CMS RESEARCH UPDATES

JULY 2012

RESEARCH HIGHLIGHT 1: SINGAPORE SHIP SALE FORM (TRACK LEADER: PROF BERNARD TAN, RESEARCHER TICY VELUVELLEL THOMAS)

CHALLENGES

- Today, Asia is a dominant player in world shipping, with Asian ship owners controlling about 50 percent of the world's fleet. Coupled with the rapid growth of the Chinese and Indian economies, and with the centre of gravity of global shipping fast gravitating to Asia, ship sales and purchases will increase exponentially. The number of maritime arbitration and disputes cases in the region is expected to increase, thus giving rise to the need to have these disputes arbitrated in Asia itself.
- The challenge is to develop a new form for vessel sale and purchase in Asia, as a viable alternative option to other widely used forms in the industry.

SINGAPORE SHIP SALE FORM

- The Singapore Ship Sale Form ("the SSF") answers the challenge.
- Launched by the Singapore Maritime Foundation in January 2011, the SSF is a response to the Singapore and Asian maritime community's call for an alternative form that would cater to their needs.
- The SSF is a standard form contract drafted for use in the international sale & purchase of second-hand ships. SSF is a simple, relevant, up-to-date and comprehensive standardized contract made available to the shipping community of the world by Singapore.

MERITS OF THE SSF

- The SSF is discernibly simple
- Unambiguous and easy to use standard sale form
- Balanced, alternative sale form drafted in line with the latest sale & purchase practice, up to date with changes in banking regulations
- Reflects latest developments in the maritime law
- Caters to the needs of the Asian shipping community by providing an Asian venue for arbitration

TransportHUB

THE BUSINESS TIMES Wednesday, June 13, 2012 19

Singapore ship sale form usage hits century mark

The SSF reaches important milestone with more than 100 transactions

By LYNN KAN

THE Singapore Ship Sale Form (SSF) has sailed past the 100 transactions mark since its launch in January 2011, an "important milestone" for the form.

High-profile shipping companies from the likes of container line Neptune Orient Lines, industrial shipping company IMC Industrial Group and and Kuok Group subsidiary Pacific Carriers Ltd have used the SSF in sale and purchase deals.

"Crossing the 100-transactions mark is an important milestone for the SSF," said Michael Chia, chairman of Singapore Maritime Foundation, which launched the form.

"The very basis of the SSF was to serve the maritime community, in particular, to respond to the appeal of the Singapore and Asian maritime communities for an alternative form that could better serve their business needs for the S&P of second-hand vessels."

Singapore-listed NOL has increasingly relied on the SSF document for their vessel sales.

It first adopted the SSF in March 2011 for the sale of a 300 twenty-foot equivalent unit feeder ship *Tiger River*. This year, it used the form during the sale of three second-hand vessels, two of which were sold to companies owned by Diana Containerships.

"Ship sale and purchase transactions are complex and the SSF has proven to be a viable and effective form which meets the needs of the shipping industry today," said Cedric Foo, group deputy president and chief financial officer of NOL.

"We will continue to support and use the SSF as our preferred form."

Dry bulk operator Pacific Carriers Ltd has used the SSF while selling five ships to owners of various nationalities including Russians and Chinese.

"Its ready acceptance by others only points to the SSF's obvious usefulness and superiority for which we are extremely proud to be associated with," said KK Kuok, managing director of PCL.

Senior chairman of IMC Group Frank Tsao found the SSF's strength to be its user-friendliness, partly because it was designed in close consultation with shipping associations and maritime companies that specialise in sale and purchase transactions.

The SSF has increasingly gained traction among the global maritime community. The Federation of Asian Shipowners' Associations (Faas) and the Asian Shipowners' Forum (ASF) have backed the SSF and have encouraged their members to use it in their deals.

The SSF has been intensely published. It has an accompanying guide, *A guide to the Singapore ship sale form*, which was distributed during Singapore Maritime Week 2012.

Moreover, during Q4 2012, a new practitioner's guide authored by shipping academics Filippo Lorenzon and Charles Debattista+ to will be published.

"Sale of ships under the Singapore form" will be a detailed clause-by-clause commentary of the SSF and the key differences between the SSF and the widely used Norwegian Sales Form, both its 1993 and 2012 editions.

"With the shipping sphere of influence gravitating to the east and Asia being projected as one of the key centres of growth for maritime activities, we are confident that the number of SSF users will escalate in time to come," said Mr Chia.

Mr Chia: *Confident that the number of Singapore Ship Sale Form users will escalate in time to come*

STRAIT TALK

A dispute that is all froth

By DAVID HUGHES

A FEW weeks ago, the big marine mutual liability insurer, the UK P&I Club, issued a bulletin to its members with the heading: "Bulletin 826 – 05/12 – Cappuccino Bunkers – Singapore".

Not surprisingly, this was quickly picked up by the press and the subsequent reports were widely read throughout the industry, not least in Singapore.

The bulletin said, "It has come to the Club's attention that some bunker deliveries at Singapore have contained excessive amounts of air. As a result, the quantity of fuel delivered and received was significantly overstated. This effect is termed 'cappuccino' as the entrained air causes the fuel to 'foam', which makes traditional manual measurement at the time of delivery unreliable. After a few days, the foam tends to collapse and tank measurements then show a significant 'loss' of fuel."

The bulletin then gave guidelines, written by Chris Fisher, of Bunker Claims International, and intended to "assist ship's crew with identification of this potential problem and hopefully help with dispute resolution".

The Singapore Shipping Association (SSA) was quick to spot the reports and respond, issuing a press release saying that it took a very serious view of the "al-

by MPA. Therefore, any claim of 'cappuccino' bunkers received in Singapore is unlikely to be upheld."

Alain Khershed, VP of Germanischer Lloyd here and chairman of SSA's Bunkering Sub-Committee, commented: "The myth of cappuccino in bunkers arises as a result of the physical change of the volume owing to the entrained air bubbles. Unlike cappuccino bubbles in a cup of coffee, where air is breathed in and a couple of proteins are denatured, cappuccino in bunkers does not have a similar effect. Hence, the entrained micro-bubbles of air disappear after some time. The question that one should be concerned with is where and how and when these micro-bubbles of air enter the bunker parcel."

More study needed

One of the problems in addressing complaints of cappuccino bunkers is that very little is really known about this phenomenon. As Mr Khershed noted, "no study is available of the effect of the temperature of pumped fuel and the temperature of the receiving tanks on the cappuccino effect. Similarly, no study is available in relation to the rate of cappuccino against the rate of air injection to the bunker parcel, be it inadvertently or fraudulently. The effect of injecting air during bunkering or post-bunkering

Source: Lynn Kan, "Singapore Ship sale form usage hits century mark, The Business Times, 13 June 2012

DISTINCTIVE FEATURES

- Introduction of new and practically relevant Notice of Actual Readiness concept
- Detailed & effective documentation clause
- Distinctive pro-Asian arbitration clause
- Inclusion of new clauses on confidentiality & implied terms
- Structurally different with Boxes in the front page followed by elaborate clauses
- Improved Deposit & Payment Clauses
- Updated and improved physical inspection, encumbrances clauses

RESEARCH HIGHLIGHT 1: SINGAPORE SHIP SALE FORM (TRACK LEADER: PROF BERNARD TAN, RESEARCHER TICY VELUVELLEL THOMAS)

ACHIEVEMENTS

- Presented in 7 Asian Cities— Tokyo, Hong Kong, Shanghai, Jakarta, Mumbai, Seoul and Singapore
- Presented in national conferences and international conferences
- Number of transactions completed using SSF, have passed the 100th mark by June 2012
- SSF is translated into Japanese & Chinese guidance versions
- Endorsed by Asian Ship Forum & Federation of ASEAN ship-owners Association

ACCOLADES

- " Industry-led initiatives like the Singapore Ship Sale Form have placed Singapore firmly on the international maritime law map" - Mrs. Lim Hwee Hua (Former Minister, Prime Minister's Office, Second Minister for Finance and Second Minister for Transport)
- The SSF "removed a lot of ambiguity in the contract and would help save time and costs by arbitrating in Singapore" - Capt. Chua Eng Boon, Director of Marco Polo Shipping, first SSF user party.
- SSF is a "commercially tenable instrument of law that everyone can on, no matter where they are doing ship-ping transactions in the world" - Mr. Henry Mytton Mills, Managing Director, Aires Ship-broking Ltd
- "The Singapore Maritime Foundation is to be commended for providing an alternative to NSF93 which is tailored towards Asian owners, and incorpo-rates sensible practice and procedure" - Tricia Tong, Senior Associate, Ince & Co, Singapore

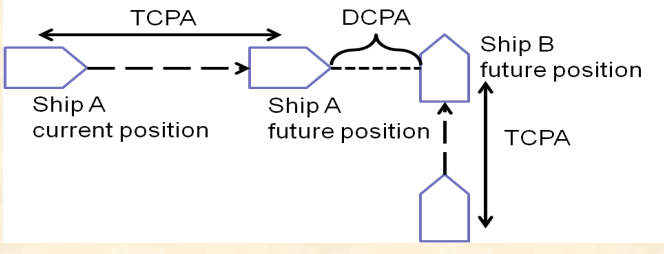
RESEARCH HIGHLIGHT 2: AUTONOMOUS VESSEL-COLLISION AVOIDANCE SYSTEM (TRACK LEADER: A/PROF TAN WOEI WAN, RESEARCHER MR CHEN XUETAO)

CHALLENGES

- According to the Review of Maritime Transport in 2008, global seaborne trade will increase by 44 percent in 2020 and double by 2031
- Increase in tonnage of maritime traffic
- Collision Risks will increase as a result of higher volume of maritime traffic
- Increased need to understand ship behavior more thoroughly
- Enhancement in efficiency, safety and capacity of marine traffic is necessary

MAIN CONCEPTS

- **Time to Closest Point of Approach (TCPA)**
- **Distance to Closest Point of Approach (DCPA)**
- **Ship Safety Domain**



RESEARCH HIGHLIGHT 2: AUTONOMOUS VESSEL-COLLISION AVOIDANCE SYSTEM (TRACK LEADER: A/PROF TAN WOEI WAN, RESEARCHER MR CHEN XUETAO)

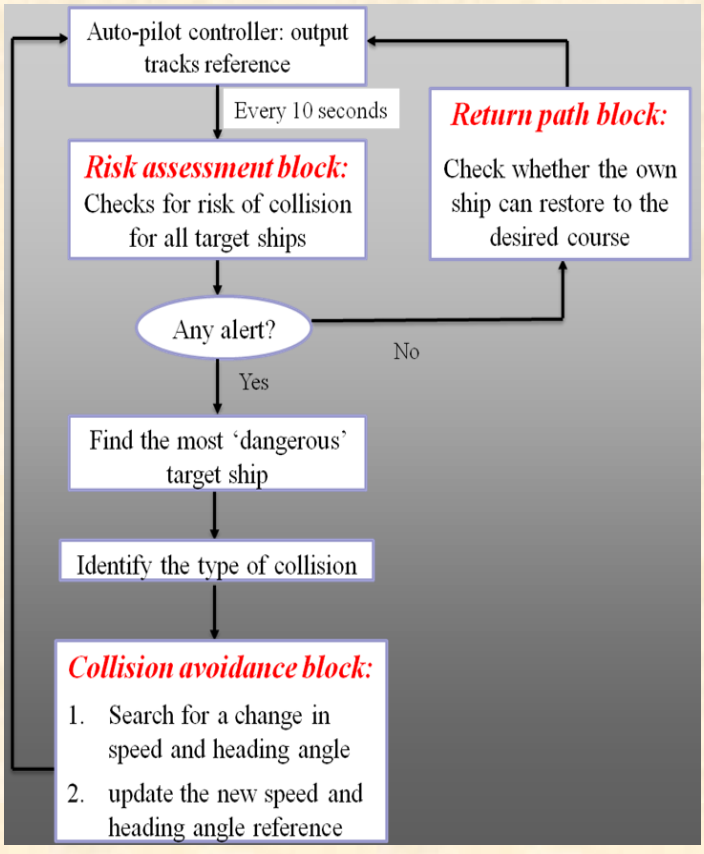
OBJECTIVES

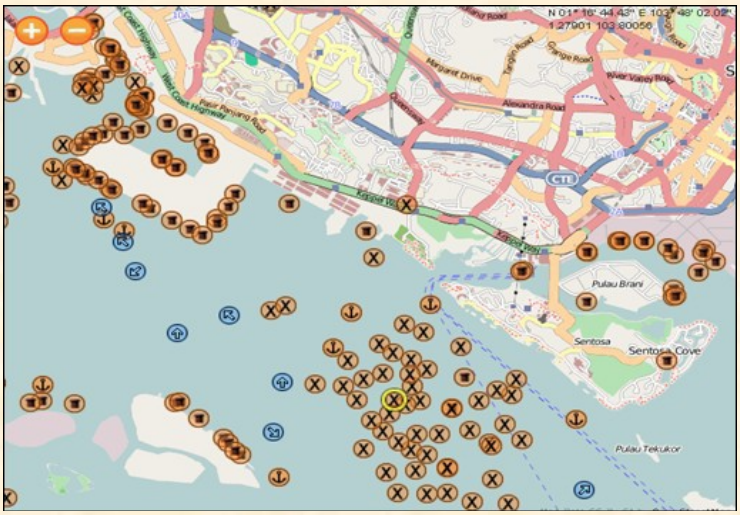
- Establish vessel safety domain
- Model vessel Interaction
- Plan collision avoidance path
- Support decision making in navigation

METHODOLOGY & MODELLING

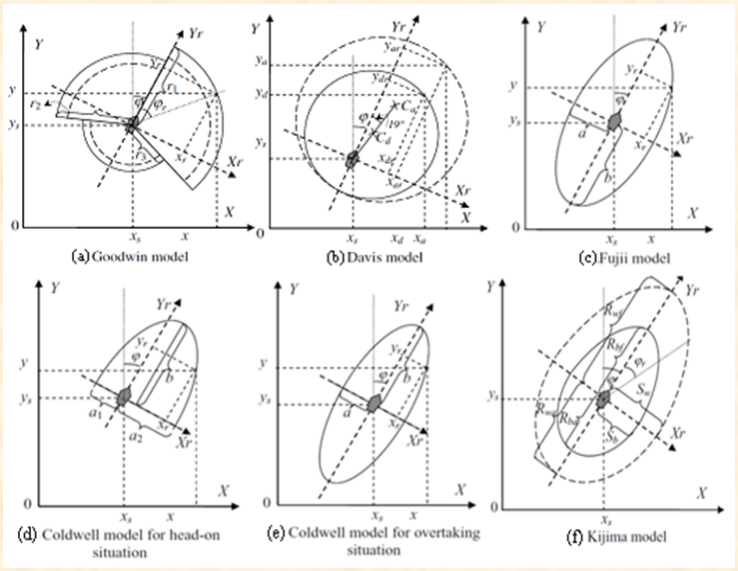
- Analytical modeling of vessel interaction with consideration of vessel dynamics and various encounter situations
- Statistical validation and verification of models
- Efficient collision-avoidance path planning through Computation Intelligence
- Single-Vessel Simulation
- Multi-Vessel Simulation
- Data sources: APRS & AIS data

PRELIMINARY RESULTS



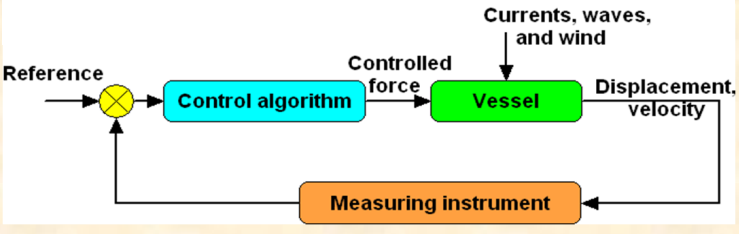


RISK ASSESSMENT SYSTEM



POTENTIAL INDUSTRY APPLICATIONS

- Onboard navigation system for collision avoidance
- Traffic lane planning and design criteria
- Adding safety monitor and alarm function to shore -based Vessel Traffic Information System
- Traffic simulation model



PUBLISHED TECHNICAL PAPERS (WITH ABSTRACTS ATTACHED)

1. Yin Long, Loo Hay Lee , Ek Peng Chew , (2012), The sample average approximation method for empty container repositioning with uncertainties, European Journal of Operational Research, 222:1, 65-75

Abstract

One of the challenges faced by liner operators today is to effectively operate empty containers in order to meet demand and to reduce inefficiency in an uncertain environment. To incorporate uncertainties in the operations model, we formulate a two-stage stochastic programming model with random demand, supply, ship weight capacity, and ship space capacity. The objective of this model is to minimize the expected operational cost for Empty Container Repositioning (ECR). To solve the stochastic programs with a prohibitively large number of scenarios, the Sample Average Approximation (SAA) method is applied to approximate the expected cost function. To solve the SAA problem, we consider applying the scenario aggregation by combining the approximate solution of the individual scenario problem. Two heuristic algorithms based on the progressive hedging strategy are applied to solve the SAA problem. Numerical experiments are provided to show the good performance of the scenario-based method for the ECR problem with uncertainties.

2. Suyi Li, Qiang Meng, and Xiaobo Qu, (2012), An Overview of Maritime Waterway Quantitative Risk Assessment Models, Risk Analysis, 32:3, 496-512.

Abstract

The safe navigation of ships, especially in narrow shipping waterways, is of the utmost concern to researchers as well as maritime authorities. Many researchers and practitioners have conducted studies on risk assessment for maritime transportation and have proposed risk reduction/control measures accordingly. This article provides a detailed review and assessment of various quantitative risk assessment models for maritime waterways. Eighty-seven academic papers and/or project reports are summarized and discussed. The review then proceeds to analyze the frequency and consequence estimation models separately. It should be pointed out that we further summarize the advantages and disadvantages of frequency estimation models and provide recommendations for their application. From the overview, we find that the quantification of the impact of human error is of great importance and should be considered in future studies. Possible solutions are also proposed in the discussions.

3. Qiang Meng and Xiaobo Qu, (2012), The economic importance of the Straits of Malacca and Singapore: An extreme-scenario analysis, in Transportation Research Part C: Emerging Technologies, 48:1, 258-265.

Abstract:

This paper proposes a decision tree model to estimate the loss to global economy on the hypothesis of an extreme scenario of blockade of the Straits of Malacca and Singapore. The insurance surcharges, inventory costs and the time values of cargoes, and Time Charter Equivalent rate are used to estimate the psychological loss, the loss to industries, and the loss to carriers, respectively. Interestingly, there is a pseudo-paradoxical phenomenon with respect to the loss to carriers. An illustrative example is also provided to explain the "Malacca Paradox".

PUBLISHED TECHNICAL PAPERS (WITH ABSTRACTS ATTACHED)

4. Shuaian Wang, Qiang Meng (2012), Robust schedule design for liner shipping services, Transportation Research Part E: Logistics and Transportation Review, 48:6, 1093-1106

Abstract:

This paper examines the design of liner ship route schedules that can hedge against the uncertainties in port operations, which include the uncertain wait time due to port congestion and uncertain container handling time. The designed schedule is robust in that uncertainties in port operations and schedule recovery by fast steaming are captured endogenously. This problem is formulated as a mixed-integer nonlinear stochastic programming model. A solution algorithm which incorporates a sample average approximation method, linearization techniques, and a decomposition scheme, is proposed. Extensive numerical experiments demonstrate that the algorithm obtains near-optimal solutions with the stochastic optimality gap less 1.5% within reasonable time.

5. Qiang Meng, Shuaian Wang, (2012), Liner ship fleet deployment with week-dependent container shipment demand, European Journal of Operational Research, 222:2, 241-252

Abstract:

This paper addresses a practical liner ship fleet deployment problem with week-dependent container shipment demand and transit time constraint, namely, maximum allowable transit time in container routing between a pair of ports. It first uses the space–time network approach to generate practical container routes subject to the transit time constraints. This paper proceeds to formulate the fleet deployment problem based on the practical container routes generated. In view of the intractability of the formulation, two relaxation models providing lower bounds are built: one requires known container shipment demand at the fleet deployment stage, and the other assumes constant container shipment demand over the planning horizon. An efficient global optimization algorithm is subsequently proposed. Extensive numerical experiments on the shipping data of a global liner shipping company demonstrate the applicability of the proposed model and algorithm.

6. Shuaian Wang, Qiang Meng, (2012), Liner ship fleet deployment with container transshipment operations, in Transportation Research Part E: Logistics and Transportation Review. 48:2, 470-484.

Abstract:

This paper proposes a liner ship fleet deployment (LSFD) problem with container transshipment operations. The proposed problem is formulated as a mixed-integer linear programming model which allows container transshipment operations at any port, any number of times, without explicitly defining the container transshipment variables. Experiments on the Asia–Europe–Oceania shipping network of a global liner shipping company show that more than one third (17–22 ports) of the total of 46 ports have transshipment throughputs. Computational studies based on randomly generated large-scale shipping networks demonstrate that the proposed model can be solved efficiently by CPLEX.

CMS RESEARCH SEMINARS

1. Single Vessel Simulator and Its Potential Application in Maritime Studies, by Researcher Mr Chen Xuetao (Track Leader: A/Prof Tan Woei Wan)

Seminar Abstract:

Single-vessel simulator is the imitation of the operation of a single vessel over time. It is used in many contexts, such as simulation of technology for performance optimization, testing, training, education, and video games. In this presentation, one of the single vessel simulators is introduced. It is built upon Matlab/Simulink with a modular structure. Emphasis is put on the principles of the single vessel simulator. Additionally, potential applications of the single vessel simulator in maritime studies are discussed through several examples.

2. Charterer's Risk Management and Interest Protection under GENCON Forms – Case Study on Sino-Angola Shipping, by Visiting Assoc Prof. Feng Zhanqing

Seminar Abstract:

The most widely used proforma forms by charter-parties in voyage chartering, Gencon's wordings are frequently used to the advantage of ship owners, resulting in great risk and loss by charterers in instances of disputes. In order to gain the upper hand in contract negotiations, charterers not only need to know the literal meaning of each clause, but also understand the underlying risk of each clause and wording, combined with acute market insight. This seminar presents a case study on the potential risk faced by charterers in a niche market; the Sino-Angola shipping route, where Gencon forms are used to conclude voyage charters. The purpose of this seminar is to help the audience understand the unique aspects of this market and suggestions given to the charterers for their risk avoidance and interest protection.

3. Cartels in International Shipping, by Researcher Ms Remani Chinchu Balaji (Track Leader: Prof Bernard Tan)

Seminar Abstract:

The aim of this paper is to understand cartels and its effects on general trade. Further to understand if cartels have found a way into the International Shipping Industry if so what are its implications. Is there a need to have laws in place to correct any negative implications of cartels in the International Shipping Industry?

4. AIS and COLREG based on cases of ship collision , by Visiting Researcher Ms Li Yuan (Track Leader: A/Prof Bressan Stephane)

Seminar Abstract:

With the rapid advance of science and technology, the system navigation has become safer and more efficient. The AIS (automatic identification system) is a very important equipment for vessels nowadays and it help vessels avoid collisions. This seminar shall introduce the AIS and further explain the international regulation COLREG (Convention on the International Regulations for Preventing Collisions at Sea), but also the problems they bring shall be introduced.

CMS RESEARCH SEMINARS

5. Impact Analysis of Maritime Cabotage Legislations on Liner Hub-and-Spoke Shipping Network Design, by Researcher Dr Zheng Jianfeng (Track Leader: A/Prof Meng Qiang)

Seminar Abstract:

The maritime cabotage legislations are published by the coastal countries to exclusively conduct the domestic shipping operations. For a particular coastal country, its maritime cabotage legislation does not allow a ship built, owned and/or operated by citizens of any other country to transport cargoes between its two domestic ports. A two-phase mathematical programming model is proposed to formulate the liner hub-and-spoke shipping network design problem subject to the maritime cabotage legislations. And a Lagrangian relaxation based solution method is proposed to solve it.

6. Overview of the GTAP model and its application in global trade , by Researcher Ms Maggie Sou Weng Sut (Track Leader: Dr Raymond Ong)

Seminar Abstract:

The Global Trade Analysis Project (GTAP) was established with the objective of supporting the analysis of international trade, environment, and resource issues in an economy-wide framework. The GTAP model is a standard Computable General Equilibrium (CGE) model which can be used to analyze the impact of general macroeconomic issues, international trade policy, etc. on bilateral trade flow.

7. Study on the Performance of the Frame-bridge Based Automated Container Terminal, by Researcher Dr Hu Hongtao (Track Leader: A/Prof Chew Ek Peng)

Seminar Abstract:

In this study, we analyze the performance of a frame-bridge based automated container terminal which utilizes multi-storey frame bridges and rail-mounted trolleys to transport containers between the quay and the yard. At first, we use Markov chain model to study the performance of the transfer platform which serve one block area during a long time. We also consider different deployment strategies, such as the transfer platform can travel between two blocks. We also developed a decomposition method to consider the performance of the whole system with limited number of quay cranes and yard cranes. At last, a simulation model with detailed port operations at the berth and yard area is developed.

8. Islands and the Law, by Researcher Ms Ticy Veluvellel Thomas (Track Leader: Prof Bernard Tan)

Seminar Abstract:

Islands are vital features that are capable of generating significant maritime claims such as maritime sovereignty and maritime boundary delimitation claims for nations. As demonstrated through various maritime boundary disputes including the most recent one in South East Asia (Spratly Islands), islands are also the main source of maritime territorial conflict between two or more nations, posing a threat to the maintenance of international peace and security. The modest purpose of this seminar is to throw light upon the existing law on islands and the judicial approach that have developed from decisions of the International Court of Justice on the treatment of islands.

CMS RESEARCH SEMINARS

9. An Exploratory Study on the Effect of Trade Data Aggregation on International Freight Mode Choice, by Researcher Dr Yang Dong (Track Leader: A/Prof Anthony Chin)

Seminar Abstract:

Planners tend to use various rules of thumb to judge if a certain commodity is to be carried by a certain transportation mode. One such rule of thumb is the use of commodity value-weight ratio as a means to estimate the amount of commodities transported by a given mode. Alternatively, discrete choice model may be employed using available macroscopic commodity trade information. Using international commodity flows between continents, discrete choice models can be developed to compare the modal split between air and sea transport. However, given different aggregation level of data, the data collecting work can be remarkably huge and the analyses require considerable amount of resource, time and cost especially when multiple origin-destinations are taken into consideration over time. One issue that planners face is whether or not the estimated parameters are transferable spatially (among regions) or temporally (over time). This study therefore aims to explore the potential impact of trade data aggregation (international trade ODs, trade classification levels, periods and commodity types) on commodity mode choices derived from discrete choice models.

10. Finding Community Structure in Spatial Maritime Shipping Networks, by Researcher Dr Sun Zhuo (Track Leaders: A/Prof Chew Ek Peng, A/Prof Lee Loo Hay)

Seminar Abstract:

This study explores the community structure in spatial maritime shipping networks. As compared with air transportation networks and urban road networks, ports in spatial maritime shipping networks have smaller connections due to the physical confinement. A new divisive algorithm is proposed for detecting community structure in spatial maritime shipping networks. At each iteration for modularity optimization, the length of each edge is successively updated, instead of edge removal used in the conventional divisive method. Finally, numerical experiments based on the global maritime shipping network are carried out to account for the properties of community structure in spatial maritime shipping networks.

CONTACT DETAILS

Centre for Maritime Studies
National University of Singapore
12 Prince George's Park
Singapore 118411
Tel: + (65) 6516 8669
Fax: + (65) 6775 6762
Email: cmssec@nus.edu.sg