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# A Study to Analyse the Various Bunker Dispute Settlements in the Bunkering Industry

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**ABSTRACT:** This study explores the complex landscape of bunker dispute settlements in the maritime industry, examining methods such as negotiation, mediation, arbitration, and litigation. It reviews literature, case studies, and expert interviews to assess the effectiveness of these techniques and their implications for stakeholders. The research also looks at how changing market conditions, regulations, technology, and geopolitical issues affect dispute resolution and aims to enhance stability and cooperation in the global bunker supply chain.

**KEYWORDS:** Bunker dispute settlements, Geopolitical issues, Regulatory frameworks, Alternative dispute resolution

## I. INTRODUCTION

The aim of this project is to study the different types of bunker dispute settlements. For this purpose, one should understand what is bunkering and what is a dispute in bunkering.

In simple words, Bunkering is the supplying of fuel for use by ships (such fuel is referred to as bunker), including the logistics of loading and distributing the fuel among available shipboard tanks. A person dealing in trade of bunker (fuel) is called a bunker trader.

The term bunkering originated in the days of steamships, when coal was stored in bunkers. Nowadays, the term bunker is generally applied to the petroleum products stored in tanks and bunkering to the practice and business of refueling ships. Bunkering operations take place at seaports and include the storage and provision of the bunker (ship fuels) to vessels. Singapore is currently the largest bunkering port in the world.

In the process of bunkering mainly there are two parties, one is the bunker supplier i.e., one who gives the fuel, and the other is bunker receiver i.e., one who receives the fuel for the purpose of running the ship. Bunker dispute happens when both the parties are having a conflict with one another that happens during the process of bunkering. These disputes arise because of wrong measuring of quantity received/ supplied, change in position of ship, etc. Dispute needs to be settled or otherwise these may lead to legal claims which will cause huge loss to both the parties. Research on bunker dispute settlement is very limited and the available research only shows legal dispute settlement. Legal dispute settlement is a very lengthy, time consuming and a huge loss to both the parties. Therefore, disputes can be settled by other methods. This project studies the various dispute settlement mechanisms.

## II. RELATED WORK

Bunker disputes are a common issue in the shipping industry, often arising between shipowners and bunker suppliers over the quantity and quality of fuel supplied. Gao et al. (2019) found these disputes frequently lead to costly legal proceedings, and suggested that digital technologies, like blockchain, could enhance transparency and accountability in the bunker supply chain to prevent such conflicts. Additionally, Clarke et al. (2018) examined the allocation of liability between shipowners and charterers under English law, noting that liability apportionment depends heavily on the specific terms of the charter party agreement. Another dimension is the impact of international trade and sanctions, with Ruppel and Maier (2019) highlighting how US sanctions complicate the legal landscape, potentially leading to disputes due to the complexity and lack of clarity in regulations.

The practical implications of bunker disputes are significant for the shipping industry, affecting operations by causing vessel departure delays and increasing costs for both shipowners and bunker suppliers, as noted by Lee and Kim (2018). Resolving these disputes requires a blend of legal, commercial, and technical expertise, with various methods available, including litigation, arbitration, mediation, and negotiation. Litigation, as studied by Yang and

Chen (2019), is a common but costly and time-consuming method that provides a formal legal process for dispute resolution. On the other hand, arbitration offers a more flexible and efficient alternative, with Bao (2021) observing a growing trend towards arbitration in bunker disputes due to its customizable nature.

Mediation and negotiation are also viable methods for resolving bunker disputes. Adu-Ampong et al. (2019) found mediation to be cost-effective and time-efficient, facilitating mutually acceptable solutions without formal legal proceedings. Similarly, Li et al. (2020) noted that negotiation, especially when combined with mediation or arbitration, can be effective if parties communicate openly and are willing to compromise, helping to maintain relationships and avoid legal complexities. Overall, the literature suggests that the best approach to settling bunker disputes depends on the specific circumstances, and emphasizes the importance of communication, collaboration, and exploring alternative dispute resolution methods for timely and cost-effective outcomes.

### III. EXPERIMENTAL RESULTS

#### Research Design

Research design is the framework of methods and techniques chosen by a researcher. It involves deciding in advance the methods and techniques for data collection and analysis, considering the research objectives and available resources like staff, time, and money. This study uses a descriptive research design, a scientific method that involves observing and describing the behavior of a subject without influencing it. Descriptive research is used to obtain information about the current status of phenomena, answering questions like what, when, where, and how.

#### Population

The population for this study includes staff from the operations departments of the Bunker Industry.

- **Sampling Technique:** The study uses probability sampling, where samples are chosen based on probability theory, ensuring random selection.
- **Sampling Method:** Stratified random sampling is used, dividing the population into smaller subgroups (strata) for more accurate representation

#### Sample Size

The sample size for this study is 50 staff members from the operations department.

#### Method of Data Collection

- **Structured Questionnaire:** A set of 16 predetermined questions designed to gather relevant information from respondents.
- **Statistical Tools Used**
- **Tables:** Systematic arrangement of data in rows and columns.
- **Graphs:** Pictorial representation of data, including bar graphs and pie charts.
- **Percentage Analysis:** Calculation to determine the percentage of respondents for each question.
  - Formula: Percentage analysis = (number of respondents / total number of respondents) x 100
- **SPSS Tool for Analysis:** Statistical software used for data analysis.

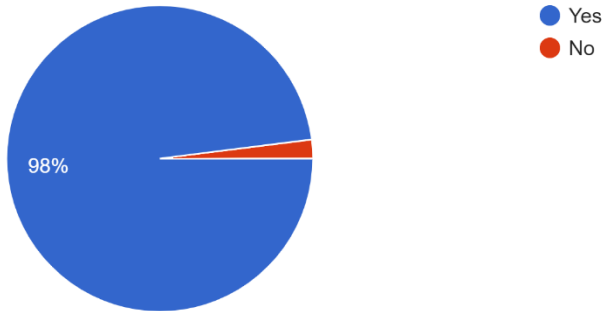
#### Data Analysis and Interpretation

Table showing if bunker dispute is frequent or not according to respondents.

SL. NO	DISPUTE FREQUENT OR NOT	NO. OF RESPONDENTS	PERCENTAGE
1	YES	98	98%
2	NO	2	2%
3	TOTAL	100	100%

Sources: Primary Data (Questionnaire)

Pie-chart showing weather the bunker dispute is frequent or not by the respondents.



**INTERPRETATION:**

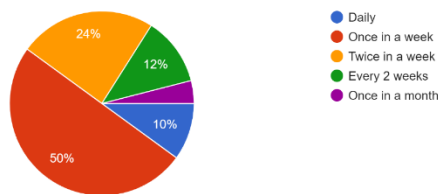
From the following data we can determine that 98% of the respondents agree that bunker disputes are frequent and only 2% does not agree that bunker dispute is frequent.

Table showing the frequency of bunker dispute by the respondents.

SL. NO	FREQUENCY	NO. OF RESPONDENTS	PERCENTAGE
1	DAILY	10	10%
2	ONCE IN A WEEK	50	50%
3	TWICE IN A WEEK	24	24%
4	EVERY 2 WEEKS	12	12%
5	ONCE IN A MONTH	4	4%
6	TOTAL	100	100%

Sources: Primary Data (Questionnaire)

Pie-chart showing the frequency of bunker disputes.



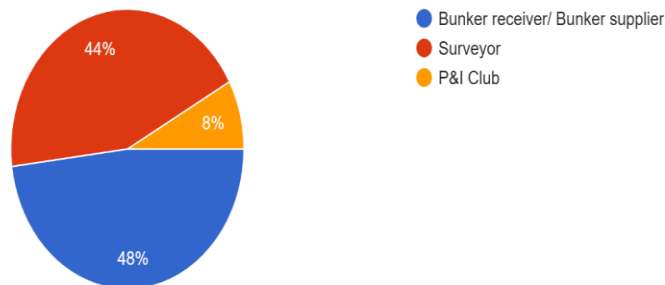
From the following data we can determine that 50% of the respondents say dispute happens once in a week, 24% say twice in a week, 12% say every two weeks, 10% say daily and 4% say once in a month.

Table showing the various parties involved in bunker dispute.

SL.NO	VARIOUS PARTIES	NO.OF RESPONDENTS	PERCENTAGE
1.	SURVEYOR	44	44%
2.	BUNKER SUPPLIER/RECEIVER	48	48%
3	P&I CLUB	8	8%
4.	TOTAL	100	100%

Sources: Primary Data (Questionnaire)

Graph showing the various parties in bunkering dispute.



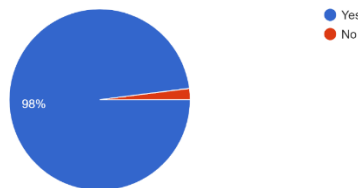
From the above data we can determine that the receiving vessel and bunker vessel is main party by 48%, followed by Surveyor 44%, and P&I Club 8%.

Table showing the no. of respondents aware of bunker dispute settlement.

SL. NO	AWARE OF BUNKER DISPUTE SETTLEMENT	NO. OF RESPONDENTS	PERCENTAGE
1	YES	98	98%
2	NO	2	2%
3	TOTAL	100	100%

Sources: Primary Data (Questionnaire)

Pie-chart showing the no. of respondents aware of bunker dispute settlement.



From the following data we can determine that 98% of the respondents are aware of bunker dispute settlements and only 2% is not aware of bunker dispute settlement.

**FACTOR ANALYSIS**

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.775
Bartlett's Test of Sphericity	Approx. Chi-Square	283.159
	df	10
	Sig.	.000

**Interpretation**

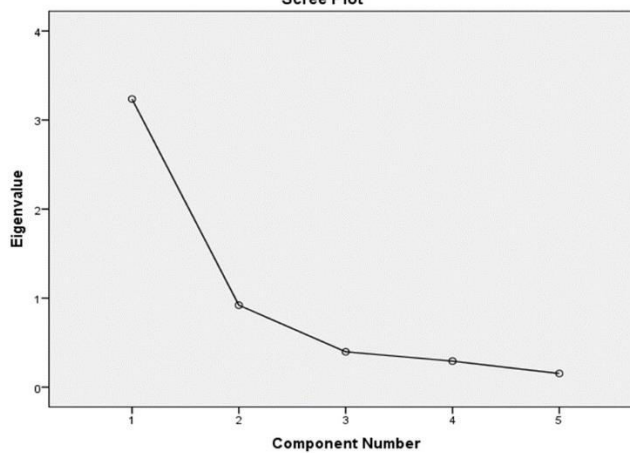
- Bartlett's test is noteworthy since the KMO value is .916 (high). This suggests that factor analysis is acceptable with the available data.
- The Bartlett's Test of Sphericity significant value of 0.00, which is less than 0.24, indicates that the variables are strongly linked.

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.236	64.716	64.716	3.236	64.716	64.716	2.276	45.513	45.513
2	.921	18.417	83.133	.921	18.417	83.133	1.194	23.887	69.400
3	.397	7.944	91.077	.397	7.944	91.077	1.084	21.677	91.077
4	.293	5.853	96.930						
5	.154	3.070	100.000						

Extraction Method: Principal Component Analysis.

**Scree Plot**



**Rotated Component Matrix<sup>a</sup>**

	Component		
	1	2	3
Wrong gauging after bunkering	.924	.181	.144
Wrong gauging prior bunkering	.923		.178
Adjusting vessel draft to reduce/increase the quantity	.691	.448	.326
Bunker fuel blocked in cargo horse	.190	.925	.286
Giving wrong information of bunker received/supplied	.239	.310	.918

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser Normalization.  
 a. Rotation converged in 5 iterations.

**IV. CONCLUSION**

Bunker disputes are very common in bunkering firms, occurring regularly as part of bunker operations. It's crucial to resolve these disputes before they escalate to legal actions, as legal proceedings can lead to significant losses for both parties. To prevent this, various forms of bunker dispute settlement are used, ensuring smooth operations in the bunkering industry. This study found that bunker disputes are prevalent in the bunkering field, with the most common cause being incorrect gauging after bunkering. The company employs several dispute settlement mechanisms, with re-gauging identified as the most effective method. Both bunker suppliers and receivers prefer to avoid the involvement of the P&I Club, considering it a last resort if the dispute cannot be settled through other means.

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