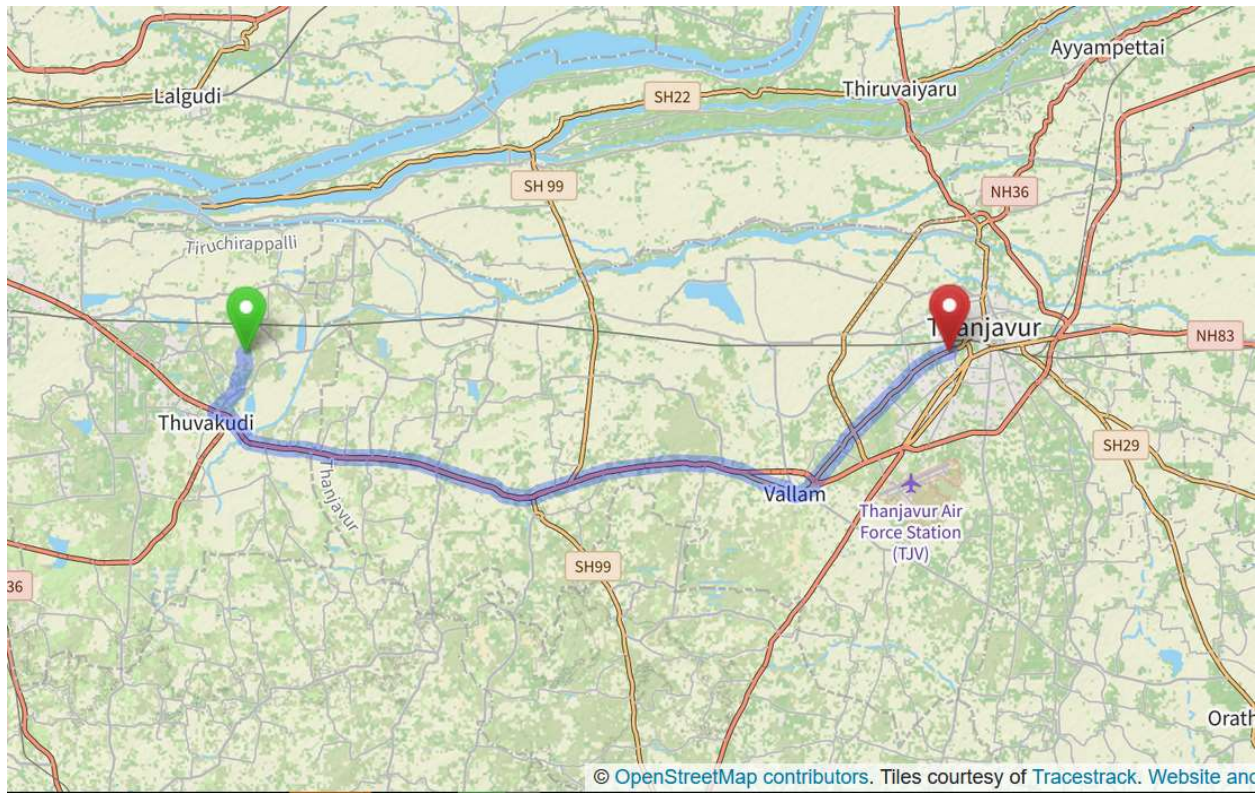




IndianOil

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



Welcome to the Journey Risk Management Study for VRK FUELS

Total distance: 25 km; Start with: (10.7753, 78.8368), End with: (10.77455 , 79.12355)

❖ Route Safety Analysis Report

1. Overview of the Route Map

The route from Trichy Terminal (T.N) To VRK Fuels . The route passes through several key points including SIDCO to Indian oil Storage, Thuvakudi to SIDCO& Indian oil Storage, Markandan Agency onto NH 83 Toll road, turn at TNSTC TRICHY RE CONDITIONING UNIT(RC), Trichy-Tanjore Rd, Thanjavur RingRd, Vennar bypass BridgeRd and Total distance from Trichy Terminal To VRK Fuels is 40 km for heavy vehicles carrying hazardous materials.

Typical Weather Conditions and Potential Weather-Related Hazards

Weather Conditions: Trichy Terminal (T.N) To VRK Fuels experiences 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 58.8°F to 106°F and is rarely below 56.8°F to 108°F.

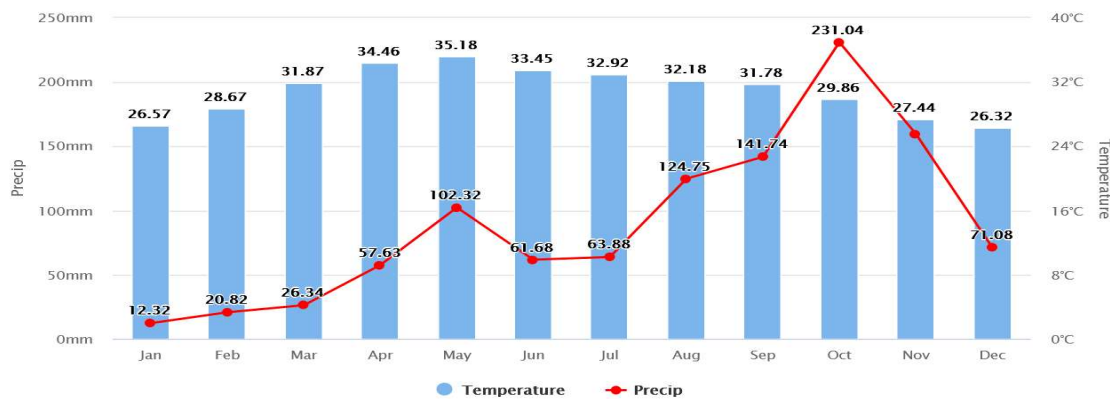
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	33.0 (91.4)	38.0 (100.4)	41.0 (105.8)	43.0 (109.4)	43.0 (109.4)	42.0 (107.6)	40.0 (104.0)	39.0 (102.2)	38.0 (100.4)	37.0 (98.6)	34.0 (93.2)	33.0 (91.4)	43.0 (109.4)
Average high °C (°F)	30.27 (86.49)	32.88 (91.18)	36.0 (96.8)	38.27 (100.89)	38.79 (101.82)	36.78 (98.2)	36.17 (97.11)	35.4 (95.72)	35.03 (95.05)	32.9 (91.22)	30.38 (86.68)	29.34 (84.81)	34.35 (93.83)
Daily mean °C (°F)	26.57 (79.83)	28.67 (83.61)	31.87 (89.37)	34.46 (94.03)	35.18 (95.32)	33.45 (92.21)	32.92 (91.26)	32.18 (89.92)	31.78 (89.2)	29.86 (85.75)	27.44 (81.39)	26.32 (79.38)	30.89 (87.6)
Average low °C (°F)	19.88 (67.78)	20.93 (69.67)	24.04 (75.27)	27.62 (81.72)	28.89 (84.0)	27.59 (81.66)	27.04 (80.67)	26.45 (79.61)	25.95 (78.71)	24.64 (76.35)	22.43 (72.37)	20.93 (69.67)	24.7 (76.46)
Record low °C (°F)	16.0 (60.8)	17.0 (62.6)	19.0 (66.2)	22.0 (71.6)	25.0 (77.0)	25.0 (77.0)	24.0 (75.2)	23.0 (73.4)	22.0 (71.6)	21.0 (69.8)	18.0 (64.4)	17.0 (62.6)	16.0 (60.8)
Average precipitation mm (inches)	12.32 (0.49)	20.82 (0.82)	26.34 (1.04)	57.63 (2.27)	102.32 (4.03)	61.68 (2.43)	63.88 (2.51)	124.75 (4.91)	141.74 (5.58)	231.04 (9.1)	159.62 (6.28)	71.08 (2.8)	89.44 (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

Weather-Related Hazards: Trichy Terminal (T.N) To VRK 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 VRK Fuels weather 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 VRK Fuels peak traffic hours are from 8:00 AM to 12:00 AM and 5:30 PM to 9:30 PM on weekdays.

Congestion-Prone Areas:

- M. J. Agencies
- Bridgestone Select - Shakthi Tyres
- Diamond Diesel Pump Service
- Government hospital kottucherry
- Servite Higher secondary School
- Kottucherry Police Station,
- Navakiraha Orphanage Care Home - Nocomer Trust,

❖ **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: Bismi Briyani, Thuvakudi to SIDCO & Indian oil Storage, NH 83, U-turn at TNSTC TRICHY RE CONDITIONING, Ms Manivijay Nagar Rd,

Alternative Route 2: NIL

❖ **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:** M. J. Agencies, Jude Digital Studios, Ajs Maligai, Sengipatti, Suriyur, Lakshminapati, Palandamati, M. Marimuthu Coffee Shop
- **Educational institutions:** - Trichy School, Sneha Girls Hostel, Irrigation Management Training Institute, State Institute Of Hotel Management and Catering Technology, V.O.C Govt Higher Secondary School
- **Hospital:** - ESI Dispensary, Trustee Medical Center Velangudi,
- Govt. Hospital Thenkarai Mathur

- **Gas Station:** -Bharat Petroleum, Reliance Petrol Pump, R.M Traders, M/S R.K Agencies, Ranjith Petrol Pump, ESSAR petroleum pudukudi Thanjavur, NAYARA Energy-Sri Kandhar
- **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**

- Indian oil Storage, Sacred Heart School ,Tiruchirappalli , V.O.C Govt Higher Secondary School, Kottucherry Police Station, It takes about (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 and State Highway.
- **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

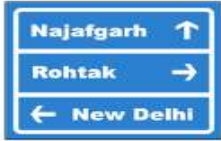


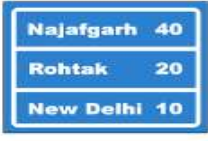
















 Stop	 Give way	 No entry	 Straight prohibited
 One way	 One way	 Vehicles prohibited in both directions	 Horn prohibited
 Pedestrians prohibited	 Cycles prohibited	 Right turn prohibited	 Left turn prohibited
 U-turn prohibited	 Overtaking prohibited	 Trucks prohibited	 Tonga prohibited

 <p>All motor vehicles prohibited</p>	 <p>Hand cart prohibited</p>	 <p>Bullock cart prohibited</p>	 <p>Bullock and hand carts prohibited</p>
 <p>No parking</p>	 <p>No parking or stopping</p>	 <p>Speed limit</p>	 <p>Axle load limit</p>
 <p>Width limit</p>	 <p>Weight limit</p>	 <p>Length limit</p>	 <p>Load limit</p>
 <p>Restriction and</p>			

Cautionary signs

 <p>Right hand curve</p>	 <p>Left hand curve</p>	 <p>Right hand pin bend</p>	 <p>Left hand pin bend</p>
 <p>Right reverse bend</p>	 <p>Narrow bridge</p>	 <p>Gap in median</p>	 <p>Cycle crossing</p>
 <p>Pedestrian crossing</p>	 <p>School</p>	 <p>Men at work</p>	 <p>Roundabout</p>
 <p>Narrow road</p>	 <p>Road widens</p>	 <p>Side road left</p>	 <p>Side road right</p>

Information signs

			
Advance direction	Map type advance direction	Rotary intersection	Reassurance
			
Direction	Direction	Place identification	Truck lay bay
			
Toll booth ahead	Parking this side	Parking both sides	Cycle stand
			
Scooter and motor cycle stand	Taxi stand	Auto-rickshaw stand	Cycle-rickshaw stand
			
Public telephone	Filling station	Hospital	First aid post

Conclusion

The route for Trichy Terminal (T.N) To VRK Fuels is 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	10.75826994715787, 78.83326651420096	2.0 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.756715887788083, 78.83021887801165	2.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.751274985268047, 78.82506273704801	3.3 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.749406921191936, 78.83062696831735	3.9 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.745172516487582, 78.83368104214479	4.5 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.739119119860915, 78.83810753689248	5.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.735296935060319, 78.8649298251201	8.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.732950078633909, 78.87545277973047	9.5 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.73087486908852, 78.90608995975295	12.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.723764671172908, 78.9285599072715	15.4 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.721125274436691, 78.93786647838668	16.5 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.718221002127057, 78.94304398964309	17.2 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.7181899017704, 78.9560914041222	18.6 KM	10 km/hr TO 20 Km/Hr
Sharp turn	Medium	10.730969484477892, 79.01761228410292	25.5KM	10km/hr TO 20 Km/Hr
Sharp turn	HIGH	10.726561431768483, 79.06521400420263	30.7 KM	10km/hr TO 20 Km/Hr
Sharp turn	HIGH	10.72308854798758, 79.0698337039081	31.4 KM	10km/hr TO 20 Km/Hr

Sharp turn	Medium	10.73705102370136, 79.10766164424598	35.9 KM	30km/hr TO 40 Km/Hr
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❖ **Risk Assessment - Elevation Changes**

Risk Type	Specific Risk	Risk Level	Coordination	Elevation Change	Gradient	Recommendation Speed
Elevation Change	Ascent	Low	10.7753, 78.8368	2.28m	1.96 %	40 km/hr to 50 km/hr
Elevation Change	Ascent	Low	<u>10.77455, 79.12355</u>	28m	2.28%	40 km/hr to 50 km/hr

❖ **Risk Assessment – Key Location:**

Sr No	Location	Lat, Lon.
1	Hall/Hotel	10.757627679523425, 78.83287045929539
2	OLD Burma Colony	10.75810448259808, 78.83342945889828
3	School/College	10.751940259658717, 78.824855152166
4	School/College	10.751244043943656, 78.82964545444308
5	Bank	10.749935829138195, 78.8268757083185
6	Toll Plaza	10.739223590189045, 78.82491390378034
7	Jagdish Filling station IOCL RO	10.730096699158965, 78.86385149738328
8	Bus Stand	10.737619717156392, 78.84469108474981
9	School/College	10.743654738281231, 78.85235497712233

10	Shri Rakku Sakti IOCL retail outlet	10.736854782210685, 78.85825905782572
11	School/College	10.736328228804307, 78.86222089649122
12	Moogambigai Agencies IOC RO	10.720992946251965, 78.94066066619781
13	G Parthasarathi Fuel Agencies IOCL RO	10.731949135570895, 79.01839981851398
14	Auto Parts Mall	10.73479825344728, 78.86383650381019
15	Trichy-Thanjavur Border check post	10.734414736299165, 78.8687554646539

SHARP TURN IMAGE

Total distance: 40 km; Start with: (10.7753, 78.8368), End with: (10.77455 , 79.12355)



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.74328897463726, 79.14225760188724



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.780404751602815, 79.16734250741605



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.954296172087506, 79.34774637212439



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.955808147992787, 79.36573625410698



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.960551970688885, 79.38611597224178



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.998322729754582, 79.53231697386092



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.97664252932043, 79.46227340774438



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.994194075371174, 79.56081163873246



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.98205716524272, 79.66772881733506



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI. 10.750307701965173, 78.82832678223028



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.730801241545027, 78.81876421912196



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.701959474295487, 78.7318164898981



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.697331232469807, 78.713823479486



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.73888374814383, 78.68225059068071



IMAGE: SHARP TURN RISK LEVEL: - MEDIUM, COORDI 10.75438694906606, 78.6662268755092