

The impacts of Thailand's prospective Kra Canal



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This paper analyses the proposed Kra Canal that could shortly drive through Thailand, thereby providing a crucial new route for cargo ships traversing the Asian region. The key areas this paper addresses are the overall impact the Kra Canal would have on the supply chain, as well as the economic viability of the project as a whole.

Talk of a Kra Canal is not new; this subject has been considered many times over the past few hundred years and there have been many suggestions as to the route it should take. Decisions such as this will always be determined by factors of length and terrain. The commonly suggested preferred route is from the Andaman Sea coast in Southern Satun (adjacent to Ko Tarutao) towards Songkhla Lake in the Gulf of Thailand (as shown in Figure 1). This route would be approximately 100 kilometres, or 54 nautical miles.

Malacca traffic

The Strait of Malacca is the shortest sea route between the Indian Ocean and the South China Sea, as well as being the busiest shipping channel in the world. It is just over 430 nautical miles in length (796 kilometres), one kilometre wide at its narrowest point, and 25 metres deep at it shallowest. It is classified as an International Waterway, being administered jointly by Malaysia, Indonesia and Singapore; therefore it is toll-free. As it is toll-free and has no specific (commercial) owner, apart from vessel traffic safety and control, it is not maintained.

In recent years, there has been a spike in the incidences of piracy, and at certain times of year the Strait suffers poor visibility due to a regional smoke haze. There have been a few accidents, sometimes resulting in sea pollution, but so far nothing has been severe enough to disrupt traffic flows.

It has been suggested that any major incident in the Strait would be catastrophic to world trade. However, alternatives do exist. Mid-large sized vessels have the Sunda Strait (depth 20 metres), and mega-ships have the Lombok Strait. However, transiting via Lombok does add around 1,000 nautical miles of extra distance compared to Malacca – the equivalent of approximately 3 days in time. The Strait has a maximum annual capacity of 122,000 transits, and in 2013 nearly 78,000 transits were made. Figure 2 breaks down the vessel types in transit. Of these transits, roughly 60,000 could potentially be suited to the Kra Canal.

Competitive advantage of Kra

As shown in Figure 3, the distance between the Indian Ocean and the South China Sea is significantly less via a Kra Canal than via the existing Strait of Malacca preferred route. In terms of total

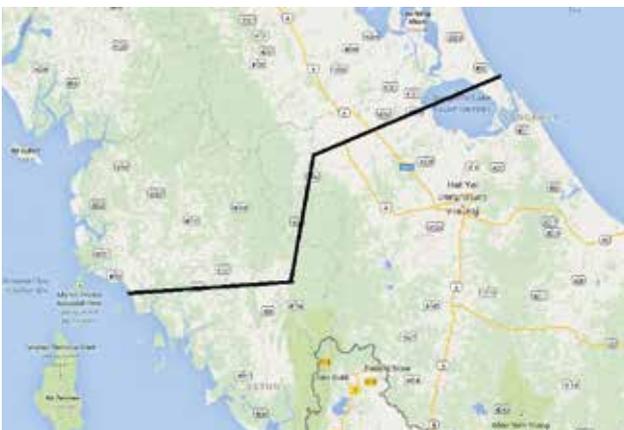


Figure 1: This route would be approximately 100 kilometres, 54 nautical miles

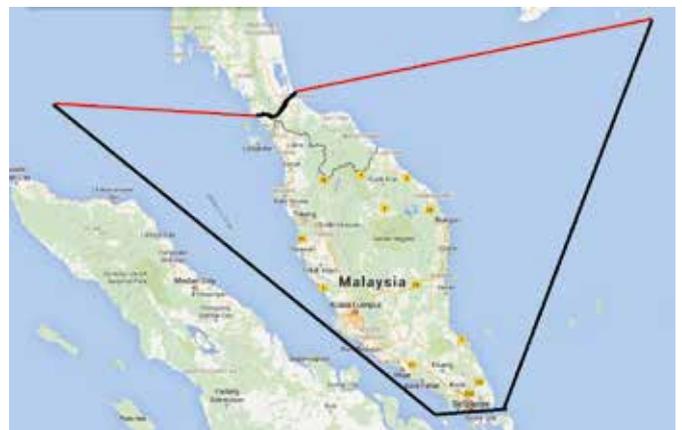


Figure 3: Distance comparison

distance, based upon a service from Suez to Hong Kong, the varying travelling distances are as follows:

- Via Malacca Strait: 6,751 nautical (N/) miles
- Via Kra Canal: 6,394 N/miles
- Distance saved: 357 N/miles

Or in terms of total time, considering slower speeds in the Kra Canal compared to the Strait, and assuming no waiting time or locks:

- Via Malacca Strait: 17.6 days
- Via Kra Canal: 16.9 days
- Time saved: 0.7 days

The combination of time and distance influences vessel fuel consumption, and by using an example of a contemporary large container vessel deployed on the Asia-North Europe route and a fuel cost of US\$500 per metric tonne, the total saving for a vessel going through a Kra Canal (instead of Malacca) would be approximately \$110,000 per transit. A similar cost picture would also prevail for large crude or bulk vessels on long-haul routes.

So, as long as the Kra Canal toll did not exceed the savings achieved by the vessel, it would be economical to transit it. By comparison, for a vessel of this size transiting the Suez or Panama Canals, the toll would be in excess of \$700,000 per transit. So the ceiling for Kra Canal toll is far lower.

Transshipment considerations

This is only applicable to long-haul container vessels and not to tankers, bulkers or RoRo's. Referring back to Figure 2, container vessels would represent around 17% of the total market. South East Asia's container hubs presently handle in excess of 13 million transshipment containers per year (41 million TEU lifts) – predominantly to/from other South East Asian/South Asian ports. Figure 4 shows an approximate geographical split.

Smooth transshipment connectivity is crucial for a container line operator's overall network efficiency and utilisation. So, in order to attract container vessels

to the Kra Canal, there would need to be two large and efficient hubs, one on each coast.

The largest market for these transshipment volumes is Indonesia, so the feeder distance to Kra compared to Singapore/Tanjung Pelepas would be significantly longer, and therefore more expensive. However, this is off-set by the closer proximity of Kra to other markets such as Thailand, Vietnam and India. Overall, Kra does actually offer a slight advantage in terms of transshipment.

Supporting infrastructure

In addition to the transshipment facilities required to attract container vessels, these might also be complimented by logistics distribution centres, manufacturing plants, an airport and rail connectivity with hinterlands. Furthermore, refineries and oil and gas storage, as well as provision of ship fuel, could become additional sources of revenue, and some might be mandatory to support the overall traffic through the canal.

Kra Canal design

Ideally, Kra would not have locks as they are highly expensive to build and operate and add time to transits, as well as limiting overall capacity. It would ordinarily take 30-45 minutes to navigate a lock, leading to a 60-minute spacing between vessels, and limiting the quantity of transits possible in one direction to just 24 per day.

By contrast, a lock-free canal (such as Suez) requires only a 15-minute spacing between vessels, and therefore can offer a maximum capacity of 96 one-way transits per day.

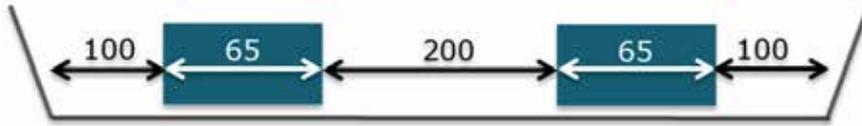
On an annualised basis, with 24/7 two-way channels, the capacity would be:

Vessel Class	2013 Transits	Share
Container (Inter)	10,200	16.9%
VLCC	4,825	8.0%
Tankers	17,745	29.4%
LNG/LPG	3,600	6.0%
Bulk	21,365	35.4%
RORO	2,590	4.3%
Sub Total	60,325	
Container (Intra)	14,450	
Other	3,200	
TOTAL	77,975	

Figure 2: 2013 Malacca Strait transits

NM's	Weight (%)	Singapore	Kra Terminals	Difference	Weighted
Jakarta	20%	493	934	441	88
Surabaya	10%	743	1,147	404	40
Semarang	8%	640	1,056	416	33
Laem Chabang	12%	768	353	(415)	(50)
HCMC	12%	602	447	(155)	(19)
Haiphong	8%	1,304	1,179	(125)	(10)
Manila	4%	1,305	1,285	(20)	(1)
Rangoon	4%	1,089	664	(425)	(17)
Chittagong	8%	1,485	1,058	(427)	(34)
Haldia	5%	1,575	1,125	(450)	(23)
Chennai	5%	1,575	1,175	(400)	(20)
Medan	4%	344	172	(172)	(7)
TOTAL	100%			(1,328)	(18)

Figure 4: Primary origins/destinations of transshipment containers in SE Asia



Segment	Mkt. Share	Transits	Ave. Toll	Toll (USD)
Container (Inter)	40%	4,080	75,000	306,000,000
VLCC	75%	3,619	100,000	361,875,000
Tankers	75%	13,309	60,000	798,525,000
LNG/LPG	75%	2,700	40,000	108,000,000
Bulk	60%	12,819	60,000	769,140,000
RORO	60%	1,554	40,000	62,160,000
TOTAL		38,081		2,405,700,000

	USD 'Million
Income	2,406
Operating Costs	476
EBITDA	1,929
Depreciation	400
EBIT	1,529
Interest	500
Net Profit	1,029
ROIC	5.15%

- With locks: 17,500 transits
- Without locks: 70,000 transits

To avoid further capacity limitations, similar to those of Panama and Suez (and potentially Nicaragua), and the associated vessel waiting times, the Kra Canal should facilitate 24/7 dual-direction vessel flows. In order to achieve this, the width of the canal would need to be at least 530 metres.

The very large crude carriers (VLCCs) and future mega container vessels have beams of 65 metres. There must be at least 200 metres between the vessels to avoid the suction effect as they pass each other, and a further 100 metres distance to the position of the canal's bank.

A full laden VLCC (with 2 million barrels of oil) has a draught of 24 metres, therefore the canal would need to be at least 26 metres at mean low water. Assuming that the average height of the terrain (above sea level) is 10 metres, the quantity of spoil to be dug (and relocated elsewhere) would be:

- $102,000 \times 530 \times 36 \text{ metres} = 1.946 \text{ billion cubic metres}$

Canal financials

Estimates of the cost to construct the Kra Canal generally hover around \$20 billion, although that is a very rough

estimate. If the canal was able to attract 50% of the present Strait of Malacca transits, it would be more than 50% utilised and capable of generating high revenues. There would be, in addition to the depreciation of capital (based upon 50 years) and interest (at 2.5%), the operating (and maintenance) costs.

Other key considerations

Predicting the long-term future is never easy, nor is it often precise. Technological disruptions can severely impact the demand for the transportation of finished goods, as can major shifts in manufacturing centres.

The world's appetite for energy is forever increasing, but the focus will continue to be towards cleaner and more sustainable forms, and that can (and will) dramatically influence the quantity of energy transported. There will be many environmental drivers to take into fuller consideration: landscape impact, tides and currents creating new alien species in existing eco-systems, and the displacement of communities. The overall list will contain many more areas which need to have a full and thorough environmental impact analysis conducted.

Mega infrastructure projects such as these will create vast quantities of work, both during construction and also afterwards in the daily running. This is often considered to be a huge upside of such projects. However, the benefits are more limited in Thailand which has a very low rate of unemployment. There might be further challenges with filling the many new jobs which would be created in a very sparsely populated area.

A final fundamental consideration revolves around who would fund such a project, and if those funds were not available nationally, whether Thailand

would be prepared to permit foreign entities access to its sovereignty.

Conclusion

There have been, are, and will be many different opinions on the viability of a Kra Canal; it is an extremely complex subject. From a physical and financial perspective, it would appear feasible, at least based upon what we know today. It would, however, also be of high risk, as there are many future variables that are difficult to predict or even envisage.

A deep and thorough further study should be conducted to reach a definitive conclusion, and thereafter it is vital to seek potential investors. If the Kra Canal is to be built, it will have a very disruptive impact on the logistics chain in South East Asia, and especially on the business models of the mega-hubs in Singapore and Malaysia. Whether this would also unsettle the process to form an ASEAN (Association of Southeast Asian Nations) economic community is a further unknown.

About the author

Andy Lane has 30 years of experience working for industry leaders in the transportation industry. He is now a partner at CTI Consultancy.

About the organisation



CTI is a business advisory and management-for-hire company specialising in creating innovative and sustainable solutions to the complex problems faced by the transportation industry. CTI's partners and associate advisors have all held senior positions with transport industry leaders. Each are experienced project leaders, creative thinkers and transformation practitioners. With a focus on 'people and process', CTI is able to guide companies in being more competitive and profitable. No project is complete before implementation, with CTI you will have a business resource and partner who you can rely on for the full journey.

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