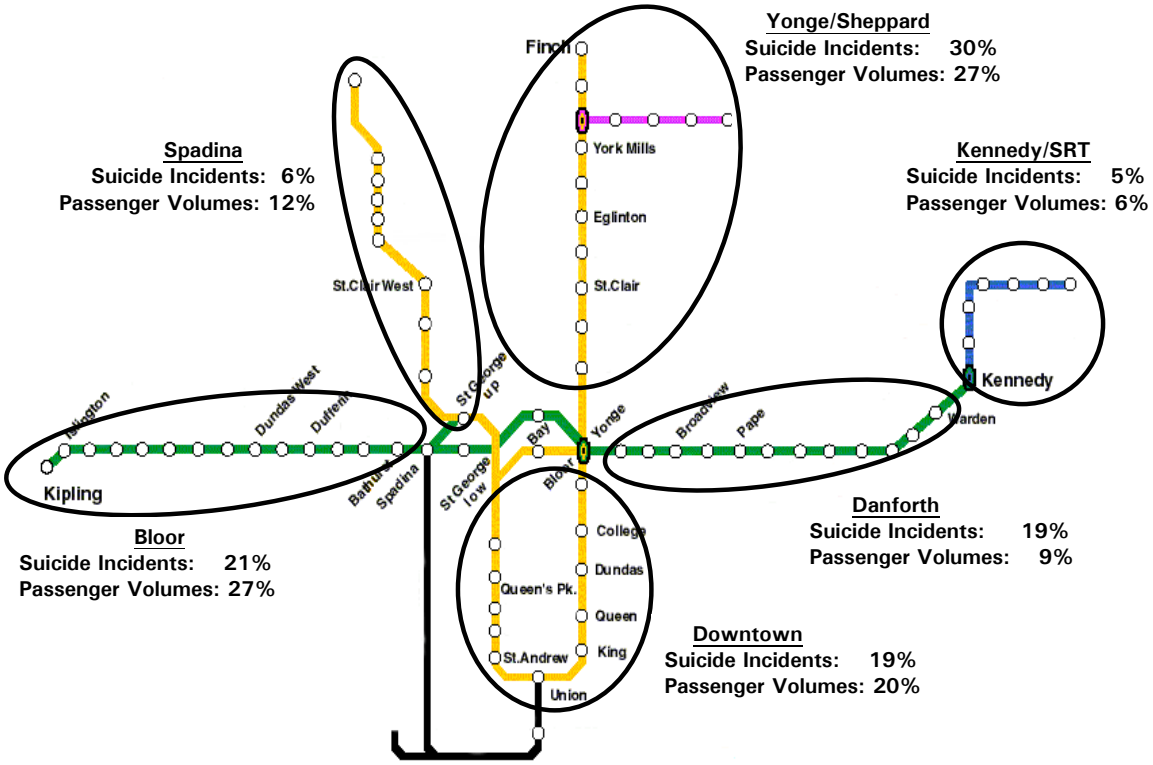
The distribution of suicides throughout the subway system is shown numerically in Chart 2 and graphically in Figure 1:

Chart 2 : Suicide Distribution by Station (2005-2009)

# of Incidents/Station	1	2	3	4	5	6	7
# of Stations	20	8	6	4	3	1	1

With respect to the 98 incidents in 2005-2009, there was no discernible pattern of suicides by station throughout the subway system. This is also supported by Figure 1.

Figure1: Concentration of Suicide Incidents by System Section 2005 to 2009



Similarly there is no pattern by the time of day, as Chart 3 shows the incidents approximately match the ridership levels.

Chart 3 : Suicide Distribution by Time of Day (2005-2009)

Time	06-08 am	08-10 am	10-12 am	12-2 pm	2-4 pm	4-6 pm	6-8 pm	8-10 pm	10-12 pm	12-2 am
# Incidents	4	13	14	17	11	12	11	3	7	6

In addition to suicides in the subway system, there are two other types of track level intrusion incidents that place our customers in grave danger at track level. The first is an unauthorized person at track level. These are persons going to track level for a variety of reasons. The number of unauthorized individuals at track level in 2009 was 77 incidents for 822 minutes of delay. The second category is unintentional falls to track level. These

incidents occur in stations where our customers inadvertently fall to track level. The number of unintentional falls to track level in 2009 was 14 incidents for 78 minutes.

While these two types of incidents are not considered suicide attempts, customers are still exposed to the extreme risk from train contact or from contacting the 600 volt power rail.

REDUCING TRAIN SPEED ENTERING STATIONS

Staff investigated the impact of reducing train speed by entering stations at a walking pace, which reduces the stopping distance in case of an emergency. The following summarises the effect on service:

1. Results in slower runtime of approximately 15 minute on each line;
2. Requirement for six additional trains on each line to address headways & capacity and would result in an additional cost of approximately $216M; and
3. Currently passenger flow southbound at Bloor station in the morning peak is being managed to reduce the dwell time from 55 to 45 seconds, resulting in up to five more trains through the station per hour. Adopting a walking pace would not only eliminate this additional capacity but reduce it from previous levels.

The implementation of reduced speeds entering stations is not an effective method of eliminating subway suicides, as even low speed contacts can be fatal.

POSSIBLE ENGINEERING REMIEDIES

As stated, the third element would be the introduction of engineering solutions. There are numerous methodologies currently employed throughout the transit industry to prevent suicides on subway systems. These methodologies are as varied as the success that is achieved from them. They include, but are not limited to Closed Circuit TV (CCTV), intrusion detection devices, and PSD.

CCTV and Monitors

CCTVs can provide real time images to the crews on the trains. This can provide the Operator with a view of the approaching station's platform. Additionally, when departing the station, a view of the cars is available to ensure that all of the doors are clear.

The challenges with this approach are:

1. The number of views required on the screen and the size of each view;
2. Distraction to the Operator in the operation of the train; and
3. The proximity of the arriving train to the station.

This methodology does not eliminate the possibility of suicides. There are very few transit systems that have in-cab monitoring as their primary prevention technology as it is most often used to monitor the clearing and closing of doors through station end-wall monitors.

Figure 2: CCTV Cameras

Platform Track Intrusion Device

A platform track intrusion device (PTID) automatically senses the presence of a person or object in an area where train contact is possible. In addition, this type of system can identify if there is a passenger caught in the gap between the platform and the train as well as access to track level via the platform end gates. The positive detection of someone or something a track level can either be sent to the Transit Control Center as an alarm, immediately cutting the 600V feed or directly to the next train approaching the area causing an emergency brake application. The sensing devices are usually infra red, radar or enhanced optical.

Figure 3: Platform Track Intrusion Detection

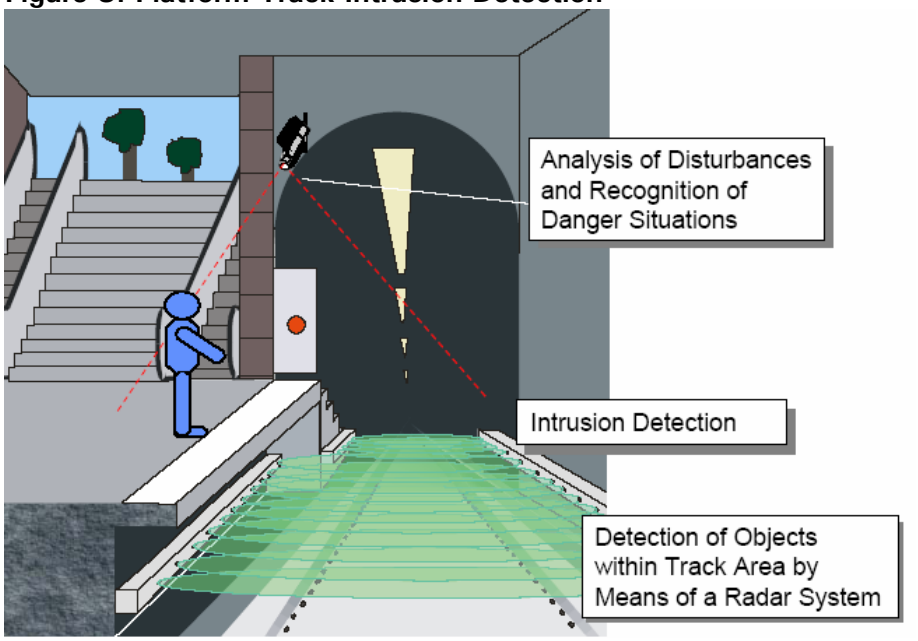


Figure 3 is from a presentation from Nuremburg's Rubin project. It shows a system of 'Intrusion Detection' devices on or above the track at the platform interface. A series of radar emitters and receivers are placed under the platform so that any object falling onto the track is detected and the railway system automatically understands that there is an object on the track which should bring the train to a halt. This system is backed up with CCTV cameras linked to the Service Control Centre which are activated upon the breaking of these radar beams.

The challenges with PTIDs are:

1. Vibration, pressure waves, tunnel dust and dirt all degrade the operation of these systems; and
2. The proximity of the arriving train to the station, as the speed and proximity of the train to the station may prevent stopping in time.

This methodology does not eliminate the possibility of suicides.

Recently, the trend has moved to enhanced optical detection through the use of conventional CCTV cameras, running the feeds though advanced computer recognition software. The sensitivity of these systems allows for the discrimination of different sizes of objects or personnel.

Figure 4: Enhanced Optical Detection

Unfortunately the previously stated limitations remain and also makes this system ineffective in preventing suicides.

Platform Screen Doors

Platform Screen Doors (PSDs) are considered very effective as they actually eliminate the hazard or prevent any track level intrusion situation from occurring. PSDs provide a barrier to track level along the entire length of the platform. The doors on the platform are synchronized to open with the doors of the train. There are a variety of PSDs in use throughout the world, but they can be generally divided into three broad categories by their height:

Figure 5: Full Height - Copenhagen

Figure 6: Three Quarters Height - Paris

Figure 7: One-Half Height – Paris

PSDs would eliminate suicides and other types of intentional or unintentional track level intrusions.

This solution can only be implemented in conjunction with ATO as it requires increased stopping accuracy in order to have the two sets of doors align.

In addition to protecting our customers from the risk at track level, PSDs also provide addition benefits. Our passengers leave a significant amount of garbage behind both on the trains and on the platform. The garbage, due to turbulence in the stations as trains pass, falls to track level. The majority of the garbage is combustible, i.e. newspapers, magazines, etc. and when it comes in contact with electrical or heating devices at track level it can ignite. These incidents have increased since the introduction of the free daily newspapers in the subway system; we are now removing over 100 bags of garbage from track level daily. Staff have assessed the system, identified specific areas of greater risk and are taking additional steps to control the ingress of garbage and removing it from track level. In 2009, there were 125 incidents of fire at track level for 1271 minutes.

PSDs reduce the number of incidents of train doors delays, specifically bags caught in doors, patrons caught in doors and patrons holding doors. In 2009, there were 304 incidents of passenger related door problems for 1195 minutes and 226 incidents of delay with debris in the doors for 956 minutes. In addition, PSDs increase the reliability of the train door systems as there are fewer patrons forcing or charging the doors. In 2009 there were 204 incidents of this nature for 1028 minutes.

Chart 4 summarizes the types of incidents that PSDs can eliminate or reduce:

Chart 4 - 2009 Delays

	Inc	Min
Suicides	18	1364
Unauthorized at track level	77	822
Falls from platforms	14	78
Fires	125	1271
Passenger door problems	304	1195
Debris door problems	226	956
Mechanical door problems	204	1028
Debris at track level	42	323
TOTAL	1010	7037

PSDs are the most effective means of suicide prevention employed in transit systems. They also provide passenger safety against other high risk incidents, such as accidental falls to track level or going to track level intentionally.

Preliminary estimates of the costs associated PSDs per station are approximately $10M dependant upon the type of PSD and the existing infrastructure.

Both the Spadina and Yonge extension programs have reviewed the introduction of PSDs and are considering a scope change to incorporate them into all of the stations.

INDUSTRY APPLICATION OF PSDs

PSDs are a relatively recent addition to many agencies around the world, being retrofitted into existing lines as well as incorporated into new builds. They are widely used in Asian and European metro systems. North America has not been as quick to adopt this technology except for airport people movers and the Las Vegas Monorail.

European agencies using PSDs are: London, Copenhagen, Paris, Toulouse, Torino, St Petersburg, Barcelona, and Rome. A partial list of other agencies using PSDs include Tokyo, Osaka, Seoul, Busan, Hong Kong, Taipei, Beijing, Shanghai, Guangzhou, Kuala Lumpur, Singapore, Bangkok, and Dubai.

The Singapore Mass Rapid Transit (MRT) was the first rapid transit system in Asia to incorporate PSDs in its stations in 1987. Full height platform screen doors were installed at all existing underground MRT stations in Singapore and at all future underground MRT stations. Signapore has recently decided that half height PSDs will be retrofitted into all existing elevated MRT stations by 2012 (starting with three elevated MRT stations in 2009). The reasons for this decision were public safety and mitigating associated delays to service.

In 1998, the Tung Chung Line and Airport Express saw the earliest operations of PSDs in Hong Kong. In 2000, the MTR Corporation began a six year programme to add 2,960 pairs of PSDs at 30 underground MTR stations on the Kwun Tong Line, Tsuen Wan Line, and Island Line. This was the world's first railway to retrofit PSDs on a transit system already in operation. The project was completed in October 2005. Platform screen doors are now operated in 51 stations. The world's longest PSDs doors are located in East Tsim Sha Tsui Station.

London's Jubilee Line extension project, which opened in 1999, saw PSDs installed on its new stations. They were designed primarily to reduce the movement of air caused by emergency ventilation fans which activate in event of a fire, or under test conditions, but also as a barrier to prevent people falling or jumping onto the tracks.

There are very few analytical investigations into the effect of the installation of PSDs on suicide reduction. One of the few investigations was, Law C.K. et al., Evaluating the effectiveness of barrier installations for preventing railway suicides in Hong Kong, Journal of Affective Disorders (2008).

The study concluded: "PSDs effectively prevent suicides with no substitution by "delethalizing" the image and altering people's perception about the desirability of railway suicide. Railway operators should extend the coverage of PSD to all railway stations in Hong Kong without any delay."

Effectively the study reported that not only did PSDs prevent suicides, but there was no transference to other transit stations or other suicide modes.

WAY AHEAD

Staff will continue to communicate with local agencies to ensure that we provide what information we can to continue to reduce the number of suicide attempts on our system.

Staff will continue to work with CAMH in developing best practices suicide prevention and the treatment of employees who have suffered trauma from these incidents. Procedures will be modified to ensure that we take advantage of the most up to date research and findings.

Engineering and Construction has completed analysis on preliminary design and costing for PSDs and is proceeding with a construction feasibility study in 2010. Further engineering studies will be conducted to determine the technical and economic viability review of PSD installation in existing and future stations.

All investigative reports are expected to be complete in the Spring of this year and based on their conclusions staff will consider their inclusion in the 2011-2015 Capital Budget.

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February 11th, 2010
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