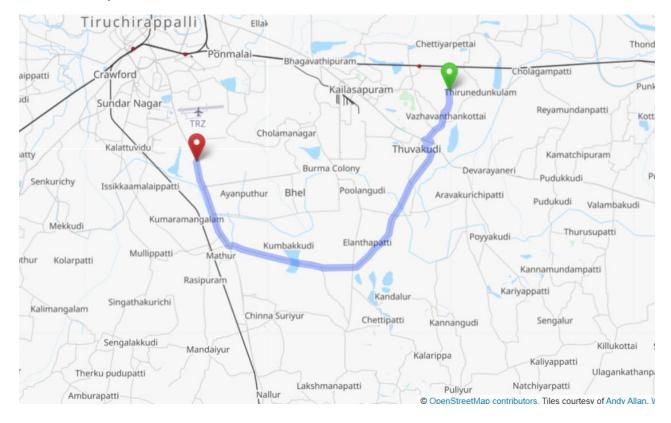
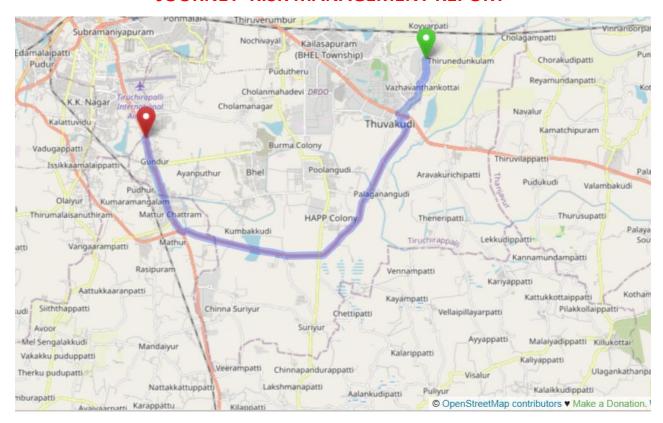


WELCOME TO JOURNEY RISK MANAGEMENT (JRM) STUDY USING ARTIFICIAL INTELLIGENCE (AI) FOR IOCL TRICHY TERMINAL

<u>IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO MM FUELS(</u>10.7408298, 78.7155364) TOTAL DISTANCE – 23.3 KM





Welcome to the Journey Risk Management Study for MM FUELS

Total distance: 23.3 KM; Start with: (10.7753, 78.8368), End with: (10.7408298, 78.7155364)

* Route Safety Analysis Report

1. Overview of the Route Map

The route from Trichy Terminal (T.N) TO MM FUELS IS Take SIDCO to Indian oil Storage to NH 83 in Thuvakudi, Head south on SIDCO to Indian oil Storage, At Jude Digital Studios, continue onto Thuvakudi toSIDCO& Indian oil Storage, Drive from Outer Ring Rd/Trichy Bypass to Thirunagar, Tiruchirappalli, Turn left at the petrol pump, and Total distance from Trichy Terminal To MM FUELSIS 23.3 KM.

Typical Weather Conditions and Potential Weather-Related Hazards

<u>Weather Conditions:</u> Trichy Terminal (T.N) To MM FUELSexperiences a tropical climate with heavy monsoon rains from June to September, high humidity, and moderate temperatures throughout the year ,The summers are short and sweltering; the winters are short, cool, and dry; and it is mostly clear year-round. Over the course of the year, the temperature typically varies from 60.8°F to 110°F and is rarely below 60.8°F to 110°F.

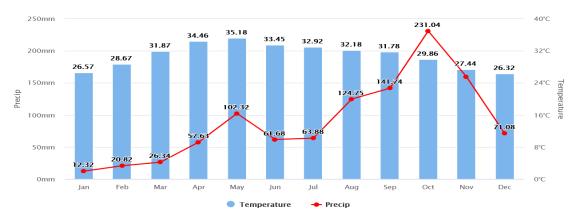
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	33.0	38.0	41.0	43.0	43.0	42.0	40.0	39.0	38.0	37.0	34.0	33.0	43.0
	(91.4)	(100.4)	(105.8)	(109.4)	(109.4)	(107.6)	(104.0)	(102.2)	(100.4)	(98.6)	(93.2)	(91.4)	(109.4)
Average high °C (°F)	30.27	32.88	36.0	38.27	38.79	36.78	36.17	35.4	35.03	32.9	30.38	29.34	34.35
	(86.49)	(91.18)	(96.8)	(100.89)	(101.82)	(98.2)	(97.11)	(95.72)	(95.05)	(91.22)	(86.68)	(84.81)	(93.83)
Daily mean °C (°F)	26.57	28.67	31.87	34.46	35.18	33.45	32.92	32.18	31.78	29.86	27.44	26.32	30.89
	(79.83)	(83.61)	(89.37)	(94.03)	(95.32)	(92.21)	(91.26)	(89.92)	(89.2)	(85.75)	(81.39)	(79.38)	(87.6)
Average low °C (°F)	19.88	20.93	24.04	27.62	28.89	27.59	27.04	26.45	25.95	24.64	22.43	20.93	24.7
	(67.78)	(69.67)	(75.27)	(81.72)	(84.0)	(81.66)	(80.67)	(79.61)	(78.71)	(76.35)	(72.37)	(69.67)	(76.46)
Record low °C (°F)	16.0	17.0	19.0	22.0	25.0	25.0	24.0	23.0	22.0	21.0	18.0	17.0	16.0
	(60.8)	(62.6)	(66.2)	(71.6)	(77.0)	(77.0)	(75.2)	(73.4)	(71.6)	(69.8)	(64.4)	(62.6)	(60.8)
Average precipitation mm (inches)	12.32	20.82	26.34	57.63	102.32	61.68	63.88	124.75	141.74	231.04	159.62	71.08	89.44
	(0.49)	(0.82)	(1.04)	(2.27)	(4.03)	(2.43)	(2.51)	(4.91)	(5.58)	(9.1)	(6.28)	(2.8)	(3.52)
Average precipitation days (≥ 1.0 mm)	3.09	3.27	5.36	7.36	16.73	12.36	13.55	18.91	19.64	22.73	17.55	9.73	12.52
Average relative humidity (%)	72.01	65.19	58.27	53.97	51.56	50.59	51.14	56.11	60.33	70.18	77.39	76.61	61.95
Mean monthly sunshine hours	11.19	11.34	11.34	11.63	12.65	12.68	11.83	11.24	11.05	9.11	7.68	8.29	10.84

<u>Weather-Related Hazards:</u> Trichy Terminal (T.N) To MM FUELS Providing a local hourly weather forecast of rain, sun, wind, humidity and temperature.

The Long-range 12 day forecast also includes detail for weather today. Live weather reports from Trichy Terminal (T.N) To MM FUEL Sweather stations and weather warnings that include risk of thunder, high UV index and forecast gales.

Climate Graph

The chart below shows the mean monthly temperature and precipitation of Tiruchirappalli in recent years.



Analysis of Traffic Patterns

Peak Hours:

Typically, Trichy Terminal (T.N) To MM FUELS peak traffic hours are from 8:00 AM to 11:00 AM and 4:00 PM to 8:00 PM on weekdays.

Congestion-Prone Areas:

- Malar Mahal
- Old Burma Colony
- Government Branch Press, Tiruchirappalli
- National Institute of Technology Tiruchirappalli
- AGN InfoSystems & AGN INFOTECH
- NIT Trichy
- BHELEC CINEMA 4K Dolby 7.1
- MedPlus Trichy Rail Nagar

Assessment of Road Quality and Infrastructure

Road Quality: Generally, the roads are well-maintained but can suffer from potholes and waterlogging on State Highway during the monsoon season.

Infrastructure: Adequate signage, street lighting, and traffic signals are present, but some areas may lack proper drainage systems, leading to waterlogging.

Suggestions for Alternative Routes for Emergencies

Alternative Route 1-). Take SIDCO to Indian oil Storage to NH 83 in Thuvakudi, At Jude Digital Studios, continue onto Thuvakudi to SIDCO& Indian oil Storage, Continue on NH 83 to A.I.B.E.A. Colony, Tiruchirappalli, Drive to Kallanai Rd/NH 45 - North Bank Kallanai Rd in Panayakurichy, and Total distance from Trichy Terminal To MM FUELSIS 23.3 KM.

Alternative Route 2- Take SIDCO to Indian oil Storage to NH 83 in Thuvakudi, At Jude Digital Studios, continue onto Thuvakudi toSIDCO& Indian oil Storage, Continue on NH 83 to A.I.B.E.A. Colony, Tiruchirappalli, Turn right at TNSTC TRICHY RE CONDITIONING UNIT(RC) onto NH 83, Drive to Kallanai Rd/NH 45 - North Bank Kallanai Rd in Panayakurichy, At VARSHA POWER WEEDER - TRACTOR OPERATED SEEDDRILL - VENUS CORPORATION, continue onto MDR822, Slight left at Shafi Juice Shop onto Kallanai Rd/NH 45 - North Bank Kallanai Rd.

Summary of Local Regulations Affecting Hazardous Material Transport

Regulations: Transport of hazardous materials is regulated by the Petroleum and Explosives Safety Organization (PESO) and the Motor Vehicles Act. Specific routes and timings may be restricted for hazardous material transport.

Permits: Ensure all necessary permits and documentation are in place.

Overview of Historical Incidents

Historical Incidents: There have been occasional incidents involving heavy vehicles, particularly during the monsoon season due to waterlogging and poor visibility. No major incidents involving hazardous materials have been reported recently.

***** Environmental Considerations and Sensitive Areas

 Sensitive Areas: Malar Mahal, Old Burma Colony, Government Branch Press, Tiruchirappalli, National Institute of Technology Tiruchirappalli, AGN InfoSystems & AGN INFOTECH, NIT Trichy, BHELEC CINEMA 4K Dolby 7.1, MedPlus Trichy Rail Nagar.

- Educational institutions: State Institute Of Hotel Management and Catering Technology, National Institute of Technology Tiruchirappalli, AGN InfoSystems & AGN INFOTECH, NIT Trichy.
- **Hospital:** Dr Kamali's Home Clinic, Muthammal Medical Foundation Hospital, Times Hospital (Trichy Institute of Medical and Educational Services), Apollo Speciality Hospitals Trichy. GVN Hospital (P) Ltd. Multispecialty Hospital Trichy.
- Gas Station: IndianOil, Bharat Petroleum Sri Vela Fuels, IndianOil, Reliance Petrol Bunk.
- **Environmental Impact:** Minimize noise and air pollution, especially in residential and sensitive areas.
- **Air pollution**: Volatile chemicals evaporate during the filling and discharge process, or from leaks.
- **Loss of habitats**: Oil and gas operations can degrade animal habitats and disrupt migratory pathways.
- Oil spills: Oil spills can be devastating for animals and humans.
- **Greenhouse gas emissions**: Oil and gas operations can emit greenhouse gases like methane.
- Analysis of Communication Coverage

Communication Coverage: Generally good throughout the route, but potential dead zones may exist densely built-up areas or underpasses.

Dead Zones: Monitor for any communication blackouts, especially in underpasses or near large buildings.

- Estimated Emergency Response Times-Malar Mahal,Old Burma Colony, Government Branch Press, Tiruchirappalli, National Institute of Technology Tiruchirappalli, AGN InfoSystems & AGN INFOTECH,NIT Trichy, BHELEC CINEMA 4K Dolby 7.1,MedPlus Trichy Rail Nagar, areas like have quicker response times (15- 20 minutes). Congested areas may experience delays (up to 30-40 minutes).
- Overall Summary of Risk Assessment

- **Risk Level:** Moderate to High, especially during monsoon season.
- **Key Risks**: Waterlogging, traffic congestion, and potential communication dead zones.
- **Mitigation Measures**: Plan travel during non-peak hours, ensure proper vehicle maintenance, and have alternative routes and emergency contacts ready and control on the speed limit of the vehicle.

• Road Signage for TT/PT Driver

Road Traffic Signs in India

Mandatory/Regulatory Signs





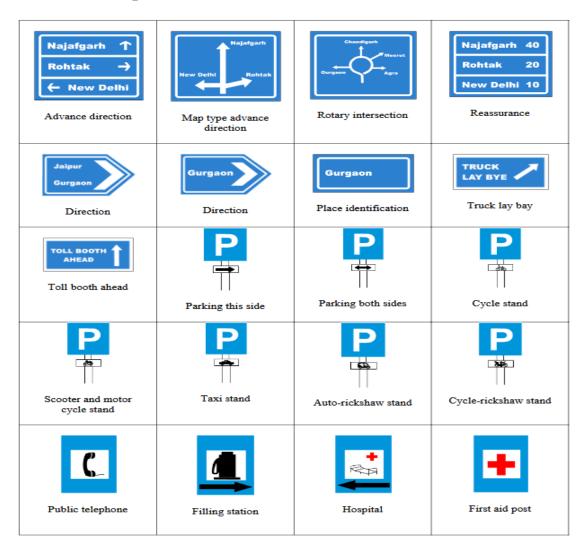


Restriction ands

Cautionary signs



Information signs



Conclusion

The route for Trichy Terminal (T.N) To MM FUELSis generally manageable but poses several risks, particularly during the monsoon season. Proper planning, adherence to regulations, and awareness of potential hazards can significantly mitigate these risks.

• Risk Assessment - Sharp Turns

Risk Type	Risk Level	Coordination	Distance From Start	Recommendation Speed		
Sharp turn	Medium	10.769517372474736, 78.83735063199906	650 M	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.76584461192607, 78.8361700257199	1.1 KM	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.764182189802032, 78.83459588401435	1.3 KM	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.75826698538096, 78.83349398474651	2 KM	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.756372549032195, 78.83034570133539	2.4 KM	20km/hr TO 30 Km/Hr		
Sharp turn	High	10.751346435623256, 78.8252297405902	3.2 KM	10km/hr TO 15 Km/Hr		
Sharp turn	High	10.757906942798716, 78.81117677157785	6.2 KM	10km/hr TO 15 Km/Hr		
Sharp turn	Medium	10.787358384509025, 78.77401388280337	10.8 KM	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.807926793454792, 78.72541718894573	16.7 KM	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.812858780584483, 78.71601872869049	17.8 KM	20km/hr TO 30 Km/Hr		
Sharp turn	High	10.813153854161522, 78.7123280092307	18.2 KM	10km/hr TO 15 Km/Hr		
Sharp turn	High	10.8132381608445, 78.71189885580515	18.3 KM	10km/hr TO 15 Km/Hr		
Sharp turn	Medium	10.817664228587676, 78.7119846864179	18.8 KM	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.825209469597384, 78.71241383982665	19.6 KM	20km/hr TO 30 Km/Hr		
Sharp turn	Medium	10.844809252744147, 78.71308566683136	21.8 KM	20km/hr TO 30 Km/Hr		

Sharp turn	High	10.848867431944997,	22.2 KM	10km/hr TO 15
		78.71317588521788		Km/Hr
Sharp turn	High	10.848867431944997,	22.3 KM	10km/hr TO 15
		78.71346458407959		Km/Hr
Sharp turn	Medium	10.843905458719005,	22.8 KM	20km/hr TO 30
		78.71344654040074		Km/Hr
Sharp turn	High	10.841388997909634,	23.1 KM	10km/hr TO 15
		78.71341045302391		Km/Hr

• Risk Assessment - Elevation Changes

Risk Type	Specific Risk	Risk Level	Coordination	Elevation Change	Gradient	Recommen dation Speed
Elevation Change	Descent	Low	10.7753, 78.8368	-3.02m	-2.96 %	40 km/hr to 50 km/hr
Elevation Change	Descent	Low	10.993921 , 78.326323	-9.28m	-6.28%	40 km/hr to 50 km/hr

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10.769073692604486, 78.83720120889187



10.764113439530249, 78.83446118711721



10.758209570013967, 78.83344387884853



10.751314343624747, 78.82530656733346



10.75126610223314, 78.82518044583597



10.759296455409434, 78.80954749245673



10.787270680907813, 78.77433315009567



10.801869769228155, 78.74289067038384



10.807212761783093, 78.727384388977



10.69177132146183, 78.79288572783435



10.701632882918734, 78.73189212642274



10.731804335525913, 78.71766355300038



10.740800127937064, 78.71564954626241