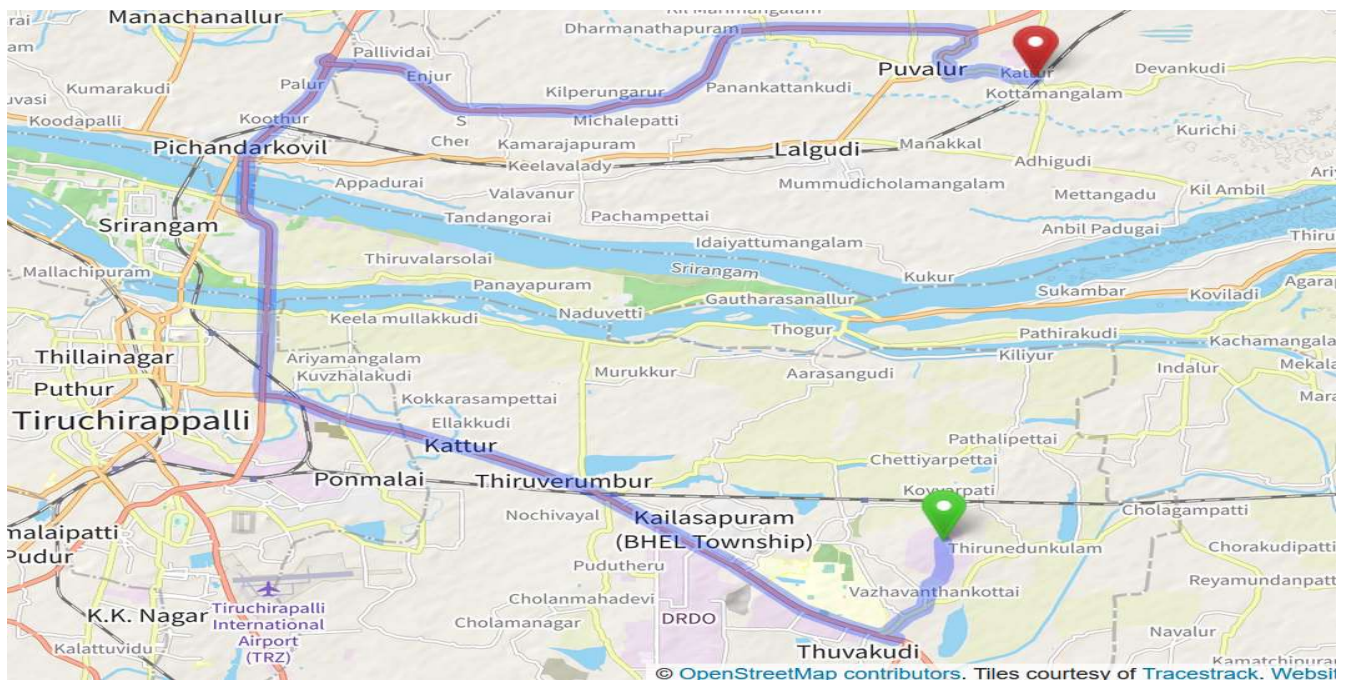
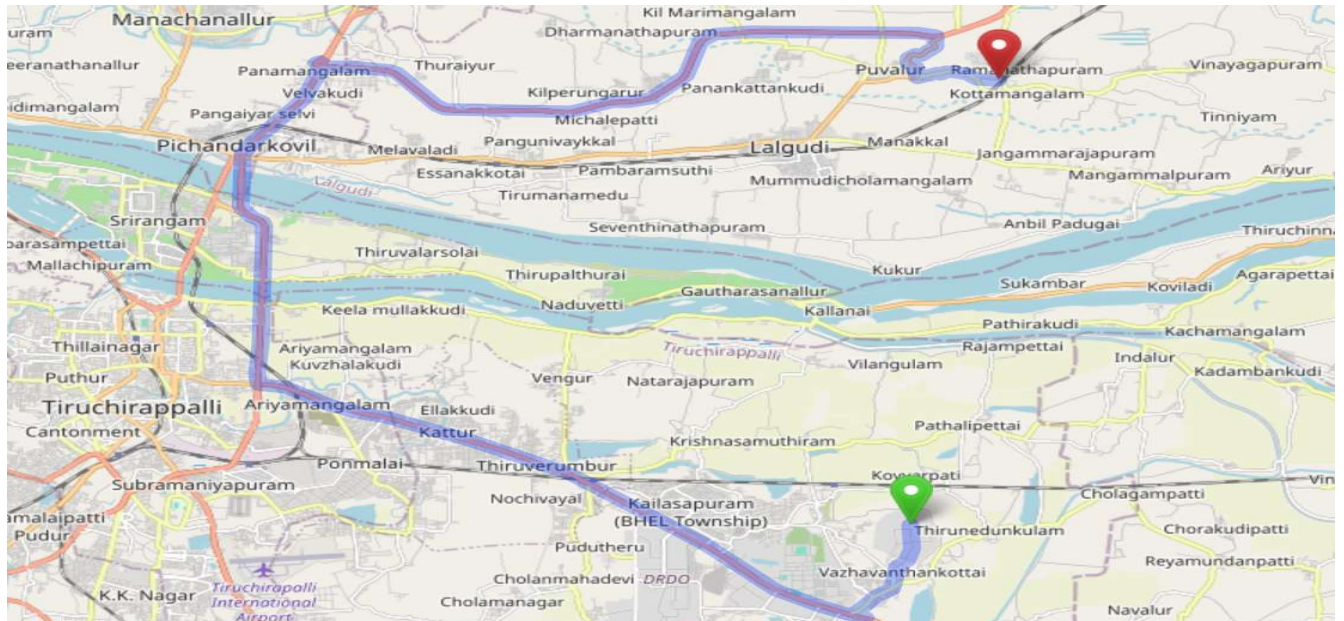




IndianOil

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

IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO KOTHARI SUGARS - CHEMICALS LTD,(10.895298 , 78.85379) TOTAL DISTANCE - 47KM



Objective of the JRM Report

This JRM report is designed to ensure compliance with the Central Motor Vehicle Rules, 1989 (CMVR), AIS140 standards, and the Road Transport Safety Policy (RTSP). It provides a comprehensive risk assessment for the transportation of hazardous materials along specified routes. By integrating these legal frameworks, the report offers a broad strategy for identifying and mitigating route-specific risks.

Regulatory Compliance

The report complies with the Central Motor Vehicles (Eleventh Amendment) Rules, 2022, mandating safe transportation practices for N2 and N3 category vehicles carrying hazardous materials. These rules require detailed route assessments, especially regarding road conditions, speed limits, and risk areas, to ensure safety compliance.

Risk Management Strategy

This report categorizes transportation routes into high-risk and medium-risk areas, with a focus on factors such as sharp turns, accident-prone regions, and elevation changes. The goal is to provide actionable recommendations to minimize these risks, including speed regulations, driver warnings for hazardous zones, and the option of alternate routes.

Compliance with the Road Transport Safety Policy (RTSP)

The report integrates RTSP provisions, including mandatory driving hours, rest periods, and nighttime driving restrictions. It ensures that drivers follow official guidelines, such as taking prescribed rest breaks and avoiding dangerous road conditions like poor visibility, heavy crowds, or high-traffic areas during peak hours.

Emergency Preparedness and Response

The report highlights the significance of predetermined emergency stops for refueling, rest, and over night stays. It includes protocols for safe responses to road hazards, alternative routes, and rerouting processes if roads are closed or severe weather arises. This aligns with the RTSP emphasis on driver safety and rapid emergency response.

Environmental Considerations

The JRM report addresses environmental risks along the route, ensuring compliance with environmental protection laws in ecologically sensitive zones. It suggests strategies such as identifying areas near waterbodies, forests, or populated regions and implementing safety measures to minimize environmental impacts during transport.

Journey Risk Mitigation

The report includes route-specific risk assessments, detailed journey charts, and defensive driving guidelines for each transport route. Integration with vehicle tracking systems guarantees real-time warnings on hazardous areas, speed limits, and

mandatory stops, consistent with RTSP and CMVR safety norms. Compliance with Government Directives

This report fully adheres to governmental directives regarding hazardous material transportation, implementing mandatory speed limits, nighttime driving restrictions, and comprehensive driver briefing and real-time alerts about route-related risks.

Welcome to the Journey Risk Management Study for KOTHARI SUGARS - CHEMICALS LTD,

Total distance: 47km; Start with: (10.7753, 78.8368), End with: (10.895298 , 78.85379)

❖ Route Safety Analysis Report

1. Overview of the Route Map

The route from Trichy Terminal (T.N) to KOTHARI SUGARS - CHEMICALS LTD. The route passes through several key points including Thuvakudi to SIDCO& Indian oil Storage Pass by Jude Digital Studios, NH 83, Service Rd.Pass by Sri Krishna Agencies , Keep right to continue on NH38/NH 83 Pass by Anandha Modern , Continue straight past Police out post to stay on NH38/NH 83Pass by Harihar residency, Continue straight onto NH38 Toll road and Total distance from Trichy Terminal To KOTHARI SUGARS - CHEMICALS LTD, is 47km for heavy vehicles carrying hazardous materials.

Typical Weather Conditions and Potential Weather-Related Hazards

Weather Conditions: Trichy Terminal (T.N) To KOTHARI SUGARS - CHEMICALS LTD,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 60.8°F to 110°F and is rarely below 60.8°F to 110°F.

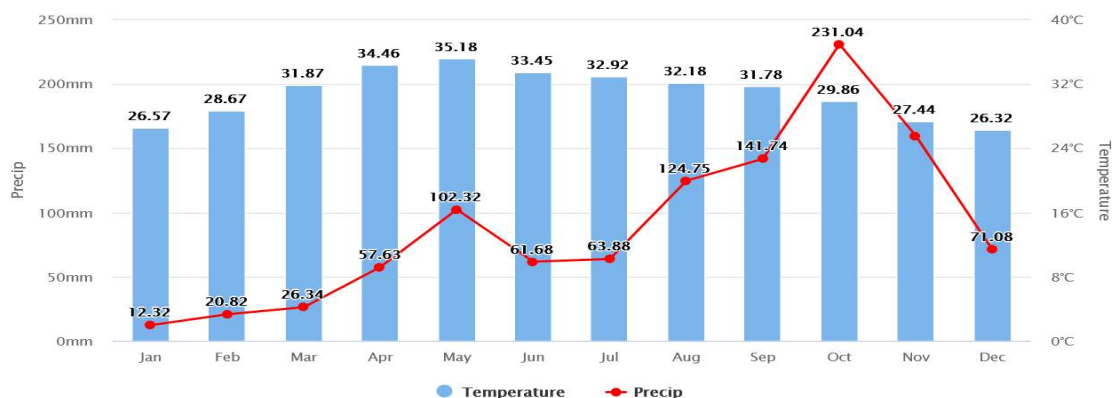
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	33.0 (91.4)	38.0 (100.4)	41.0 (105.8)	43.0 (109.4)	43.0 (109.4)	42.0 (107.6)	40.0 (104.0)	39.0 (102.2)	38.0 (100.4)	37.0 (98.6)	34.0 (93.2)	33.0 (91.4)	43.0 (109.4)
Average high °C (°F)	30.27 (86.49)	32.88 (91.18)	36.0 (96.8)	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 KOTHARI SUGARS - CHEMICALS LTD, 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 KOTHARI SUGARS - CHEMICALS LTD, 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 KOTHARI SUGARS - CHEMICALS LTD, peak traffic hours are from 7:00 AM to 11:00 AM and 4:00 PM to 8:00 PM on weekdays.

Congestion-Prone Areas:

- Thuvakudi Ring road junction
- Subash Nagar
 - Sai Restaurant Mahalshmi Iyengar Bakery
- Boothakudi Toll Plaza

❖ 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, Follow Outer Ring Rd/Trichy Bypass to Kanthalur Rd in Sooriyur

Alternative Route 2-via Thuvakudi to Palanganamgudi Road, Trichy Bypass and NH 38.

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:** P.selvamani Madhu's Mahal ValaVanthankottai Mr, P.selvamani Madhu's Mahal Vala Vanthankottai Mr, Thuvakudi Ring road junction, Bharani Bhavan Veg Restaurant, mother India property, Ring road korai bridge Trichy Panchapur Bus Terminal.
- **Educational institutions:** Trichy Hindi Tuition and Coaching Centre, National Institute of Technology Tiruchirappalli,
- **Hospital:** - Dr Kamali's Home Clinic, Dr. Miller Hospital, VK hospital, Child Jesus Health Center, Muthammal Medical Foundation Hospital.
- **Gas Station:** Indian Oil, Bharat Petroleum, Petrol Pump -R.G.R Enterprises, Reliance Petrol Bunk, SREE KRISHNA AGENICES, HP Petrol pump + CNG Bunk, M V AGENCY,
- **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**














Green and Clean Technology solution, Bismi Briyani, Sri Muthumari Amman Thirukovil, Ajs Maligai, Sengipatti ,Aishwarya Medical Centre,Taj Auto Diesel Works, Sengipatti Bus Stop, 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

			
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 KOTHARI SUGARS - CHEMICALS LTD, 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	10.764002894225586, 78.83372340784275	1.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.758294726273947, 78.83299437439508	2 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.757037897216662, 78.83178868967495	2.2 KM	10km/hr TO 15 Km/Hr
Sharp turn	High	10.758197385262152, 78.83078017257283	2.4 km	10km/hr TO 15 Km/Hr
Sharp turn	Medium	10.756828584214515, 78.83121999053446	2.6 km	20km/hr TO 30 Km/Hr
Sharp turn	High	10.751232718753535, 78.8251530493418	3.5 km	10km/hr TO 15 Km/Hr
Sharp turn	High	10.750241408277951, 78.82805866023332	3.9 km	10km/hr TO 15 Km/Hr
Sharp turn	Medium	10.749034805784385, 78.83063037838396	4.2 km	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.73982694249115, 78.82558532878997	5.4 km	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.707702495814758, 78.80839854442726	9.5 km	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.691323058587177, 78.79168361572819	12 km	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.69086206410584, 78.77809672399388	13.6 km	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.701650391815441, 78.7321432503498	18.8 km	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.697161249342605, 78.71517568446149	20.7 km	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.74245706262852, 78.68036269255809	27.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.75550753443587, 78.66222471721194	29.8 KM	20km/hr TO 30 Km/Hr

Sharp turn	High	10.759407471467847, 78.65948209120083	30.4 KM	10km/hr TO 15 Km/Hr
Sharp turn	Medium	10.759318839307491, 78.65879641567828	30.5 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.735626027344347, 78.6337565461009	34.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.906930800834374, 78.84196982877685	43.2 KM	10km/hr TO 15 Km/Hr
Sharp turn	Medium	10.914920757041136, 78.85537931064194	45.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.914785356637012, 78.85575359358322	45.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.913225045454015, 78.85492622643805	45.5 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.895634763596412, 78.85448146570937	46.9 KM	20km/hr TO 30 Km/Hr

IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO KOTHARI SUGARS
- CHEMICALS LTD,

(10.623201, 78.562349) TOTAL DISTANCE - 47KM



10.758153155040972, 78.83331769359472



10.765641530652818, 78.83579356865998



10.764170874436603, 78.83427988660449



10.757177502396965, 78.83185382895383



10.758133696104316, 78.83095921986101



10.751115767787965, 78.82537859843715



10.750304126125497, 78.8278730427343



10.749201643134423, 78.83053412397238



10.748945483699988, 78.83034380889936



10.739840041530618, 78.82553868035929



10.691598020312208, 78.79259017721844



10.701625818527672, 78.7316669354289



10.741537082904177, 78.68138708591911



10.7548199326953, 78.66585721414535



10.759076715598898, 78.65946371533151



10.735671794914094, 78.6336319317504



10.627339886024359, 78.56743931100029