

# Traffic Safety @ Brookfield High School

Systems Thinking with Risk Analysis to Improve  
Student Safety



by the Simulation Club:  
Patrick Cicvak, Ian Shaw,  
Julie Bergeron, Leonid  
Chepelev, Mr.Kubanek

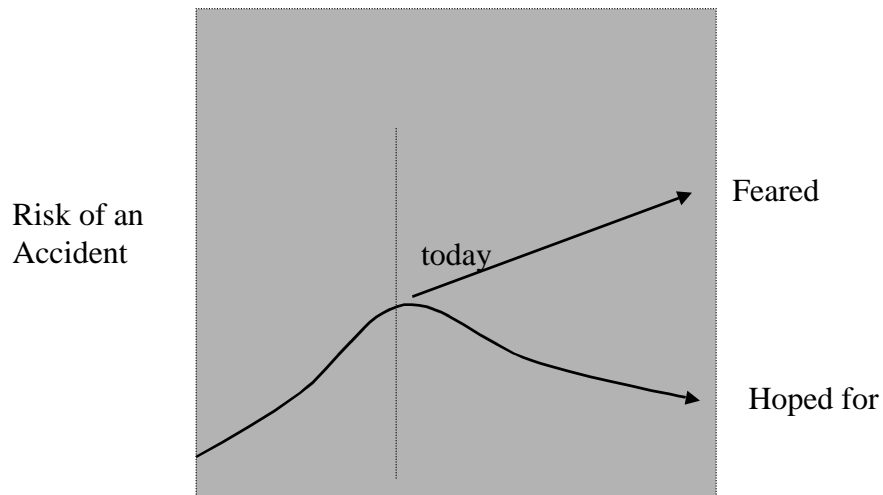
K-12 ST & Dynamic  
Modeling Conference 2002

## *Problem Statement*

- At 3:15 there is chaos
- There is a high risk of an accident resulting in personal injury
- The mood of chaos creates an unflattering impression of the School



## Risk Over Time @ BHS



## Presentation Outline

- A. Background
- B. Research Data & Survey on traffic safety
- C. Systems Thinking Modeling of Relationships between factors
- D. Risk Analysis
- E. Recommendations

## A. Background

- The School was originally built with U-shaped driveway but when the Library was built this was removed
- More parents are driving their kids to School; this is due to 2 factors:
  - more students from Barrhaven and Manotick with no/poor bus service &
  - a general Societal shift to driving kids to School
- Speed bumps and a V.P. acting as a “Traffic Cop” have been used to slow cars down

## What we did

- Background research, survey & data collection
- System Thinking modeling and Risk analysis
- Identified the root causes of the Traffic Snarl
- Found ways to reduce the risk of Student Injury
- Listed Recommendations to support the School Council & Principal.

## **B. Research Data on traffic & student flow @ 3:15 - 3:30 [avgs.]**

- # cars exiting: 90
- # entering: 30
- # parents in cars waiting: 40
- # students exiting: 900
  
- The level of chaos resultant risk of injury increased dramatically with the number of student/car crossings per minute

### Observations from the Parking Lot

- Traffic flow and driver behaviour was much improved when a V.P. was on duty;
  
- Many parents wait right in the middle of the traffic flow or drop off their child & block everybody else;
  
- Safety is not an issue before School;
  
- The level of “chaos” varied by day considerably: depending upon the Weather& other factors...

### ***Other Traffic Facts***

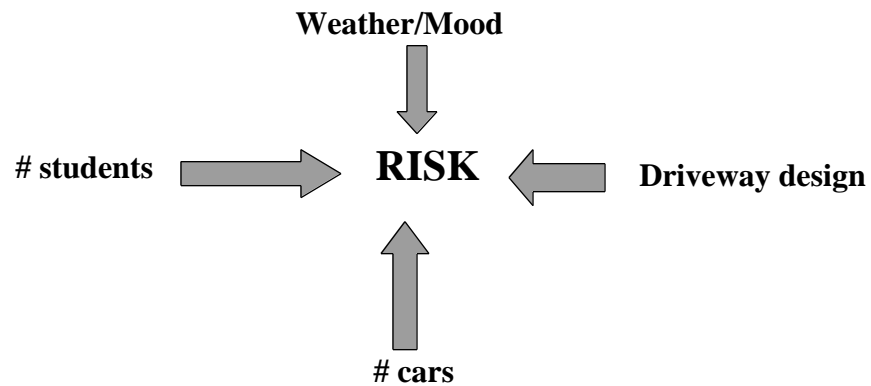
- As there is no space to wait many cars wait between the rows of parked cars and cut others off as they exit
- Cars waiting beside the School block off those parked there
- There is no room for Buses/Trucks to turn around safely
- Some bus drivers wait until the bus is full while others drive away even if students are running after them
- Students run across Brookfield Road to catch Bus #140 & #117

### ***Parent Survey Results: “Is this a problem & what would you recommend?”***

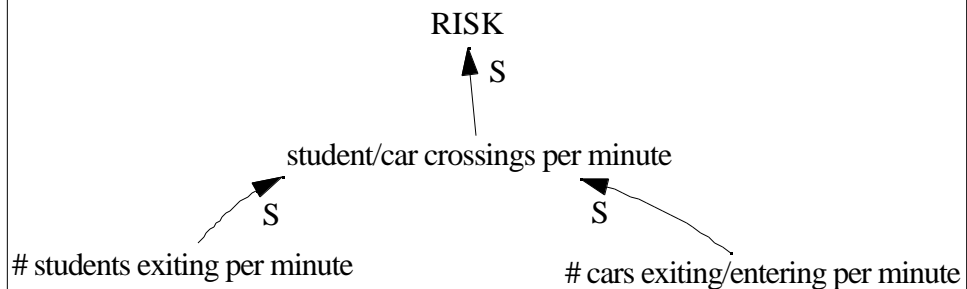
- Is traffic flow a problem?      **100% YES**
- What would you recommend?
  - Open up an exit road to the side street to the West of the School between BHS & 770 Brookfield Rd
  - separate entrance/exit roads
  - put up lane dividers & arrows to direct cars to the South End of the parking lot to wait
  - no student cars at School

## C. Systems Thinking Modeling

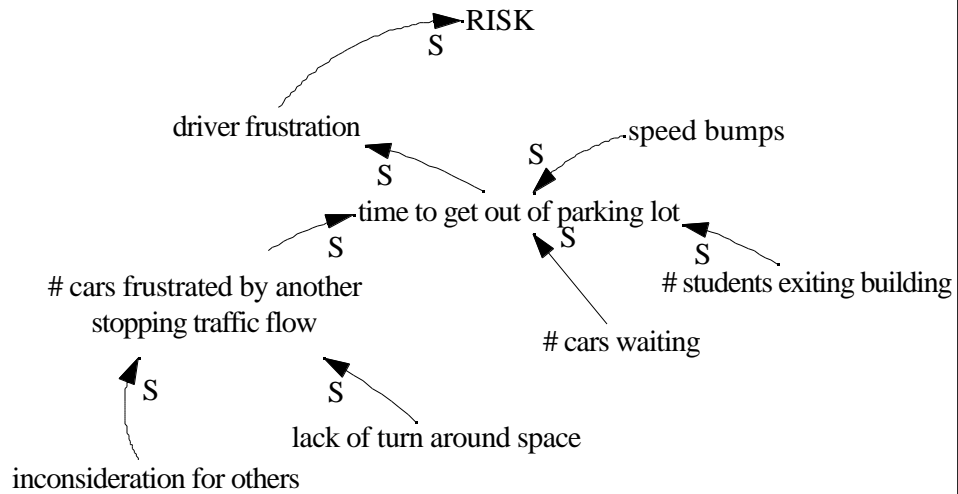
We identified the factors that increase risk and then how these factors were related



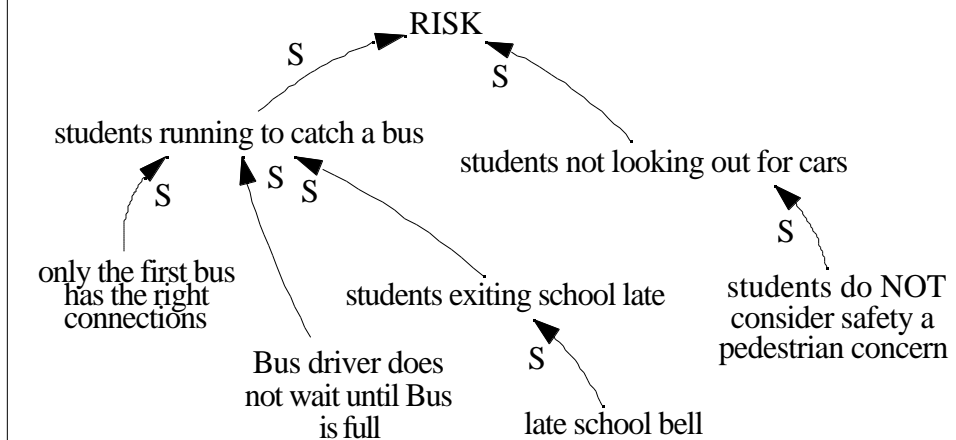
## The unfolding Story of Risk: I. Cars crossing in front of students



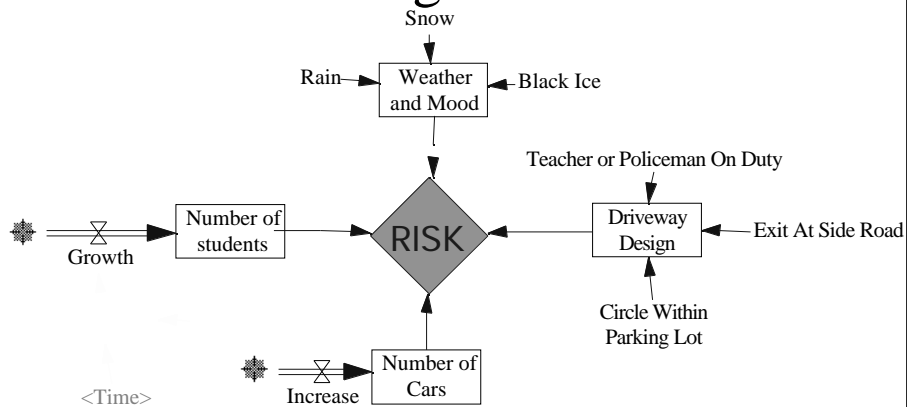
## II. Driver frustration



## III. Risky Student Behaviour

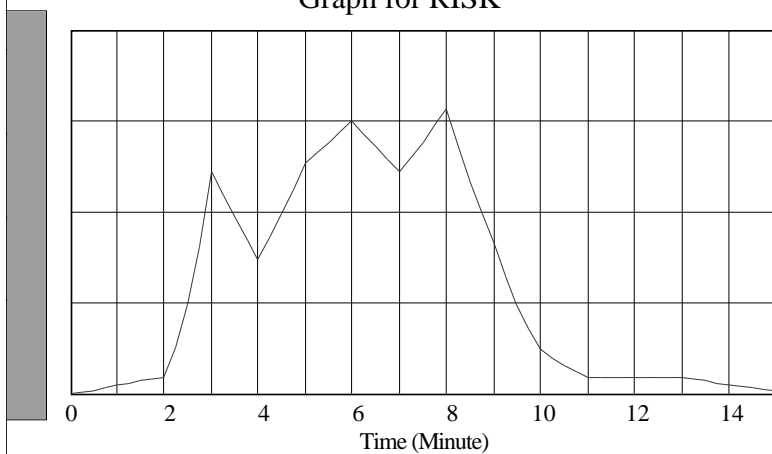


## Model relating the 4 Factors



## Variation in Risk from 3:15 - 3:30

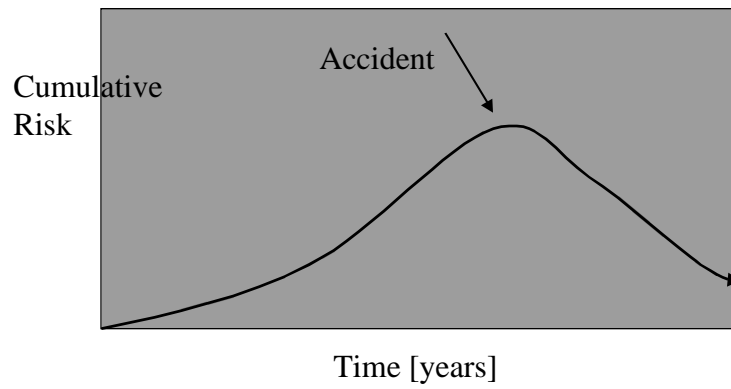
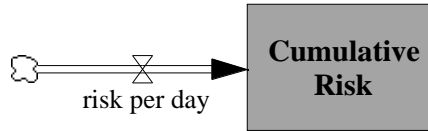
Graph for RISK



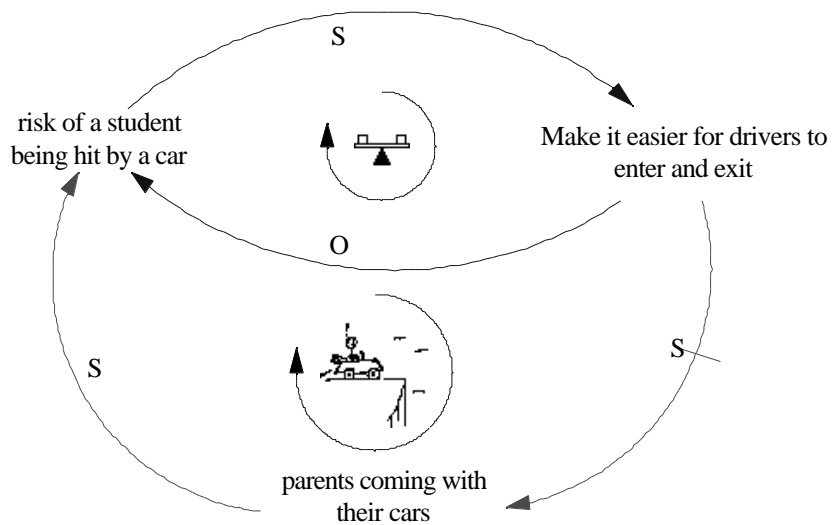
RISK : Current \_\_\_\_\_



# However, Risk is Cumulative



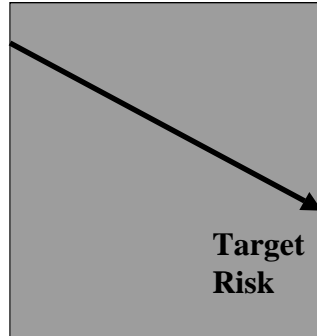
## Traffic Safety at Brookfield High School: A Causal Loop Diagram



## D. Risk Analysis: Target Risk

*by G.Wilde*

Current accepted  
risk level



- People make decisions according to an unconscious accepted level of risk
- Safety is primarily about behaviour – not technology
- To make permanent changes we need to convince people that their current “acceptable risk” is too high

## Safety is about Behaviour

- **People alter their behaviour in response to the implementation of health and safety measures,**
- **but the riskiness of the way they behave will not change,**
- **unless those measures are capable of motivating people to alter the amount of risk they are willing to incur.**

## Focus on the Desired Outcome

Beware of the “Delta Illusion”

- Countermeasures that are oriented towards specific behaviours instead of towards the outcome do not prevent **behavioural adaptation** from occurring.
- Reduction in the frequency of one particular cause may simply make room for other causes to become more prominent.

## E. Recommendations

- We have 2 proposed driveway design changes
- Education of students and parents is needed to compliment any physical changes we make
- ***Our big news*** is that we are in contact with the owner of 770 Brookfield to allow access to his road !

## **A. Increase the perceived benefit of cautious behaviour [carrots]**

- Have buses #140,640 & 117 wait an extra 5 min
- Set School clock to be fast by 5 min
- Exit drive to side road by 770 Brookfield

## **B. Decrease the perceived cost of cautious behaviour**

- Widen current road
- Better bus service to School [ie. Hunt Club, Barrhaven, Manotick...]
- Train parents to NOT stop to block the traffic flow
- Arrange a waiting zone that does not to block in cars parked against the School wall

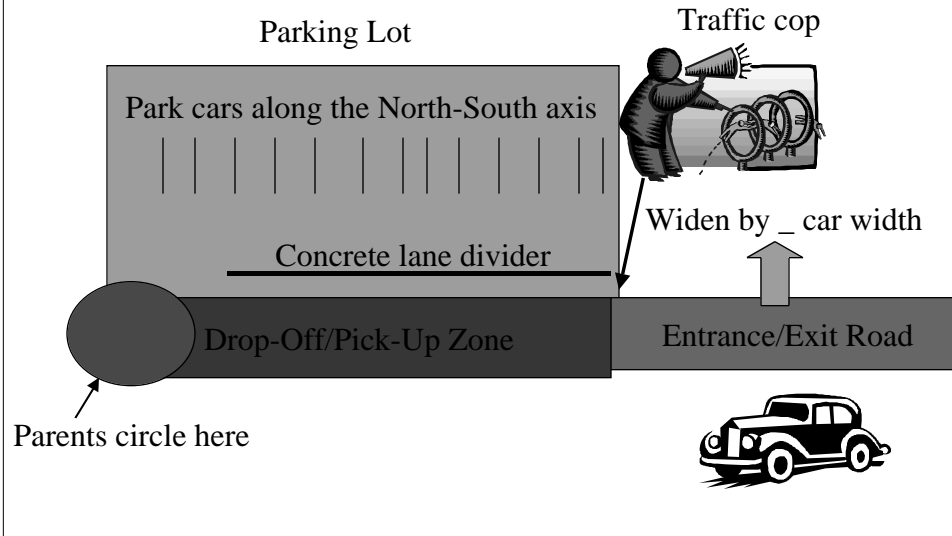
## **C. Increase the perceived cost of risky behaviour [stick]**

- Post a teacher every day as traffic cop
- Convince students not run across Brookfield to catch buses
- Request Bus drivers to wait until full [complain to OC Transpo]

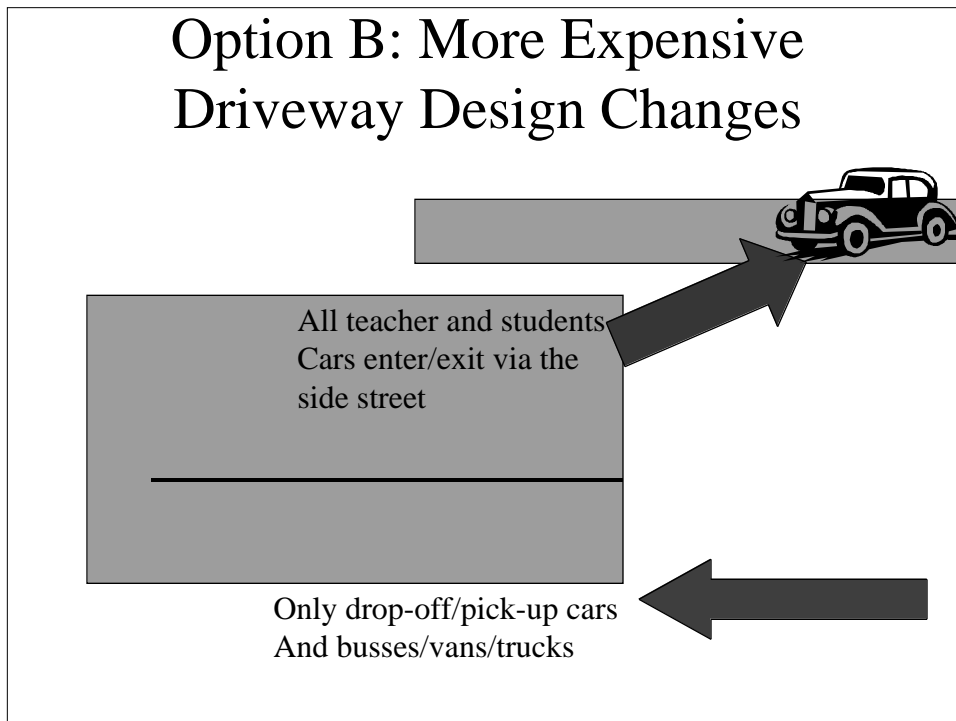
## **D. Decrease the perceived benefit of risky behaviour**

- Put in a concrete lane divider to separate parking spots from pick-up zone so parents cannot park between the cars
- Rearrange parking spots to go lengthwise along a North-South axis
- Place a large sign at start of the parking lot “NO Stopping” so they circle at the End of the Drop off Zone”

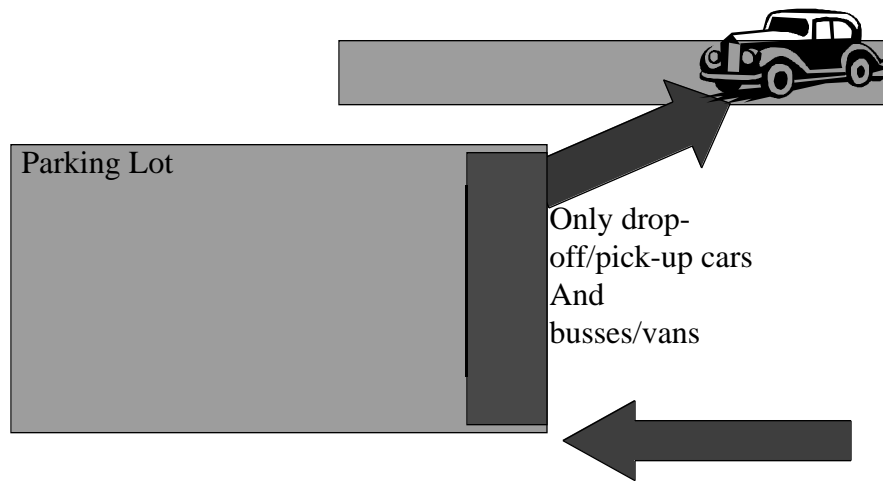
## Option A: Less Expensive Drive Way Design Changes



## Option B: More Expensive Driveway Design Changes

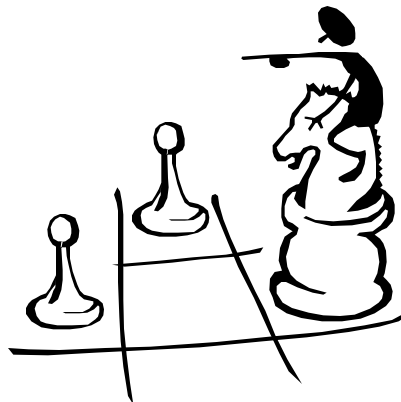


## Option C: Preferred Driveway Design



## A Bonus is an improved School Image

- We will improve the image of the School.
- We can, as a School Community, take action to create an orderly and inviting ending to the day.



## In Conclusion



- We can change the traffic flow without spending lots of money;
- It will take some will power and some behaviour changes;
- **The effort is worth it as our students' safety is at stake!**