A Review of Trespassing Accident and Suicide on Railway Track for Pedestrian Safety

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ABSTRACT

Railway accident prevention and protection are a key part of a wider picture of transport safety. The rail sector thus needs to improve its knowledge of trespassing and suicide related accidents in order to work out suitable responses by analysing measures already taken.

More than 100 people die each year in Sri Lanka due to the collision with a train due to suicides or trespassing. This research analyses the data related to above accidents recorded in Sri Lanka Railways. The following factors were considered for the analysis.

1. Distance from Colombo
2. Day and Month of the incident
3. The gender and age of the victim
4. Geometry of the railway track
5. Noise level of the surrounding area of the incident
6. Visibility between trespassers and train drivers
7. Weather condition
8. Permissible speed in the incident area
9. Availability of short paths avoiding railway track

The review of articles and data gives a picture of where, how and who is involved in suicide and trespass accidents.

Here the accidents implying persons out of level crossings, or "accidents to persons", mostly involve unauthorized persons crossing or walking along the tracks, usually because of convenience. Another, much more common cause of fatalities and significant accidents out of level crossings is the suicidal intent of persons entering the railway premises to voluntarily be hit by a train.

The main similarities between railway suicides and trespassing accidents relate to gender and location: the victims in railway suicides and trespassing accidents and observed trespassers were predominantly male, and most of the railway suicides and trespassing accidents occurred in densely populated areas.

Keywords: Railway; safety; suicide; trespassing

ACKNOWLEDGEMENTS

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1 INTRODUCTION

1.1 General Background

The rail transport mode is made more effective and efficient by the fact that it connects the most populated areas at increasingly high speeds, providing social cohesion at local level. (El Miloudi El Koursi, 2016)

Train pedestrian collisions have been shown to be the leading cause of fatality in train related accidents in Sri Lanka. 365 number of trains are operating in 1600km length of track per day which is 30 000 train-km per day approximately.

That carries 21 million passenger-km per day in different speeds.

Most of the suburban train service and long distance service are delayed every day. 20% of them are caused due to trespass accidents or suicide as per the records of railway.

The rail sector thus needs to ensure its security against accidents and suicides occurring on its property in order to offer continued service and maximum reliability. Therefore analyse of this records of the accidents is important for railway efficiency and punctual running.

1.2 Objectives

Objective of this study is to analyse the data related to trespassers and suicide accidents, identify the patterns and propose suitable system to mitigate which could result in minimizing train related accidents and passenger delays due to fatal accidents.

1.3 Problem Statement

Over 300 trespass accidents are occurred every year which cause more than 100 deaths per year. Railway has to give duty leave to the train crew to support police investigation of the incident which will result in extra cost around 10,000 Rupees per incident for the railway.

The higher factor of cost of an incident affect the country's economy.

When one incident occur the average delay is 20mins per train which means wastage of 124,000 productive labour hours for the country (as average passenger travel is 374,000 per day then 374,000*20/60 =124,666 labour hours) resulting a cost of Rs.14.8 million. (As 124,000 *Rs. 120.00 =14,850,000 (as labour hour cost =Rs. 120.00) rupees per incident to the country's economy.

Average 100 people die each year due to trespass and suicide accidents in rail track, adding following cost for the country each year.

Investigation cost per department   = 100nos*Rs.12000.00 per case =Rs.1,200,000.00

GDP per capita in 2016 = US$ 3768.70 =Rs. 160.00*3768.70 = Rs. 602,992.00

Assume death person balance expected life time is 30 yrs

Total loss for families of the victim =100 nos.*Rs. 602,992.00 *30years = Rs.1808 million

Total loss per the year approximately =14.8M+1.2M+1808M =Rs. 1,824 millions

1.4 Scope of the Report

Chapter 1 : Introduction. This chapter describes the general background of this study is based.

Chapter 2 : Literature Review. This chapter describes the literature referred.

Chapter 3 : Data Collection. In this chapter, the method used to collect data described.

Chapter 4: Analysis. In this chapter, collected data are analysed.

Chapter 5 : Conclusion and Recommendation. In this chapter, findings are tabulated and conclusions and recommendations are made.

2   LITERATURE REVIEW

There was not any literature on this matter in Sri Lanka. When considering the world no major research have been done except for few individual researches which were carried out by just reviewing articles.

1. El Miloudi El Koursi, J. L. (2016, March 17). Railway Accident Prevention and Infastructure Protection. *Journal of Civil Engineering and Architecture*, 96-107.

2. Frittelli, J. (2018). *Trespassing: The Leading Cause of Rail-Related Fatalities.* Federation of Congress. Congressional Research Service.

3. Marie-Hélène Bonneau, G. H. (2014). How to prevent suicide and trespass on the railways and mitigate the consequences? Practical guide. International Union of Railways.

4. Silla, A. (25/01/2013). *Improving safety on Finnish Railways by prevention of trespassing*

2.1   Different intensions of trespassers

Mainly 3 different intensions of trespassing can be identified by referring to literature. They are,

1. Trespassing behaviours with no intent of casualty, like shortcutting, loitering in railway premises and vandalism.

2. Enter the tracks refers to suicide-specific aspects.

3. Unintentional trespassing, i.e., situations in which the circumstances result in inadvertently entering the tracks.

   (El Miloudi El Koursi, 2016)

2.2   Rules and Regulations to prevent trespassing

Proper guidance have been given to employees of railways to prevent trespassing.

"Where recognized footpaths along or through railway land are in existence, steps must be taken to prevent right of way being established by the public. It will be the duty of the District Officer of the Way and Works Department to close such footpaths on the first Monday of December every year during the whole day, displaying notices pointing out that the public have no rights over the path and that if they trespass on railway property they do so at their own risk. The closing of the footpath must be notified prior to the closing in all the local newspapers and in the Government Gazette, and the District Officer must see that this is duly attended to." (Special Rules, Way And Works Department, 1927)

"Inspectors, Foremen Platelayers, Overseers, Kanganies and other Way and Works employees should do all in their power to stop trespassing on the line by ordering persons having no pass or other authority for walking on the railway off railway premises. If any person or persons persist in using the railway as a public thoroughfare after being duly warned off, such cases should be reported to the District Engineer, so that steps may be taken for prosecutions." (Special Rules, Way And Works Department, 1927)

DATA COLLECTION

Every train has a journal with the Head Guard of the train who is in-charge of the train. He noted down every incident of the train movement in the journal. Finally the data in the journal is entered into the main record book which is kept by the chief control office. The main resource of data for this study was the above mentioned main record book.

The location, date, description, train number, details about number of injured, deaths of the accidents are recorded in that book.

Data for years from 2011 to 2016 were extracted from that book.

Extract from the main record book has shown below.

මිනිසුන් දුම්රියෙන් වැටීම් 2016

අංකය	වාර්තා කරන ලද්දේ	දිනය	ස්ථානය	විස්තරය	දුම්රිය අංකය	තුවාල හෝ මරණයට පත් වූවන්ගේ නම	තුවාල	මරණ	වෙනත්
1	HGD 1016	2016.01.01	MDA	වැටීම	1016	නාදුනන මගියෙකු	1		
2	HGD 3810	2016.01.05	CHL/MDP	පැනීම	3810	නාදුනන මගියෙකු			1
3	SM/KPN	2016.01.10	KPN	වැටීම	4004	නාදුනන මගියෙකු		1	
4	HGD 1015	2016.01.10	FOT	වැටීම	1015	නාදුනන මගියෙකු		1	
5	SM/MDA	2016.01.19	MDA/FOT	වැටීම	657	වැටුනු පුද්ගලයෙකු හමුවීම		1	
6	HGD 1182/8775	2016.01.20	BPT/WTE	වැටීම	1182 /8775	නාදුනන මගියෙකු		1	
7	HGD 89	2016.01.21	WRW/KEN	වැටීම	89	නාදුනන මගියෙකු			
8	SM/ VGD	2016.02.05	VGD	තුවාල වීම	1035	නාදුනන මගියෙකු	1		
9	HGD 1566	2016.02.07	VGD/GPH	වැටීම	1566	අවු 25 ක පමණ මගියෙකු	1		
10	HGD 6012	2016.02.07	GPH	වැටීම	6012	නාදුනන මගියෙකු			1
11	HGD 8039	2016.02.08	WTE	වැටීම	8039	නාදුනන මගියෙකු	1		
12	HGD 1527	2016.02.09	HUN/KLA	වැටීම	1527	හසිත නැමති පුද්ගලයෙකු	1		
13	HGD 1168	2016.02.20	FOT	වැටීම	168	නාදුනන පිරිමි පුද්ගලයෙකු	1		
14	HGD 9262	2016.02.24	KOT/PAN	වැටීම	9262	නාදුනන කාන්තාවක්	1		
15	HGD 8327	2016.02.26	KTS	වැටීම	8327	නාදුනන මගියෙකු	1		
16	HGD 8319	2016.03.02	KDA	වැටීම	8319	ධම්මිකා නැමති කාන්තාවක්			1
17	HGD 8040	2016.03.04	MLV	වැටීම	8040	නාදුනන මගියෙකු			1
18	HGD 4017	2016.03.06	ALW	වැටීම	4017	නාදුනන පිරිමි ළමයෙකු	1		
19	HGD 8058	2016.03.07	PND	වැටීම	8058	පැනීමට තැත්කල අයෙකු	1		
20	HGD 8378	2016.03.14	MLV	වැටීම	8378	නාදුනන පිරිමි පුද්ගලයෙකු	1		
21	HGD 4086	2016.04.28	HRL	වැටීම	4086	හෂාන් නැමති පුද්ගලයෙකු	1		
22	SM/HKD	2016.05.20	HKD	වැටීම	8097	නාදුනන මගියෙකු	1		
23	HGD 1151	2016.05.26	Loko Jun.	වැටීම	1151	පාසල් ශිෂ්‍යයෙකු	1		
24	HGD 1527	2016.06.08	KLA/DAG	වැටීම	1527	නාදුනන මගියෙකු			1
25	HGD 8764	2016.06.08	FOT	වැටීම	8764	මොහොමඩ් නැමති පුද්ගලයෙකු	1		
26	HGD 9268	2016.06.09	NUG	වැටීම	9268	නාදුනන මගීන් දෙදෙනෙකු	1		1
27	HGD 1537	2016.06.15	KLA/DAG	වැටීම	1537	නාදුනන මගියෙකු	1		
28	HGD 8777	2016.06.15	WDA/KTN	වැටීම	8777	නාදුනන මගියෙකු			1

Figure 1 : Extract from the main record book of Railway

The following data was collected from the field officers of the relevant area.

1. Noise level ; a qualitative measurement taken by field officers
2. Visibility ; Engine drivers viewing distance without obstruction
3. Geometry ; the track alignment
4. Availability of parallel lines ; available of parallel roads to use instead of rail track for pedestrians on both side or single side

The permissible speed of the incident area was taken from the part I of working time table issued by the Railway Operating Department. (An extract has attached below)

When reducing loads of trains on the request of Drivers they must give reasons on their train tickets for the inability to take the given loads. The Station Master concerned should forward a report to the Transportation Superintendent of the District or D/OPS in every such instance.

When the load of a train is reduced at the request of the Driver, the Guard must in addition to stating the reason in the journal for this step, should comprise and record in his journal the gross weight of the train prior to reduction.

MAXIMUM PERMISSIBLE SPEEDS

The following are the authorized maximum speeds of trains for the different sections, excepting certain restrictions subsequently detailed. It must be understood that trains are **NOT** booked to run at the maximum speeds shown below. The table is intended to serve as a guide to drivers as to the maximum speed at which they may run on the various sections when running late, load, weather, gradients, and local restrictions, permitting them to do so.

Main Line			Talaimannar Line		
Between		*Kmph.*	*Between*		*Kmph.*
Colombo — Mirigama	..	80	Madawachchi — Talaimannar	..	80
Mirigama — Rambukkana	..	72			
Rambukkana — Kadugannawa	..	32	**Batticaloa and Trincomalee Line**		
Kadugannawa — Peradeniya Junction	..	40			
Peradeniya Junction — Kandy	..	72	Maho — Valaichchenai	..	56
Peradeniya Junction — Gampola	..	64	Valaichchenai — Batticaloa	..	80
Gampola — Navalapitiya	..	40	Galoya — Kantalai	..	64
Navalapitiya — Badulla	..	32	Kantalai — China Bay	..	56
			China Bay — Trincomalee	..	48
Matale Line					
			Kelani Valley Line		
Kandy — Katugastota	..	32			
Katugastota — Matale	..	40	Colombo — Puwakpitiya	..	32
			Puwakpitiya — Avissawella	..	24
Coast Line					
			Branch Line		
Colombo — Galle	..	80			
Galle — Matara	..	72	Urugodawatta — Kolonnawa	..	16
			Urugodawatta — Bloemendhal	..	32
Puttalam Line			Bloemendhal — Kochchikade Coal Grounds	..	08
			Ambepussa — Ambepussa Quarry	..	08
Ragama — Chilaw	..	64	Ratmalana — Workshops	..	16
Chilaw — Bangadeniya	..	56	Galgamuwa — Galgamuwa Quarry	..	08
Bangadeniya — Puttalam	..	72	Jaffna — Customs Siding	..	16
			Kankesanturai — Customs Siding	..	08
Northern Line			China Bay — Jetty Siding	..	16
			China Bay — Admiralty Siding	..	16
Polgahawela — Potuhera	..	56	22Km.27m. PTM Line — Colombo Airport, Katunayake		16
Potuhera — Kankesanturai	..	80			

SPEED RESTRICTIONS — ROLLING STOCK

The following Speed Restrictions with regard to Rolling Stock must be strictly observed :—

	K.M.P.H.	M.P.H.
Mixed and Goods Trains	64	40
Trains formed of one or more Four Wheeled Wagons ..	48	30
Passenger Trains—		
(A) Old Passenger Stock	72	45
(B) New Passenger Stock 58 ft. 7 in. and 58 ft. 3 in. long over buffers ..	80	50

NOTE :—

When trains are formed with New and Old type coaches, the speed restriction under (A) will apply.

The speeds indicated above must always be observed and should, under no circumstances be exceeded although the Maximum Permissible Speeds for the line on certain sections shown above are higher.

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Figure 2 : Extract from the part I of working time table issued by the Railway Operating Department

The following changes were done after the rehabilitation of rail track from Kalutara South to Matara, from Omanthei to Kankasanthurai and Madawachchiya to Thalai mannar

1. Kalutara South - Matara   100 km/h
2. Omanthei - Kankasanthurai   100 km/h
3. Madawachchiya to Thalai mannar   100 km/h

3 ANALYSIS

3.1 Methodology

In this study, the most recent period where up to date information was taken into account, covering more specifically the year 2016 time-frame. More recent data are not fully available yet, and as it is the nearest time frame for which data is available, it would be an added advantage when interviewing the field officers.

First of all, the distance from Colombo in 50 km interval to the relevant location of the cases was analysed in order to identify the area with the highest frequency of accidents referring to the table and the figures below. Area within 50km of radius from Colombo was identified as the area with the highest frequency of trespass and suicide accidents on rail track which was 65% of the total number of cases reported during the year 2016. Therefore that area was considered for further analysis.

Table 1: Distance from Colombo

Distance (km)	Number of accidents	Percentage (%)
0-50 (Only Double Track available)	227	64.9
51-100 (Only Single Track available)	59	17
101-150 (Only Single Track available)	51	14.7
151-200 (Only Single Track available)	11	3.2
201-250 (Only Single Track available)	1	0.3
Total	349	100

- Location of 10 cases was not clear in the records.
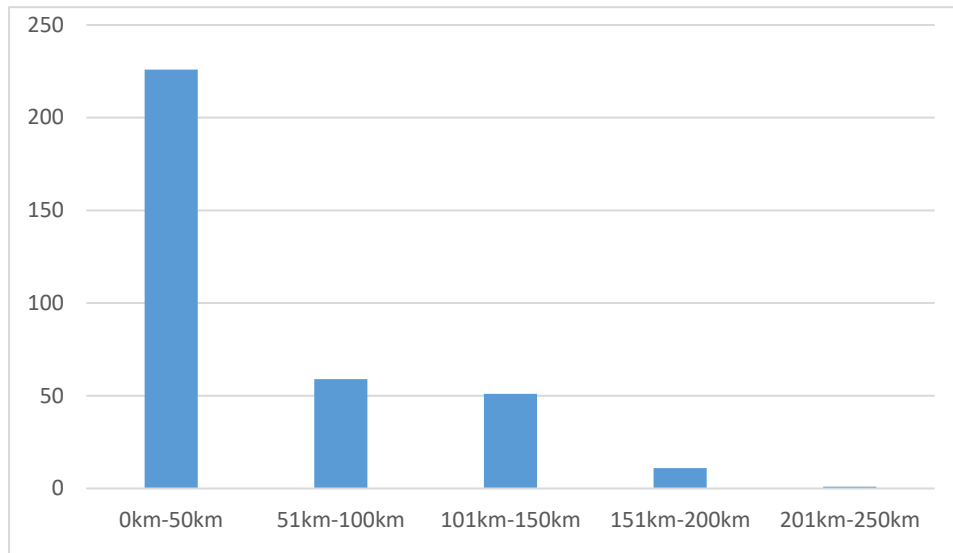
Figure 3: Distance from Colombo

3.2 Analysis

3.2.1 Total Number of Cases in each year

Following table shows the number of cases occurred during the years 2011-2016. Further the number of injured, death and others are shown there.

Table 2: Total Number of Cases in each year

Year	Cases	Injured	Death	Other	Train km operated in the year	Cases per million train km
2011	215	134	72	10	9,222,358	24
2012	342	201	119	40	9,882,738	34
2013	344	224	119	50	10,492,469	34
2014	386	252	108	95	10,616,707	35
2015	400	396	113	102	11,310,216	36
2016	359	342	98	92	11,476,126	32

Cases: Number of cases happened during the year.

Death: Number of deaths occurred.

Other: Number of lifetime disabilities occurred.

Injured: Total number of deaths and other plus minor injuries.
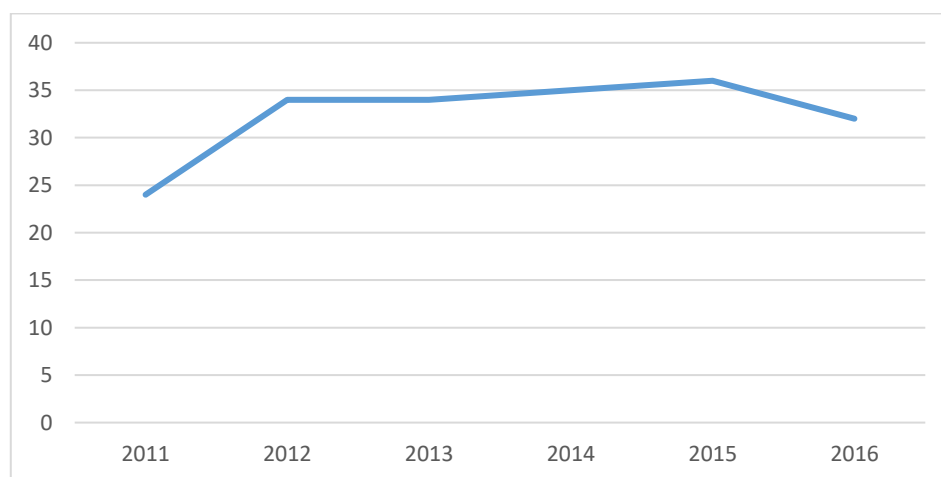
Figure 4: Cases per million train km
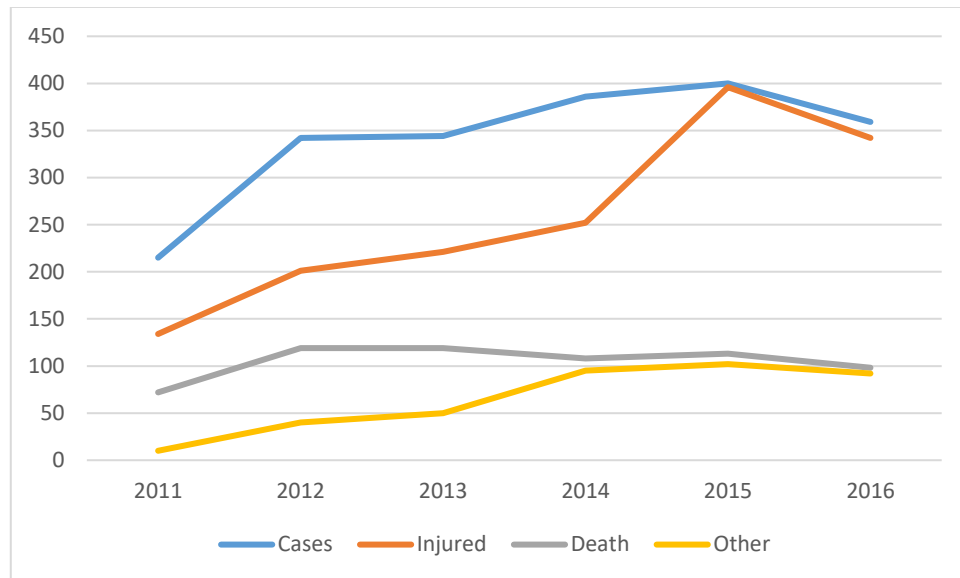
Figure 5 : Analysis of cases 2011-2016

A trend to increase in number of cases can be seen until year 2015. However there is a decrease in the number of cases in year 2016. The reason was not properly indicated in the data. Can be assumed that the awareness raised by the media in 2016 and other awareness programs were affected. (Photo 7, Photo 8)

3.2.2 Month

Following table shows the number of cases occurred during the year 2016 in a monthly basis.

Table 3 : Cases in Monthly Basis

	Month	
	Frequency	Percent
January	18	7.9
Fabruary	17	7.5
March	21	9.3
April	22	9.7
May	19	8.4
June	20	8.8
July	14	6.2
August	19	8.4
September	17	7.5
October	**27**	**11.9**
November	16	7
December	17	7.5
Total	227	100
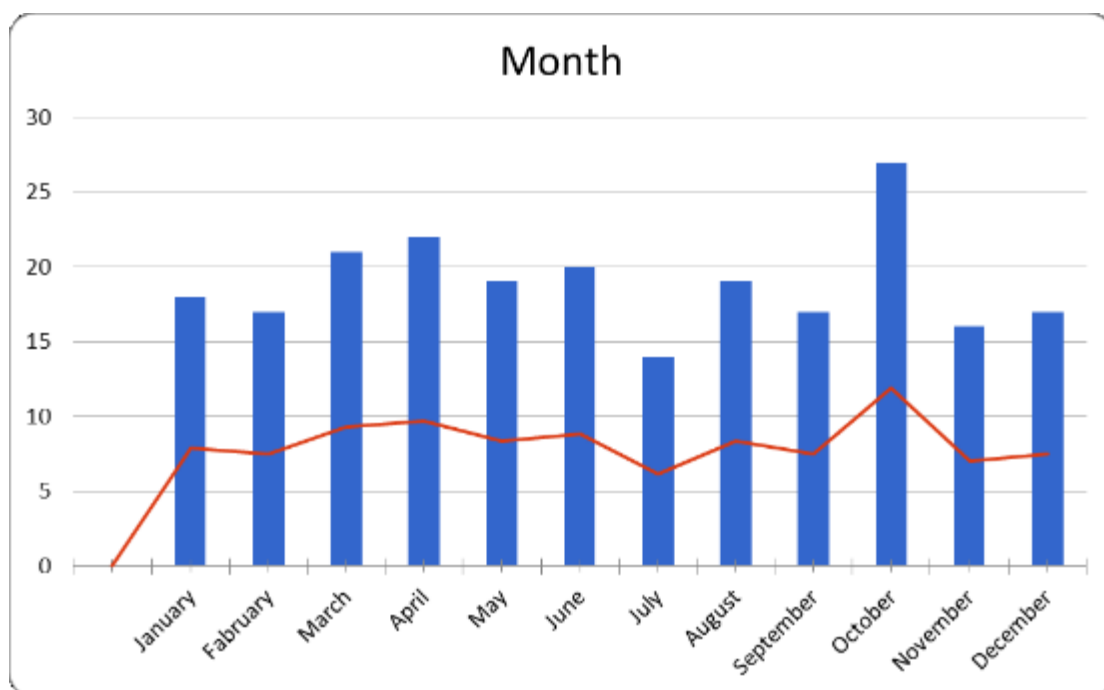
Figure 6 : Cases in monthly basis

According to metrology departments records the highest rainfall intensity was recorded during Months, March, April and October. (Annual and monthly rainfall at observation stations)

3.2.3 Day

The following table shows the accidents occurred during year 2016 analysed according to the day of the week.

Table 4 : Cases according to day

	Day	
	Frequency	Percent
Monday	40	17.6
Tuesday	**43**	**18.9**
Wednesday	29	12.8
Thursday	26	11.5
Friday	30	13.2
Saturday	**22**	**9.7**
Sunday	36	15.9
Total	226	99.6
System	1	0.4
	227	100
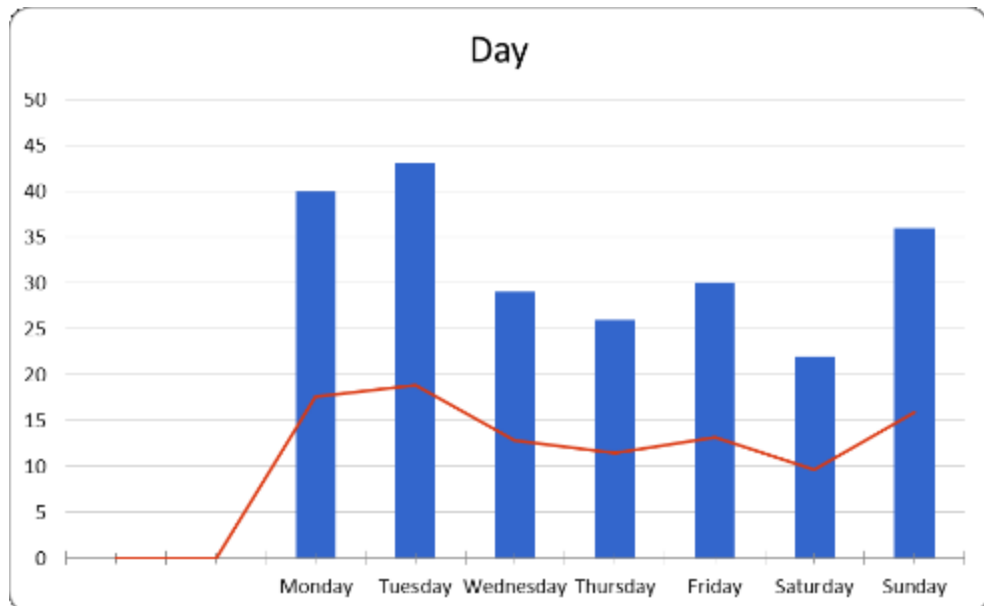
Figure 7 : Cases according to day

Sunday, Monday and Tuesday can be classified as relatively busy days of the week with respect to trespassing accidents. Further the number of Passenger move to Colombo suburban is higher in those 3 days. The increase in accidents during those 3 days can reflect that. This may lead to increase in accidents close to railway stations while trying to cross rail line to catch trains.

Also normally on Saturday the number of trains in service reduce as there are no office trains. But on Sunday evening trains are dispatched to relevant areas from Colombo to start the Office Train Service on Monday. This dispatch does not carried out in a proper pattern. Therefore people do not have proper understanding about the time of the trains. This affect the Monday and Tuesday as well.

3.2.4 Gender of the victim

Analysis for the accidents occurred during the year 2016 is shown in the following table.

Table 5 : Gender of the victim

	Gender	
	Frequency	Percent
Male	191	84.1
Female	36	15.9
Total	227	100
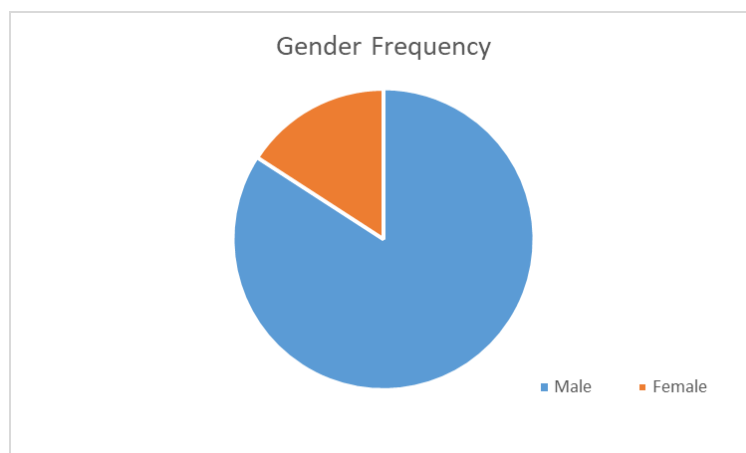
Figure 8 : Gender of the Victim

Even in places where alternative paths were available it could be seen that people are tend to use the rail line. Among them who referred the rail line even when alternative paths available the number of male were considerably higher than the number of the females as their level of confidence is high therefore neglect the risk. That fact was highlighted when I did some interviews with trespassers. Males having the higher percentage of trespassers accidents has reflected that trend.

3.2.5 Age of the victim

Following table shows the analysis of cases according to age.

Table 6 : Age of the victim

	Number of cases	Percentage (%)
<18	0	0
18-60	37	16.3
>60	14	6.2
Unknown	176	77.5
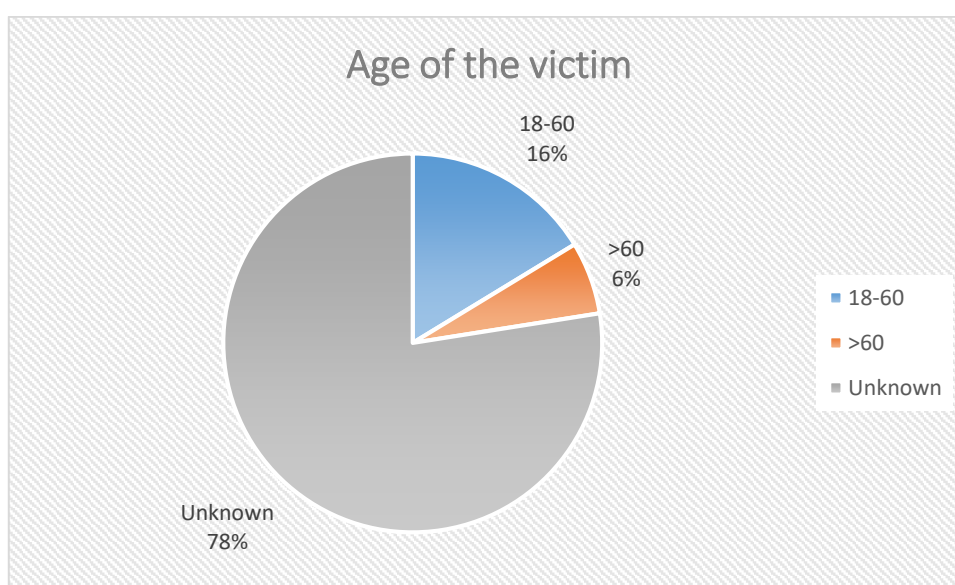
Figure 9 : Age of the victim

As the age of the victim of 77.5% cases were not available it is not appropriate to come to a conclusion with available data.

Suggestions: A standard format for recording the data relevant to the accidents is not available. This is the reason for unavailability of complete and descriptive records. Standard format should be introduced.

3.2.6 Visibility

Following table shows the analysis the visibility of the area of the cases occurred during 2016

Here visibility means the Engine drivers viewing distance without obstruction.

If the viewing distance is more than 200m is was considered as "Very Good"

If it is between 100m-200m then it was considered as "Good"

If it is less than 100m then it was considered as "Bad"

(200m - Normal breaking distance, 100m - Emergency breaking distance)

Table 7 : Visibility

	Visibility	
	Frequency	Percent
Very Good	28	12.3
Good	166	73.1
Bad	20	8.8
Total	214	94.3
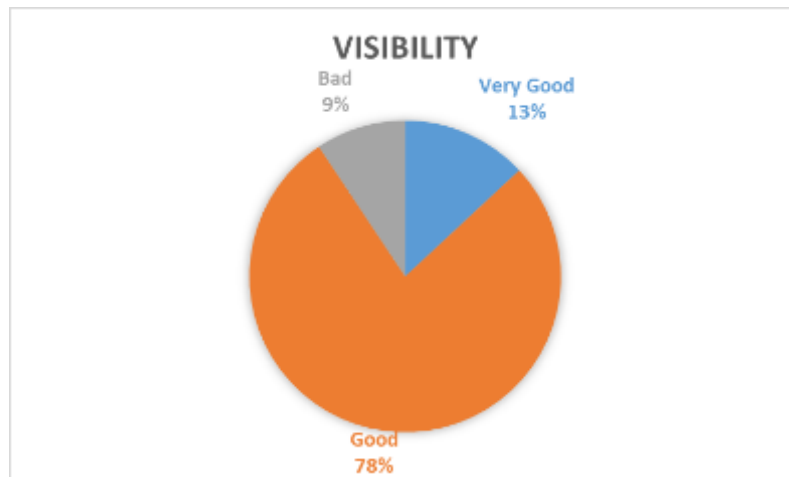
Figure 10 : Visibility

There is a trend among drivers to increase the speed of the train in areas where visibility is good. Then the breaking distance increases and the time available for the pedestrian to cross the track decreases.

3.2.7   Noise level of surrounding area

The following table analyses the noise level of surrounding area of the accidents occurred during the year 2016.

Here the noise level means a qualitative measurement taken by field officers.

Table 8 : Noise Level of surrounding area

	Noice_Level	
	Frequency	Percent
High	123	54.2
Medium	68	30
Low	35	15.4
Total	226	99.6
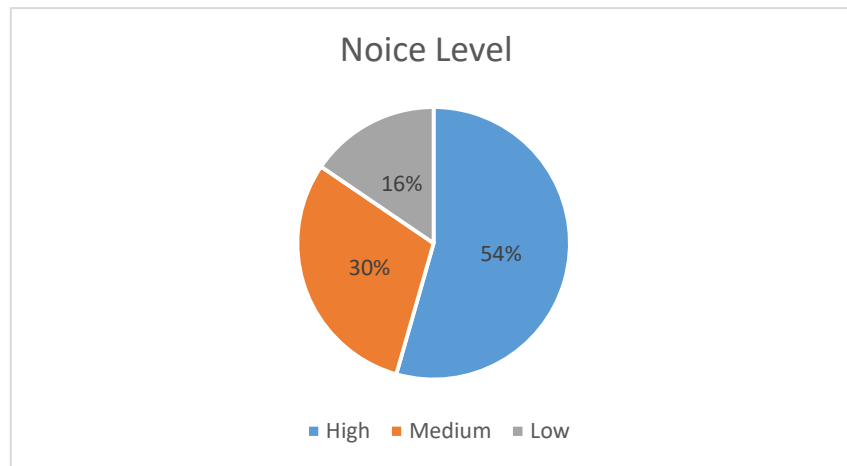
Figure 11 : Noise Level of surrounding area

As the noise level of surrounding area increases the ability to hear the noise of the train coming decreases. It is difficult to identify the horn of the train and heavy vehicles separately as both of them have similar sound.

3.2.8 Speed of the train

Following table shows the analysis of the speed of the train of the cases occurred during the year 2016.

Here high means the speed is 80 km/h or more

Medium means the speeds between 80 km/h-40 km/h

Low means the speed lower than 40 km/h

Table 9 : Speed of the train

	Speed_of_the_train	
	Frequency	Percent
High	170	74.9
Medium	36	15.9
Low	20	8.8
Total	226	99.6
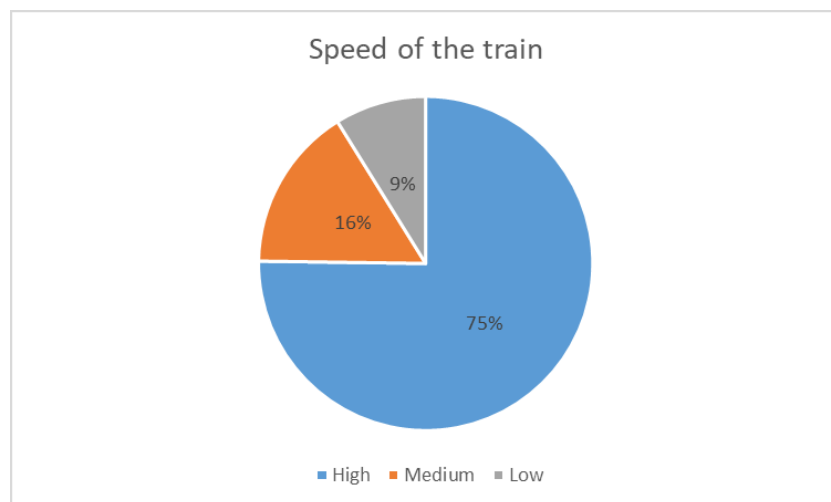
Figure 12 : Speed of the train

As the speed of the train increases, the breaking distance increases and the time available for the pedestrian to cross the track decreases.

3.2.9 Availability of parallel lines

Availability of parallel lines means available of parallel roads to use instead of rail track for pedestrians on either side or single side. It has been analysed in the following table.

Table 10 : Availability of parallel Roads

	Availability_of_parallel_lines	
	Frequency	Percent
Available	107	47.1
Not available	117	51.5
Total	224	98.7
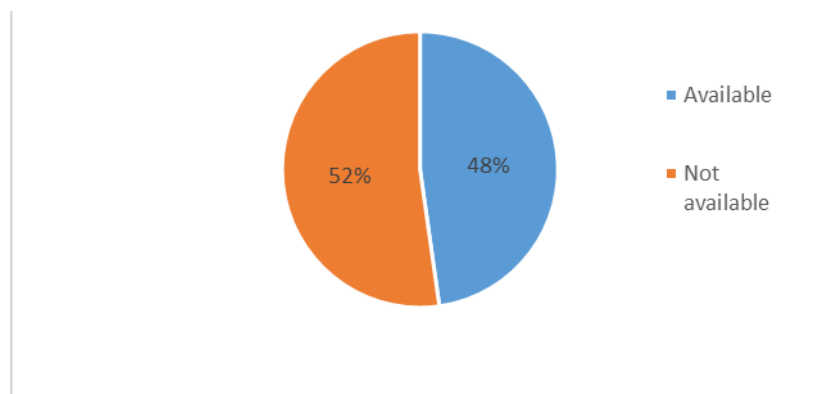
Figure 13 : Availability of parallel Roads

3.2.10 Weather Conditions

The weather condition during the time of the cases occurred during the year 2016 is analysed below.

Table 11 : Weather Conditions

	Weather_Condition	
	Frequency	Percent
Sunny	123	54.2
Rainy	68	30
Night	35	15.4
Total	226	99.6
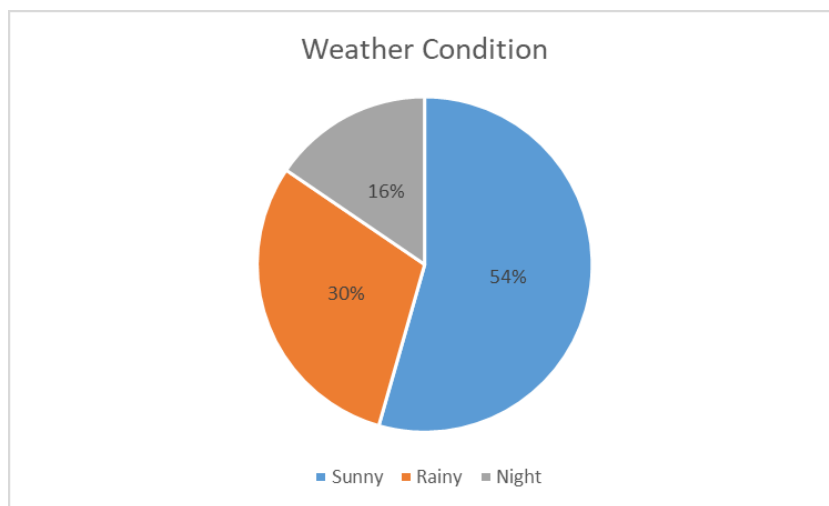
Figure 14 : Weather Conditions

In sunny conditions due to sun rays train cannot be seen properly from distance.

3.2.11 Train Line

Train route of the train of the cases occurred during the year 2016 is shown below.

Table 12 : Train *Line*

	Train Route	
	Frequency	Percent
Main Line	91	40
Puttalam Line	20	9
Northen Line	5	2
Coastal Line	89	40
KV Line	20	9
Total	225	100
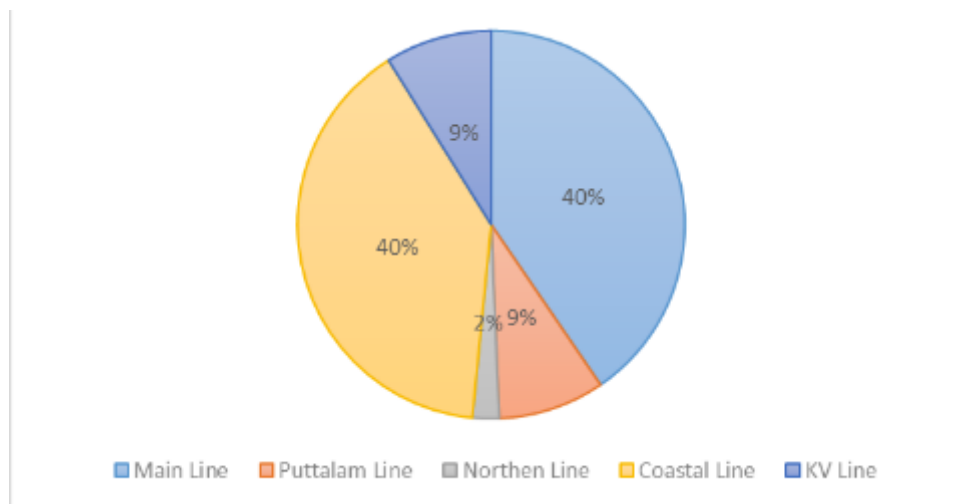
Figure 15 : Train Line

The Main line and the Coastal line can be identified as the lines with highest service level. Therefore number of trains per day is high and the number of accidents would have gone up due to that.

3.2.12 Type of train

Type of the train of the accidents during the year 2016 is analysed below.

Table 13 : Average type of train per day

Type of train

	Frequency
Unknown	10
Power Set	156
Loco	61
Total	227
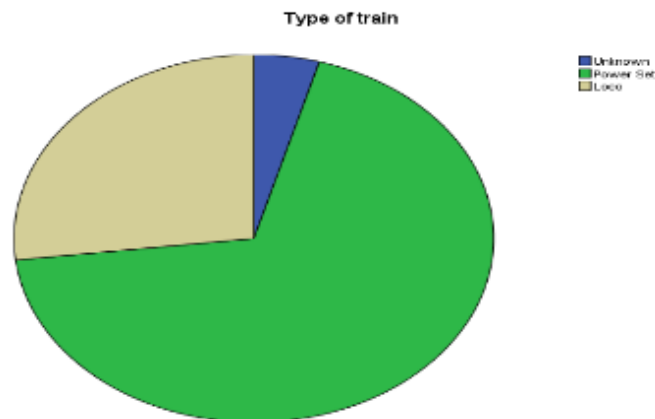
Figure 16 : Type of train

The highest number of victims have collided with power sets. Due to smooth operation of power sets the noise is low and pedestrians cannot hear the noise of the train.

The decrease in number of accidents on Saturday can be explained with this. As the number of power sets in service on Saturdays reduce due to not having office trains the number of accidents have gone down.

Daily average 237 trains are in operation within the area that has taken into consideration. Among them 40 are locos driven and 197 are power sets. Total 83% represent power set.

4   CONCLUSION & RECOMMENDATIONS

4.1   Conclusion & Recommendations

By considering above analysis it can be stated that more than the in-efficiencies in railway system, the ignorance of the risk by the people as even when parallel lines were available people had used the railway track (Photo 1, Photo 2, Photo 3), has caused most of the trespass accidents.

Therefore preventative methods to avoid people get to the rail line should be taken place.

During British Era prohibition of trespassing on rail line was done strictly. And also rules had been set to reduce trespassing.

But by considering areas where no alternative paths are available such as some areas between Nawalapitiya to Badulla the only available path for people to their house and their day to day work is rail track, using law could be less helpful in preventing trespassing activities. So that it is essential to look for alternative methods.

Fences can be used to prevent people get in to the rail line especially in more populated areas and the areas where a high risk of trespass accidents has been identified.

Also educating people about the risk of trespassing, using TV commercials can be used.

However as it is clear that the most appropriate method in preventing trespass accidents is trying to minimise trespassing we can even use modern social media marketing methods such as social media marketing, viral marketing, guerrilla marketing and influencer marketing in achieving our goal which is to make people avoid rail line as much as possible. For that initial cost may be high but at the end if the number of trespass accidents go down it would be valuable as it saves a lot for the country's economy.

But potential drawback can be the increasing of suicides in rail lines as people get more aware of a method for suicides.

It is worth noting that some measures have potentially opposing effects. For example, campaigns to raise awareness of rail-related risks can influence positively the adoption of safe behaviours in the population, but they could also have a negative effect by increasing the attractiveness of rail as a means of suicide. (El Miloudi El Koursi, 2016)

Most accident was occurred during the peak hours. Railway has double and triple line in the suburban areas. In the peak hours all lines are used to run trains in one direction. Trespassers were knocked down because they changed the track without looking other line rail movement. It can be minimized using illuminating lighting system fixed in the middle of the sleepers in 5m intervals which indicates the direction of the train movement and the speed.

5 Bibliography

Annual and monthly rainfall at observation stations. (n.d.). Department of census and statistics, Sri Lanka.

El Miloudi El Koursi, J. L. (2016, March 17). Railway Accident Prevention and Infastructure Protection. *Journal of Civil Engineering and Architecture*, 96-107.

Frittelli, J. (2018). *Trespassing: The Leading Cause of Rail-Related Fatalities.* Federation of Congress. Congressional Research Service.

Google Maps. (n.d.).

Marie-Hélène Bonneau, G. H. (2014). *How to prevent suicide and trespass on the railways and mitigate the consequences? Practical guide.* International Union of Railways.

Silla, A. (25/01/2013). *Improving safety on Finnish Railways by prevention of trespassing.* Aalto University. Espoo: JULKAISIJA-UTGIVARE.

SLR Time Table. (n.d.). Sri Lanka Railways.

SLR Train Records. (n.d.). Sri Lanka Railways.

Special Rules, Way And Works Department. (1927). Ceylon Government Railway.

Survey Data Collection. (n.d.).

6 APPENDICES

6.1 Table of Data

2016 Train Accident Tresspass	Train No.	Date	Distance from COL(km)	Straight-1, Curve-2 RS-3 Unidentified-4	Gender 1-Male 2-Female	Age of the victim upto 18-1; 18-60-2; >60-3; unknown-5	Speed of the train High-1 Medium-2 Low-3	Availability of parallel line Available-1 Not available-2	5.00hr-9.00hr=1, 9.00-12.00=2, 12.00-17.00=3, 17.00-21.00=4, 21.00-5.00=5.	Time at Accident 24hrs format	Line 1,3,8,9	Type of Locomotive Power Set-1 Loco-2	Weather Condition (Sunny-1), (rainy-2), (Night-3)	Surrounding Area Noice Level High-1 Medium-2 Low-3	Visibility (Very Good-1)(Good-2)(Bad-3)	Injured	Death	Other
3	NA	2016.01.02	40	2	1	5	1	2			1		3	2				
4	1006	2016.01.02	5.8	1	1	5	1	2	4	18.49	1	2	1	2				
5	3823	2016.01.02	2.5	2	1	3	1	2	4	18.06	1	1	1	2				
6	1578	2016.01.03	9.6	2	1	5	1	2	4	18.45	1	1	1	2				
8	1127	2016.01.03	2.5	2	2	2	1	2	1	6.56	1	1	1	2			1	
9	1191	2016.01.04	29	1	1	5	1	2	4	20.48	1	1	1	2			1	
10	4017	2016.01.06	5.8	1	1	5	1	2	2	11.57	1	2	1	2				
11	5768	2016.01.05	5.8	1	1	5	1	2			1	1	1	2				
13	8040	2016.01.08	44	2	1	5	1	1	2	9.25	8	2	2	2		1		
16	9253	2016.01.11	6	2	1	5	3	2			9	1	1	3	1	1		

17	8355	2016.01.12	15	1	1	3	1	1	3	15.42	8	1	1	2	1			
20	8304	2016.01.19	9	1	1	5	1	1	1	5.32	8	1	1	1	1			
21	1260	2016.01.19	25	2	1	5	3	1	3	15.00	9	1	1	3	1		1	
22	1006	2016.01.20	15	2	1	5	3	1			9	2	1	2	1		1	
23	1191	2016.01.20	43	2	1	5	1	2	5	21.25	1	1	3	2	1			
24		2016.01.21	3	1	1	5	3	2			1		1	2	1			
28	1016	2016.01.28	34	1	1	5	1	2			1	2	2	2	1			
29	8050	2016.01.31	24	2	1	5	1	2	1	8.22	8	2	2	2	1			
30	3419	2016.02.01	44	1	1	2	2	2	3	14.41	3	1	2	2	1		1	
33	4017	2016.02.08	6.9	2	1	3	3	1	3	12.15		2	1	3	1	1		
34	8767	2016.02.08	13	1	1	5	2	1			8	1	2	1	1			
35	3805	2016.02.09	32	1	1	5	2	2	1	6.38	3	1	2	2				
37	8375	2016.02.10	3	2	2	5	2	2			1	1	1	2	1		1	
38	4078	2016.02.11	9	1	1	5	1	1	4	18.52	8	2	1	2	1			
39	8304	2016.02.12	9	1	1	5	1	1	1	5.23	8	1	1	2	1			
40	8059	2016.02.14	47	2	2	5	1	2	1	6.57	8	2	3	2	1		1	
42	3432	2016.02.15	23	2	1	5	2	2	4	21.08	3	1	2	2	1			
43	5067	2016.02.15	3.1	1	1	5	3	2			3	2	3	2	1			
44	3823	2016.02.21	27	2	1	5	2	2	4	17.06	3	1	1	2	1	1		
46	4469	2016.02.22	30	2	1	5	2	2	4	19.30	1	1	3	3	1	1		
49	8782	2016.02.24	44	2	1	5	1	2	5	21.57	8	1	2	2	1		1	
50	9268	2016.02.24	20	2	2	5	2	2	4	18.29	9	1	2	3	1	1		
51	1575	2016.02.26	29	1	1	5	1	2	4	17.10	1	1	1	2	1		1	
52	8780	2016.02.28	9	1	1	5	1	1	4	20.07	8	1	1	2	1		1	
53	1547	2016.02.29	17	2	1	5	1	2	2	11.18	1	1	2	2	1	1		
55	3805	2016.03.01	38	2	1	5	2	1	1	6.29	3	1	1	2	1	1		
58	8309	2016.03.03	2.2	2	1	5	1	2	1	6.18	8	1	1	2	1			
60	8061	2016.03.05	9	1	1	5	1	1	4	18.31	8	2	1	1	1			
61	4850	2016.03.06	18	2	1	5	2	2	3	16.15	4	1	3	3	1	1		

62	4467	2016.03.06	9	1	1	5	1	1			8	1	1	1	1		
64	9269	2016.03.07	22	2	1	5	3	1	4	19.25	9	1	2	3	1	1	
65	8328	2016.03.07	44	2	1	5	1	1			8	1	2	2	1		1
66	8356	2016.03.08	15	1	1	5	1	1	3	16.17	8	1	1	2	1		1
67	427	2016.03.09	5.8	1	1	5	1	2			1	1	1	2	1		
68	3420	2016.03.10	9.6	1	1	5	1	2	3	14.52	1	1	1	2	1		
74	B/SLP	2016.03.13	9	1	1	5	1	1			8	2	1	1	1	1	
78	1007	2016.03.18	12	2	1	5	1	2	2	9.55	1	2	2	2	1		
79	1035	2016.03.18	0	3	1	5	3		3	16.35	1	2	1		1		
80	8782	2016.03.20	20	1	1	5	1	1	5	21.16	8	1	3	2	1		
81	8777	2016.03.21	9	1	1	5	1	1	4	19.26	8	1	1	1	1		
82	9269	2016.03.21	7.3	2	1	3	3	1	4	18.45	9	1	1	3	1		1
83	1006	2016.03.23	29	1	2	5	1	2	4	18.22	1	2	1	2	1		
84	8344	2016.03.24	15	1	2	5	1	1	2	11.40	8	1	1	2	1		
85	8305	2016.03.24	2.2	1	1	5	1	1			8	1	1	2	1	1	
86	3816	2016.03.25	23	1	1	5	2	2	2	11.10	8	1	2	2	1		1
87	1526	2016.03.31	29	1	1	3	1	2	1	7.25	1	1	1	2	1		
88	1458	2016.04.01	5.8	2	1	5	1	2			1	1	1	2	1		
89	4085	2016.04.02	2.5	2	1	3	1	2	3	13.58	1	2	2	2	1		1
90	1020	2016.04.03	29	1	1	5	1	2	4	18.12	1	2	1	2	1		
91	SPL/MRT	2016.04.05	16	1	1	5	1	1			8	1	2	2	1		
93	3828	2016.04.06	23	1	1	5	2	2	4	20.55	3	1	2	2	1		
94	9653	2016.04.08	16	2	1	5	3	1	1	7.38	9	1	1	3	1		
95	9648	2016.04.08	36	2	1	5	3	1	1	5.07	9	1	3	3	1		
98	8761	2016.04.11	16	1	1	3	1	1	3	16.48	8	1	1	2	1		
99	1164	2016.04.11	16	1	2	2	1	1	4	17.12	1	1	1	1	1	1	
100	8390	2016.04.11	5.9	1	1	2	1	1	5	23.10	8	1	1	1	1		3
101	1339	2016.04.12	6.7	1	2	3	1	1			8	1	1	1	1		1

103	1194	2016.04.17	7.9	4	1	2	1	1	5	0.49	1	1	1		1	1		
104	1552	2016.04.17	29	2	1	2	1	2	3	14.19	1	1	2	2	1			
105		2016.04.18	3	3	1	5	3				1		1		1	1		
107	4077	2016.04.20	0	3	1	5	3	2	1	6.17	1	2	1		1			
108	8050	2016.04.20	6.2	1	1	5	1	2	2	10.41	8	2	1	2	1		1	
109	8061	2016.04.21	44	2	1	5	2	1	4	17.55	8	2	2	2	1		1	
110	8079	2016.04.22	20	1	1	5	1	1			8	2	1	2	1			
111	8040	2016.04.23	20	1	1	5	1	1			8	2	1	2	1		1	
113	8777	2016.04.25	15	1	1	5	1	1	4	19.31	8	1	1	2	1	1		
114	-	2016.04.29	0	3	1	5	3	2			1		1		1		1	
115	8781	2016.04.30	15	1	1	2	1	1	4	20.07	8	1	1	2	1	1		
116	9265	2016.05.01	12	2	1	2	3	1	4	17.28	9	1	1	3	1		1	
117	8772	2016.05.03	40	3	2	5	1	1	4	19.06	8	1	2		1	1	1	
118	1019	2016.05.05	2.5	2	1	5	1	2			1	2	3	2	1		1	
119	1452	2016.05.06	9.6	2	1	5	1	2			1	1	1	2	1	1		
121	8365	2016.05.08	8.6	1	2	5	1	1	3	16.53	8	1	1	1	1		1	
122	8085	2016.05.08	57	1	2	5	1	1	2	12.00	8	2	2	2	1	1		
124	8324	2016.05.10	40	1	1	2	1	1	1	6.48	8	1	2	1	1			
126	1335	2016.05.11	16	1	1	2	1	1	3	15.22	8	1	1	2	1		1	
127	8097	2016.05.11	9	1	1	5	1	1	1	7.56	8	2	1	2	1	1		
128	8757	2016.05.12	30	2	1	5	1	1	3	16.49	8	1	1	2	1		1	
129	1329	2016.05.14	3	1	1	5	3	2			1	1	1	2	1	1		
130	Engin 945	2016.05.14	16	2	1	5	1	2			1	2	3	2	1			
132	8776	2016.05.18	44	2	1	2	1	1			8	1	2	2	1			
133	1579	2016.05.20	19	2	1	5	1	2			1	1	2	2	1			
134	-	2016.05.22	46	1	1	5	1	2			1		3	1	1	1		
135	4004	2016.05.23	5.8	1	1	5	1	2	2	10.25	1	2	1	2	1			
136	8350	2016.05.25	5.9	1	1	5	1	1	3	13.56	8	1	1	1	1			
137	8333	2016.05.30	9	1	1	5	1	1	1	8.17	8	1	1	2	1			

139	8096	2016.05.31	23	1	1	5	1	1	4	17.50	8	2	2	2	1			
140	8339	2016.06.03	3.6	1	2	5	1	1	2	9.57	8	1	1	1	1			
141	8086	2016.06.03	15	1	1	5	2	1	2	10.40	8	2	1	2	1			
142	1575	2016.06.04	16	1	1	5	1	2	4	17.30	1	1	1	1	1			
143	LOC Engin	2016.06.05	13	1	1	5	2	1			8	2	1	2	1	1		
144	4021	2016.06.07	9	1	1	2	1	1	1	5.17	8	1	1	2	1	1		
145	1458	2016.06.07	29	2	1	5	1	2			1	1	2	2	1		1	
148	3419	2016.06.09	48	1	1	5	2	1			3	1	3	2	1			
151	1267	2016.06.14	35	4	1	5	1	2			1	1	2		1			
152	Engin	2016.06.14	31	2	1	5	1	2			1	2	2	2	1			
153	8059	2016.06.15		4	1	5						2			1	1		
154	8390	2016.06.14	16	1	1	3	1	1	5	22.50	8	1	1	2	1			
157	8751	2016.06.19	15	1	1	2	1	1	3	14.30	8	1	1	2	1	1		
158	1083	2016.06.19	9.6	2	1	2	1	2			1	2	1	2	1			
159	SPL-10	2016.06.19	5.5	4	1	5	2	2			1	2	2		1	1		
160	8355	2016.06.20	23	1	2	5	1	1	3	15.08	8	1	2	2	1			
164	1278	2016.06.23	5.8	1	1	5	1	2			1	1	1	2	1			
166	9648	2016.06.25	14	2	1	5	3	1	1	6.03	9	1	1	3	1		1	
167	8302	2016.06.28	43	1	1	5	1	1	1	4.00	8	1	2	1	1			
168	4022	2016.06.24	9	1	1	5	1	1	4	20.15	8	1	1	1	1			
169	8777	2016.06.24	9	1	2	5	1	1	4	19.22	8	1	1	1	1	1		
170	8327	2016.07.02	50	1	1	5	1	1	1	6.40	8	1	2	1	1		1	
171	8096	2016.07.03	19	1	1	5	1	1	4	17.08	8	2	2	2	1		1	
173	1152	2016.07.08	13	2	1	5	1	2	3	14.26	1	1	2	2	1			
176	1825	2016.07.10	5.8	1	1	5	1	2			1	1	1	2	1	1		
181	3419	2016.07.13	47	1	1	5	2	1			3	1	3	2	1			
182	1023	2016.07.16	38	1	1	5	1	2			1	2	1	2	1		1	
183	8744	2016.07.18	32	1	1	5	1	1	4	19.48	8	1	2	2	1			

185		2016.07.20	24	2	2	5	1	1			8		2	2	1	1		
186	4090	2016.07.20	30	2	2	5	2	1	5	1.38	4	2	3	3	1			
187	8307	2016.07.23	15	1	1	5	2	2			8	1	1	2	1			
188	1803	2016.07.23	13	2	1	5	1	2			1	1	2	2	1		1	
191	8307	2016.07.25	19	1	1	5	1	1			8	1	2	2	1	1		
192	4021	2016.07.26	2.2	1	1	5	2	1	1	5.30	8	1	1	2	1	1		
193	8780	2016.07.26	15	1	1	5	1	1	4	20.12	8	1	2	2	1		1	
200	8063	2016.08.11	15	1	1	2	2	1	1	7.22	8	2	1	2	1		1	
201	3419	2016.08.11	7	2	1	5	1	2	3	13.20	1	1	1	2	1	2		
204	1550		16	1	1	3	1	2	2	11.51	1	1	1	1	1	1		
206	1581	2016.08.14	16	2	1	2	1	2	4	18.01	1	1	2	2	1	1		
211	1577	2016.08.16	13	2	2	3	1	2	4	18.22	1	1	2	2	1			
212	1183	2016.08.16	6	1	1	5	1	1	4	18.44	1	1	1	2	1		1	
216	9262	2016.08.22	37	2	1	5	2	1	4	17.30	9	1	3	3	1	1		
217	1016	2016.08.22	8	1	1	5	1	2	3	15.25	1	2	1	2	1			
219	4017	2016.08.19	30	2	1	5	1	1	3	13.35	4	2	3	3	1			
222	773	2016.08.23	30	2	1	5	1	2	4	19.07	8	1	2	2	1		1	
223	8311	2016.08.24	8	1	1	5	1	1	1	6.35	8	1	1	2	1			
224	8051	2016.08.24	16	1	1	5	1	1	4	17.50	8	1	1	2	1	1		
226	1585	2016.08.26	14	2	1	5	1	2	5	21.50	1	1	2	2	1			
228	8764	2016.08.28	30	2	1	5	1	1	4	18.50	8	1	3	2	1			
231	4021	2016.08.30	30	2	2	5	1	1	1	7.30	4	1	3	3	1		1	
232	1817	2016.08.30	10	2	1	5	1	2			1	1	1	2	1	1		
233	1421	2016.08.30	2.6	2	2	5	1	2			1	1	2	2	1		1	
234	9265	2016.08.30	3	2	2	5	3	2	4	17.11	1	1	1	3	1	1		
235	3428	2016.08.31	28	1	1	5	2	1	4	20.01	3	1	3	2	1			
236	1591	2016.09.03	8	1	1	5	1	2			1	1	1	2	1		1	
237	5768	2016.09.04	24	2	2	2	1	2			1	1	2	2	1	1		
238		2016.09.05	10	1	1	5	1	2			1		2	2	1			

239	8325	2016.09.05	20	4	1	2	1	1	1	7.52	8	1	2		1	1	
240	8777	2016.09.05	23	1	1	5	1	1	4	19.53	8	1	2	2	1		
241	8758	2016.09.06	24	2	1	5	1	1	4	18.23	8	1	2	2	1	1	
242	8349	2016.09.08	27	1	1	2	1	1			8	1	1	2	1		1
246	1527	2016.09.15	46	1	2	5	1	2	1	5.54	1	1	3	2	1		
247	1803	2016.09.15	13	2	2	5	1	2			1	1	2	2	1		
248	8339	2016.09.15	16	1	1	5	1	1	2	9.40	8	1	2	2	1		1
249	1497	2016.09.16	23	2	2	5	1	2			1	1	3	2	1	1	
250	8741	2016.09.16	30	2	1	5	1	1	2	10.45	8	1	2	2	1		1
251	8050	2016.09.16	20	2	1	5	1	1	1	7.24	8	2	1	2	1	1	
256	1339	2016.09.20	0	3	1	2	3	1			1	1	1		1		
259	8390	2016.09.26	16	1	1	5	1	1	5	22.53	8	1	2	2	1		1
260	9260	2016.09.27	8	1	1	5	2	2			9	1	1	2	1		
262	1637	2016.09.28	7	1	1	2	1	2			1	1	1	2	1	1	
265	1526	2016.10.02	10	2	1	5	1	1	1	7.49	1	1	1	2	1		
267	8782	2016.10.02	20	1	1	5	1	1	4	21.14	8	1	2	2	1		1
268	9648	2016.10.05	22	2	1	5	2	1			9	1	1	3	1		
269	1024	2016.10.05	29	1	1	2	1	1	3	13.26	1	2	1	2	1	1	
270	R/P 01	2016.10.07	25	2	1	2	2	1			9	2	2	3	1		1
271	8876	2016.10.07	3	1	1	5	1	1			8	1	1	2	1		
274	4085	2016.10.09	38	1	1	2	1	2	3	14.33	1	2	2	2	1		
276	8058	2016.10.11	24	2	1	5	1	2			8	2	2	2	1		1
279	9093	2016.10.15	32	1	2	5	1	1			9	2	3	2	1	1	
280	5067	2016.10.16	6	1	1	5	1	1	4	19.20	1	2	1	2	1		1
282	8783	2016.10.17	44	2	1	5	1	1	5	22.55	8	1	1	2	1	1	
283	R/P 04	2016.10.17	15	4	2	2	1	2			1	2	1		1		1
284	3808	2016.10.18	19	2	1	5	1	1			1	1	3	2	1		
285	8751	2016.10.18	30	2	1	5	1	2	3	15.03	8	1	2	2	1		1

287	176	2016.10.21	13	2	1	5	1	2			1	1	2	2	1			
288	8040	2016.10.22	11	2	1	5	1	2	2	10.20	3	2	3	2	1			
289	3424	2016.10.24	31	1	1	5	2	1	4	18.10	3	1	3	2	1	1		
291	162	2016.10.25	8.3	2	2	2	1	2			1	1	3	2	1		1	
293	788	2016.10.27	44	2	1	5	1	2	2	10.23	8	1	1	2	1			
294	346	2016.10.28	4	1	2	5	1	1	2	9.38	8	1	1	1	1	1	1	
295	1176	2016.10.28	24	2	1	5	1	2	4	18.20	1	1	3	2	1	1		
297	1015	2016.10.29	21	4	2	2	2	2			1	2	2		1	1		
298		2016.10.31	40	1	1	5	1	1			8		2	2	1			
299	1546	2016.10.31	10	1	2	5	1	2	2	11.35	1	1	1	2	1	1		
300	1016	2016.10.31	5	1	1	2	2	2	3	15.18	1	2	1	2	1		1	
301	9661	2016.10.31	33	2	1	5	2	2	3	15.40	9	1	3	2	1			
304		2016.11.01	29	1	1	5	1	2			1		1	2	1			
305	8744	2016.11.01	9	1	1	5	1	1	3	12.25	8	1	1	1	1	1		
306	8423	2016.11.04	14	2	2	2	2	2			2	1	3	2	1		1	
307	-	2016.11.08	30	2	1	5	1	2			8		2	2	1		1	
308	8051	2016.11.07	38	2	1	5	1	1	3	16.04	8	2	2	2	1			
309	1536	2016.11.08	10	2	2	5	1	1	2	9.37	1	1	1	2	1	1		
311	1589	2016.11.10	29	2	1	2	1	2	5	21.40	1	1	2	2	1	1		
312	8777	2016.11.10	9	1	1	5	1	1	4	19.22	8	1	1	1	1			
313	8316	2016.11.11	9	1	1	2	1	1	1	7.17	8	1	1	1	1			
315	1546	2016.11.12	13	2	2	5	1	2	2	11.33	1	1	2	2	1			
318	8749	2016.11.17	27	1	1	5	1	1	3	14.50	8	1	1	1	1	1		
320	8062	2016.11.16	16	1	1	5	1	2	4	17.20	8	2	1	2	1	1	1	
322	169	2016.11.20	6	1	1	5	1	2	3	16.33	1	1	1	2	1			
323	763	2016.11.21	15	1	1	3	1	2	3	16.49	8	1	1	2	1			
328	3816	2016.11.29	6	1	1	2	1	2	2	11.43	1	1	1	2	1			
329	1525	2016.11.30	10	2	1	5	1	2			1	1	1	2	1		1	
332	8050	2016.12.04	15	1	1	5	1	2	1	7.09	8	2	1	2	1	1		
333	4018	2016.12.04	34	1	1	5	1	2	3	12.46	1	2	3	2	1	1		

337	1045	2016.12.06	6	1	1	3	1	2	4	20.15	1	2	1	2	1			
338	8756	2016.12.10	6.7	1	1	2	1	1	3	15.33	8	1	1	1	1	1		
339	1162	2016.12.11	10	1	1	2	1	2	3	15.05	1	1	1	2	1			
340	1147	2016.12.13	8	2	1	3	1	2	3	12.05	1	1	1	2	1	1	1	
341	3825	2016.12.13	38	1	2	2	2	2	4	18.43	3	1	3	2	1			
342	5067	2016.12.13	16	1	1	5	1	2			1	2	1	1	1			
343	1172	2016.12.13	40	1	1	5	1	2	4	17.42	1	1	3	2	1	1		
346	1548	2016.12.15	24	2	1	5	1	2			1	1	3	2	1			
347	3828	2016.12.15	13	2	1	5	1	2	4	21.29	1	1	2	2	1		1	
349	1015	2016.12.17	29	1	2	5	1	2	2	9.02	1	2	1	2	1			
350	8053	2016.12.18	1.9	1	1	5	2	2	3	14.18	3	2	3	2	1			
351	8039	2016.12.18	7	1	1	5	1	1	3	16.57	8	2	1	1	1			
354	816	2016.12.21	16	2	1	5	2	2	2	11.18	3	1	2	2	1	1		
355	8373	2016.12.22	24	2	2	2	1	2	3	16.50	8	1	2	2	1			
357	9652	2016.12.26	37	2	1	2	3	2	1	6.38	9		3	3	1			
	Total														216	66	61	

6.2   Photos of field visits

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8