Critical points to recognize when preparing M/V Prima Ballerina for cargo hold inspection

Matti Heinonen

Degree Thesis for Bachelor Maritime Management

The Degree Programme in Maritime Management

Turku 2021

BACHELOR'S THESIS

Author: Matti Heinonen

Degree Programme: Bachelor of Maritime Management

Specialization: Bachelor of Marine Technology

Supervisors: Tony Karlsson, Ritva Lindell, Peter Björkroth

Title: Critical points to recognize when preparing M/V Prima Ballerina for cargo hold inspection

---

Date 22.03.2020 Number of pages 41 Appendices 1

Abstract

This thesis is study about vessel's cargo holds inspection. Specifically, what is hold inspection on bulk carriers and its requirements and how to prepare to hold inspection and what should be taken account before hold inspection, specified to vessel M/V Prima Ballerina.

Thesis includes general knowledge of hold inspection, inspection company instructions, requirements and pictures onboard M/V Prima Ballerina. The purpose of this thesis is giving general view of bulk carrier hold inspection and requirements and how to recognize the critical points when preparing hold for inspection, specify to M/V Prima Ballerina. Part of this thesis is also creating a checklist onboard M/V Prima Ballerina to ensure everything is checked and in good order before hold inspection. The study is based on information gathered from hold inspection and insurance company manuals, internet sources concerning hold inspection, interviews of masters and chief officers of M/V Prima Ballerina and self-experience working onboard M/V Prima Ballerina.

Language: English Key words: Cargo hold inspection, hatch cover, cargo hold cleanliness, Hose test

---

Table of Contents

1 Introduction

Cargo hold inspection onboard cargo vessels, specifically bulk and general cargo vessels, is a normal procedure, always performed before loading and it has to be accepted in order that vessel get permit to load the cargo and loading can be commenced. The cargo hold inspection is performed that cargo owner/ charterer can be sure that cargo hold is clean and dry and there is no dirt or any defects that can damage the cargo, to be sure the cargo remains in good and original condition during the transportation. Cargo hold inspection is also required to get insurance for the cargo. Passed cargo hold inspection doesn't mean and guarantee that cargo claims will not be applied. Cargo owner will pay the first inspection, so it is critical that vessel will be accepted at first inspection and get the hold cleanliness certificate, since all additional surveys after first one failed will be paid by ship owner and extra cleaning and repairing take also time and in mercantile shipping time is money.

Cargo hold inspection will be carried out by surveyor from company providing the cargo hold survey services. Inspector surveys and go through the cargo hold to check that hold is clean and dry such that there are not any old cargo residues, moisture or water, loose paint, loose rust, dirt, damages or odours, that can affect the cargo to be loaded. Ship's crew prepare the cargo hold before inspection, according to chief officer instructions and his/her satisfaction as chief officer is responsible of cargo hold cleanliness and condition.

Depending on the type of cargo to be loaded, especially water-sensitive cargoes like grain, fertilizers, soybean and paper for example, the hold inspection also contains the cargo hold hatch cover weathertightness test. This test is performed to check that there is not any leakage to cargo hold in case of vessel happens to encounter rough weather or heavy rain so that hatch covers will keep the water outside the cargo hold.

M/V Prima Ballerina is the vessel I'm currently working onboard. Thesis is designed to give overall picture of cargo hold survey and specified to M/V Prima Ballerina to identify the critical points to take consideration when preparing cargo hold for hold inspection to ensure hold acceptance in first inspection. In pictures it shown the important points of M/V Prima Ballerina due to structural differences of the ships.

1.1 Objective and research questions

Objective is to study what is checked in cargo hold inspection and what is critical and have to take account, specified to M/V Prima Ballerina, to ensure that hold inspection will be accepted at the first time.

- What is cargo hold inspection?
- What is inspected in cargo hold inspection?
- What is critical to check M/V Prima Ballerina to be sure that everything is in good order for inspection?

Since the M/V Prima Ballerina is less that 3000GT, officers do not need chief officer license for substituting the chief officer or work as permanent chief officer. Turnover rate is higher and there are nowadays coming people to work as chief officer with minor experience and cargo hold survey is done with every cargo, so I want to study what has to be taken account, specified to M/V Prima Ballerina, to be accepted at first time in hold inspection.

1.2 Delimitation

This thesis will focus on critical points to check for cargo hold inspection onboard M/V Prima Ballerina. Thesis can be used to get general knowledge about cargo hold inspection, but it will be focused what are the critical parts specify on onboard M/V Prima Ballerina and can't be applied to all vessels straightforward due to constructional differences between various vessels.

2 M/V Prima Ballerina

M/V Prima Ballerina was built 1986 in Sietas Shipyard, Germany. Length over all 87.99m, and width 12,80m with gross tonnage of 2673 designed to carry general cargo or bulk cargo. She has folding type steel ponton hatch cover opening one to aft and one to forward. Hatch covers are divided in four sections to be able to open or close half of the hatch cover in the aft or forward. Cargo hold can be divided in two parts, for separation of cargo, with the movable bulkhead that is stored in forward of the cargo hold. When the bulkhead is in stored position in forward, only ladders and access to the cargo hold is in the aft. (Prima Shipping Group, 2016)

M/V Prima Ballerina master described vessel condition *"Considering that vessel is 35 years old, she is still in good condition and gets lot of commendations from cargo hold inspectors."* (Laitsalmi, 2020)

Chief officer of M/V Prima Ballerina describes cargos usually carried:

"Most usual cargos carried onboard M/V Prima Ballerina are fertilizers in bulk or in big bags, soya meal, coal, steel products, grain, sand, limestone, grit, pulpwood, project cargos etc. house modules, azipods, small vessels and crane parts." (Rautiainen, 2021)

See below attached layout of M/V Prima Ballerina.

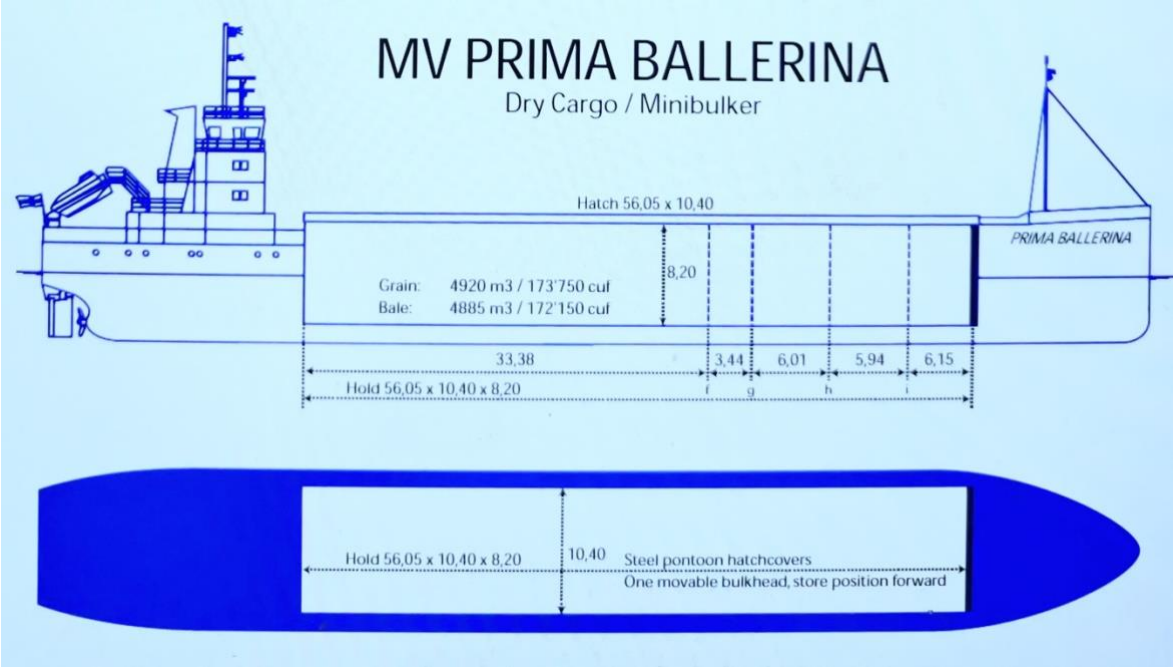

Figure 1 Layout of M/V Prima Ballerina (Prima Shipping Group, 2016)

3 Cargo hold inspection

Cargo hold inspection is done with cargo hold inspector and chief officer together checking the cargo hold and hatch covers. Inspection will start with paperwork in ship office. Inspector want to know basic information of vessel etc. name, owner, ship particulars, access points of cargo hold, 3-5 last cargos and cleaning method used. After the paperwork is done inspector and chief officer continues the cargo hold survey by going to check the cargo hold and hatch covers and taking pictures. In which order this is done depends about inspector. (Rautiainen, 2021)

Cargo hold inspection is performed visually and if there is some defects inspector might want to check with own hand, knife or scrapper example if the paint or rust is loose. There should be 1-2 crew members accompanied with chief officer and inspector with brush, bucket and rags so that if inspector finds minor defects those can be fixed immediately and hold inspection can be passed. Inspector is looking if there is any water, moisture, old cargo residues, damages, odours, loose paint, loose rust, dirt or anything that can contaminate the cargo to be loaded. Cargo hold inspector will also inspect cargo hold outside such hatch coamings, trackway, draining pipes, hatch cover paint condition and hatch cover sealing gaskets. During the cargo hold inspection hatch covers should be fully open if weather permits. Hatch covers will be moved to desired positions according to inspector demands. (Spencer, et al., 2011)

3.1 Cleanliness

Cleanliness grades required are as follows:

"In the dry bulk trades, there are essentially five grades of hold cleanliness:

1. *hospital clean, or ' stringent' cleanliness*
2. *grain clean, or high cleanliness*
3. *normal clean*
4. *shovel clean*
5. *load on top"* (Bulk Carrier Guide, 2010)

Cargo hold cleanliness grade is always up to charters opinion. The cargo hold surveyor decides do the vessel cargo hold fulfil and meet the requirements of cleanliness required. Cleanliness grade matters also in discharging port, how clean hold has to be cleaned because the amount of cargo remaining onboard depends on cleanliness grade. (Spencer, et al., 2011)

Cargo hold cleanliness grades standards is provided in next paragraphs

3.1.1 Hospital clean

Hospital clean cargo hold standard is the highest cleaning grade described as follows:

"Hospital clean is the most stringent, requiring the holds to have 100% intact paint coatings on all surfaces, including the tank top, all ladder rungs and undersides of hatches. The standard of hospital clean is a requirement for certain cargoes, for example kaolin/china clay, mineral sands including zircon, barytes, rutile sand, ilmenite, fluorspar, chrome ore, soda ash, rice in bulk, and high grades of wood pulp." (Spencer, et al., 2011)

Hospital clean grade is required for vessels carrying above mentioned cargos, fine cargos. Vessels that are carrying cargos that requires hospital clean cargo hold are carrying only these kind of cargos and aren't associate with tramp trades. (Spencer, et al., 2011)

3.1.2 Grain clean or high cleanliness

Grain clean standard is second highest cleanliness standard and National Cargo Bureau provides industry accepted definition for this standard:

"Compartments are to be completely clean, dry, odour-free and gas-free. All loose scale is to be removed.

The definition is clear.

1. *all past cargo residues and any lashing materials are to be removed from the hold*
2. *any loose paint or rust scale must be removed*
3. *if it is necessary to wash the hold, as it generally will be, the holds must be dried after washing*
4. *the hold must be well ventilated to ensure that is odour-free and gas-free."* (Seven Surveyor, 2013)

Grain clean is the most used standard and requirement for hold cleanliness. Compared to hospital clean (c.f. Paragraph 3.1.1) paint doesn't need to be intact in every spot but still there can't be any loose paint or rust scale. (Spencer, et al., 2011)

Vessels associated with traditional bulk cargos are most commonly required for grain clean cargo hold. Hence the bulk cargos loaded there is great risk of mixture of cargo and old residues, dirt and loose rust or paint scale. Hospital clean standard is only met vessels

carrying same cargo always but grain clean standard is common for vessels participating tramp trade. (Spencer, et al., 2011)

3.1.3 Normal clean

Normal clean standard is described as follows:

"Normal clean means that the holds are swept clean, with no residues of the previous cargo, and washed down (or not, depending on charterer's requirements), that is, cleaned sufficiently for taking cargoes similar to or compatible with the previous shipment". (Spencer, et al., 2011)

Normal clean is usually required for vessels carrying same cargos or same kind of cargo. Cargo grade and quality is not so high that it doesn't require hospital clean (c.f. Paragraph 3.1.1) or grain clean (c.f. Paragraph 3.1.2). Good example about normal clean standard cargo is grit. (Spencer, et al., 2011)

3.1.4 Shovel clean

The fourth highest grade for hold cleanliness is shovel clean:

"Shovel clean means that all previous cargo that can be removed with a 'Bobcat' or a rough sweep and clean with shovels by the stevedores or crew. The master should clarify what standard is expected." (Spencer, et al., 2011)

Shovel clean means exactly that cargo hold is cleaned with "shovel" grade tool. Hold might be wiped roughly but most common is only with the shovel or the bulldozer. Due to rough cleaning, there is always cargo remaining onboard. (Spencer, et al., 2011)

3.1.5 Load to top

Load to top is fifth and poorest grade of cleanliness:

"Load on top means exactly what it says – the cargo is loaded on top of existing cargo residues. Usually, this means 'grab cleaned'. This standard will commonly be required where a ship is trading continuously with the same commodity and grade of that commodity." (Spencer, et al., 2011)

Load to top standard is used to ships that are carrying same cargo and same quality. Mostly same cargo from same port so the cargo and quality is always same ex. coal. Vessels under Contract of Affreightment that are carrying single grade cargo continuously for certain period of time meet load to top standard. Due to cargo and quality is always same it is not

required to clean cargo hold from old cargo residues. Due to rough cleaning on shovel clean (c.f. Paragraph 3.1.4) and load to top grades it makes harder to notice deficiencies on cargo hold such as loose paint or rust and damages and also makes maintenance of hold harder. (Spencer, et al., 2011)

3.2 Cleanliness grades of M/V Prima Ballerina

M/V Prima Ballerina is in tramp trade what is also part of the reason that we are never required hospital clean standard *"Due to age of the ship, M/V Prima Ballerina do not even get the cargos that requires hospital clean cargo hold."* (Laitsalmi, 2020).

It would be almost impossible to get M/V Prima Ballerina to meet hospital clean standard. Cargo hold cleanliness requirement of Prima Ballerina is 85% of cases grain clean and the rest 15% it is required to normal clean grade. It is good to consider always clean the cargo hold to grain clean standard, still if not required for the next cargo, to keep cargo hold in good condition and beforehand this will make cleaning easier in the future. (Rautiainen, 2021)

3.3 Dry and dirt-free cargo hold

Cargo hold must be clean and dry is a phrase you always hear from inspector already in first emails they are sending before inspection. This is also what inspector check first, already on deck looking done to cargo hold, is it clean and specially is it dry. Inspector will also check the sides inside of the cargo hold that there is not moisture. Cargo hold inspector checks that there is no dirt, that can affect to cargo example sweeping the sides and tank top with the white cotton glove to see if there is some dirt. Old cargo residues may exist depending on cleanliness grade required but loose paint, paint chips, loose rust and any kind of other dirt, old cargo lashing equipment or garbage are prohibited and must be removed. Definition of loose paint and loose rust is, that if it can be removed, when there is applied strike with fist or light pressure with knife or scraper edge of the scale. In the cargo hold there can be oxidation rust usually on bare surfaces with no paint but if it is light and can't be removed by using knife or scrapper with light pressure applied, mostly can be seen on tank top, it will be accepted. (Seven Surveyor, 2013)

Bilges must be checked and tested to ensure safety of the cargo and safety of the ship:

"The bilge lines must be tested by a competent person (under the supervision of the cargo officer) to ensure that the non-return valves are functioning correctly and not allowing any flow back of water into the holds. The bilge high-level alarms must also be tested and confirmed as operational." (Spencer, et al., 2011)

Bilges are important to check that those are operational function. Bilge wells should be clean and dry. Strum boxes and strainers has to be cleaned well. With certain cargoes bilges will be covered with burlap and secured with duct tape to ensure cargo stay outside the bilges but water can still enter the bilges in case cargo releases water, cargo containing water or in worst case leakage of ship hull, so the water can be pumped out. Bilge covers should not be placed beforehand because inspector would like to check inside the bilge to check the bilge condition. (Spencer, et al., 2011)

Figure 2 Wet vs dry Cargo hold (Matti Heinonen 2020)

Figure 3 Loose paint side of the cargo hold (Matti Heinonen 2021)

Figure 4 Loose paint on hatch cover (Matti Heinonen 2021)

Figure 5 Bilge well full of water (Matti Heinonen 2021)

3.4 Odour- and gas-free cargo hold

Good ventilation for cargo hold before inspection is important and also keep the hatch covers open while cargo hold inspection. Ventilation is important to remove all the odours that might has remained in the cargo hold from previous cargoes. All the odours must be removed that those doesn't stick and contaminate the next cargo to be loaded. Good ventilation is important also in safety aspect when entering inside the cargo hold. (Spencer, et al., 2011)

3.5 Hatch coaming trackways and draining pipes

Drainage channel of hatch coaming is important to keep clean. Due to weather blocked and defective drainage system provides great risk of water entering cargo hold:

"Hatch coaming drains are still proving to be one of the major sources of ingress of water into a vessel's holds, and over which there can be virtually no heavy weather defence if they are either missing or defective in some way." (UK P&I, 2002)

Cargo hold inspector is not only interested what kind on condition cargo hold is inside, inspector want check also the outside the cargo hold. Cargo hold hatch cover sealing gaskets or rubber packing are visually inspected. Hatch coaming and trackway has to be cleaned from old cargo residues, dirt and all loose paint and rust scale has to be removed. In the hatch coaming there are draining pipes with draining valve. This is designed draining system of the hatch coaming. Draining pipe's purpose is give mean for water to exit from hatch coamings so that water will not enter to inside cargo hold. Draining pipes and valves has to be cleaned to ensure that those are working properly so the water splashing on top and side of the hatch covers and entering the hatch coaming will come out and not ingress in the cargo hold. Loose rust, loose paint or cargo residues can clog the draining pipe system. Draining pipe non-return valve allow water exit from draining channel and prevents water to enter other direction. Valves must be inspected and ensure proper working condition. (Lloyds's register / The Standard, 2002)

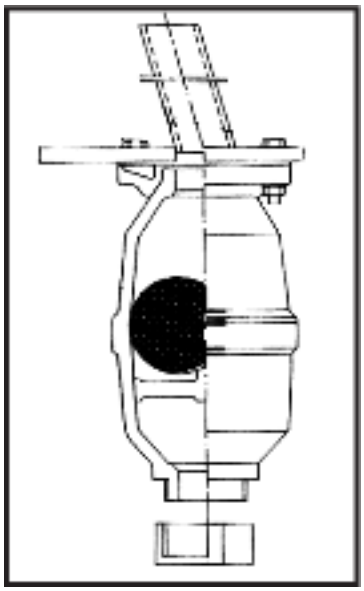

Figure 6 Typical non-return drainage valve (Lloyds's register / The Standard, 2002)

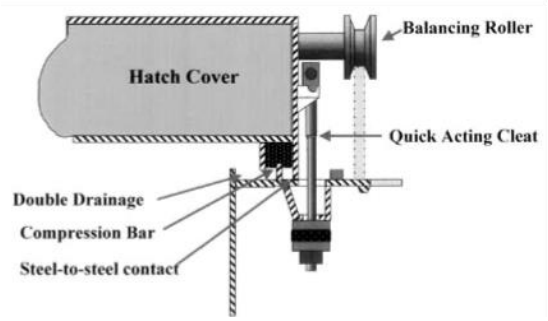

Figure 7 Cross-section sketch of a multi panel hatch cover illustrating the compression bar gasket and cleat arrangement (Lloyds's register / The Standard, 2002)

4 Hatch cover weathertightness test

Hatch cover weathertightness test will be performed to ensure hatch covers holds the water outside the cargo hold. Weathertightness test will be performed by cargo hold surveyor or separately by another surveyor. If the cargo hold survey is done by cargo hold surveyor, he or her will be checking leaking traces on inner hold plating during the cargo hold inspection. Methods used to perform weathertightness test are hose test, ultrasonic test, chalk test and light infiltration test. Ultrasonic and hose test are most used methods. (Skuld/ Anatoliy Frank, 2021)

4.1 Hose test

Hose test is very common method to test the hatch cover weathertightness. Hatch covers will be closed and secured well. Ship crew prepare ex. firehose and nozzle. Surveyor and chief officer go inside the cargo hold while another surveyor and ship crew stays outside. Hatch covers will be circulated around applying water with high pressure to all hatch joints. Surveyor in the cargo hold go around same track and same time that water will be applied outside. Surveyor is looking if there is coming any leakage inside the cargo hold through hatch cover joint. Hose test result is based on visually checking is there any water penetrating through hatch cover joint and sealing. (Lloyds's register / The Standard, 2002)

Figure 8 Hose testing (Bulk Carrier Guide, 2010)

4.2 Ultrasonic test

Insurance companies can require most accurate methods to use before accept the test for insurance:

"P&I insurers accept the records of UST as it provides measurable and reliable results. UST is the only method that shows the degree of hatch cover leakage, which is crucial in determining whether the hatch covers are in an acceptable condition. The acceptable range of leakage is less than 10% of the open hatch value (OHV)." (Skuld/ Anatoliy Frank, 2021)

Ultrasonic test is the most strict and accurate method to check hatch cover weathertightness. This test has to be performed by competent surveyor who is holding ultrasonic operator certificate. In ultrasonic is based equipment detecting sound. Sound emitter is placed inside the cargo hold and surveyor go around the hatch cover joints with sound detector. Results will be written down in report that is also handed to vessel. (Skuld/ Anatoliy Frank, 2021)

Figure 9 Ultrasonic test (Overseas Maritime, 2018)

4.3 Chalk and light infiltration test

Chalk and light infiltration test can't be used to detect is there any actual water leakage. Chalk test performed so that hatch coaming compression bar is chalked all the way and hatch covers closed and secured with the cleats. When the hatch cover is opened there should be continuous line of chalk on rubber packing. Missing chalk will tell loss of compression on that particular point which indicates that there might be possible point for leakage. (Lloyds's register / The Standard, 2002)

Light infiltration test shows if there is visually detectable opening between hatch cover and hatch coaming. Hatch covers will be closed and then entered to cargo hold. If there is coming light between hatch cover and coaming it is clear that there is opening and possible point of leakage. (Bulk Carrier Guide, 2010)

Figure 10 Light infiltration test (Bulk Carrier Guide, 2010)

5 Critical points to check on M/V Prima Ballerina

This part of the thesis provides pictures and explanations what to check when preparing M/V Prima Ballerina for hold inspection. Paragraphs are divided to cover cargo hold and hatch cover separately.

5.1 Cargo hold

There is many important and critical points to check inside the cargo hold. Important points to check inside the cargo hold is provided in the next subparagraphs. Pictures and explanations helps to recognize the critical spots.

5.1.1 Side plaiting, tanktop and bilge

Depending on cleanliness grade required cargo hold must be washed or swept to remove all dirt and cargo residues. After cleaning, check that there isn't any loose paint or rust scale. All loose paint and rust scale has to be removed. New paint should be applied always when have time and side plaiting requires it. Paint should not be applied to tanktop due to it gets hits from crane grab and bulldozer which can sever the paint that get mixed with cargo. Bilges has to be cleaned and dried and ensure those proper working condition. (c.f. Paragraph 3.1 & 3.3)

Figure 11 Bosun cleaning cargo hold with water hose (Matti Heinonen 2021)

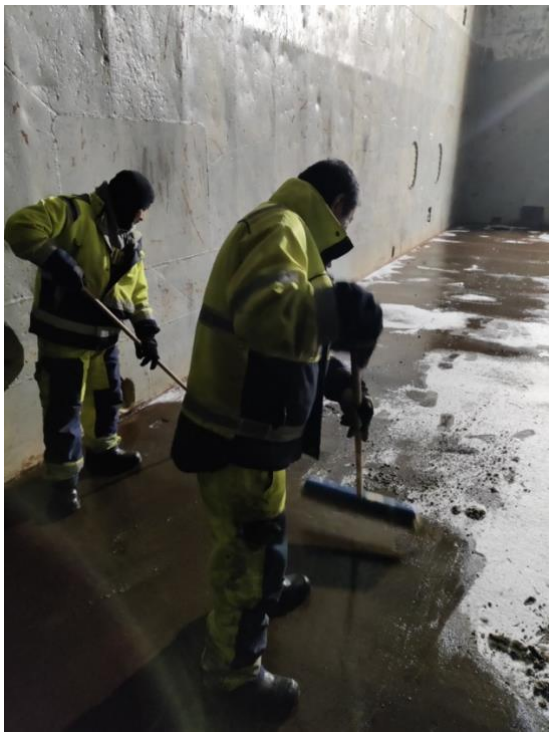

Figure 12 Crew sweeping cargo hold after discharging (Matti Heinonen 2021)

Figure 13 Optimal situation, freshly painted cargo hold during few days lay time at Ostend (Matti Heinonen 2020)

Figure 14 Clean and dry tanktop (Matti Heinonen 2021)

Figure 15 Bilge full of water after washing that needs to be cleaned (Matti Heinonen 2021)

5.1.2 Manholes, container socket and side plaiting lashing points

All the uneven spots at the cargo hold gathers dirt and cargo residues. Manholes, lashing points and tanktop container sockets have to be checked and cleaned from dirt, cargo residues. Manholes and container sockets at the tanktop is filled with concrete to make tanktop more even not to collect dirt, cargo residues and prevent bulldozer bucket to hit and damage tanktop. Concrete condition has to be checked that there isn't any loose concrete. Loose concrete pieces must be removed and replaced. (c.f. Paragraph 3.1 & 3.3)

Figure 16 Side plaiting manhole (Matti Heinonen 2021)

Figure 17 Tanktop container socket with damaged concrete and dirt (Matti Heinonen 2021)

Figure 18 Side plaiting lashing point. Showing little cargo residue between plaiting and lashing ring (Matti Heinonen 2021)

5.1.3 Bulkhead

M/V Prima Ballerina has the movable bulkhead of which purpose is give means to separate different cargos. Its stored position is at forward of the cargo hold. All the loose paint and rust scale checks apply also to bulkhead but it is also necessary and important to check bulkhead specific characteristics. There is ladders both side of the bulkhead port and starboard that collects dirt and cargo residues. Sides of the bulkhead is applied rubber rug from top to bottom to seal sides of the bulkhead. It is necessary to check behind the rubber rug that there isn't any cargo residues and dirt. One important thing is check under the bulkhead and top of the bulkhead that is has been cleaned well. In the side plaiting there is sockets to attach bulkhead when moved from stored position. Due to shape and depth of these sockets those are major spots to collect dirt and cargo residues. (c.f. Paragraph 3.1& 3.3)

Figure 19 Bulkhead in stored position at forward. (Matti Heinonen 2021)

Figure 20 Bulkhead ladders (Matti Heinonen 2021)

Figure 21 Check behind the rubber rug. (Matti Heinonen 2021)

Figure 22 Bulkhead attachment socket. No cargo residues but some loose rust and paint. (Matti Heinonen 2021)

5.1.4 Cargo hold ladders and access points

Cargo hold ladders are placed in the aft of the cargo hold. Ladders are covered with side plaiting. When loading the cargo enters in the housing of ladders. Ladders and housing has to be cleaned well also because it is the first thing what surveyor sees when entering cargo hold to make good first impression. Another cargo hold ladders are placed in the forward but can be used only when bulkhead isn't in the stored position. Entrance is located between forward mooring station and cargo hold. Due to entrance position, there is always water splashing to it and it might be source for leakage to the cargo hold. (c.f. Paragraph 3.3 & 3.5)

Figure 23 Aft cargo hold ladders and housing. (Matti Heinonen 2021)

Figure 24 Forward cargo hold entrance. Sealing gasket to be checked. (Matti Heinonen 2021)

Figure 25 Forward cargo hold entrance. Good to check runoff marks from the sides to detect possible leakage. (Matti Heinonen 2021)

5.2 Hatch cover

Hatch cover condition has to be check to ensure everything is in good condition for inspection and ready for possible weathertightness test. Subparagraphs under this subject covers the important points to check on hatch cover.

5.2.1 Hatch cover paint condition and cleanliness of joints

Check the hatch cover paint and rust condition. Hatch cover inside part must be carefully inspected that there is not any loose paint or rust scale that can be loosen and drop on top and mix with cargo. Joints between hatch cover has to be cleaned well that there is not any dirt that block the channel where water should be able to freely flow on deck. (c.f. Paragraph 3.5)

Figure 26 Loose paint on hatch cover. (Matti Heinonen 2021)

Figure 27 Intact paint on hatch cover. (Matti Heinonen 2021)

Figure 28 Snow in joint between aft and forward hatch cover. (Matti Heinonen 2021)

5.2.2 Hatch cover rubber gasket

Hatch cover rubber gasket is important to check due to defect in rubber gasket allows means for water to enter the cargo hold. Rubber gasket must be intact, dirt-free and all the gaskets that are hardened has to be replaced. Rubber gasket should be elastic otherwise it might let water penetrate through it and water can enter the cargo hold. (c.f. Paragraph 3.5)

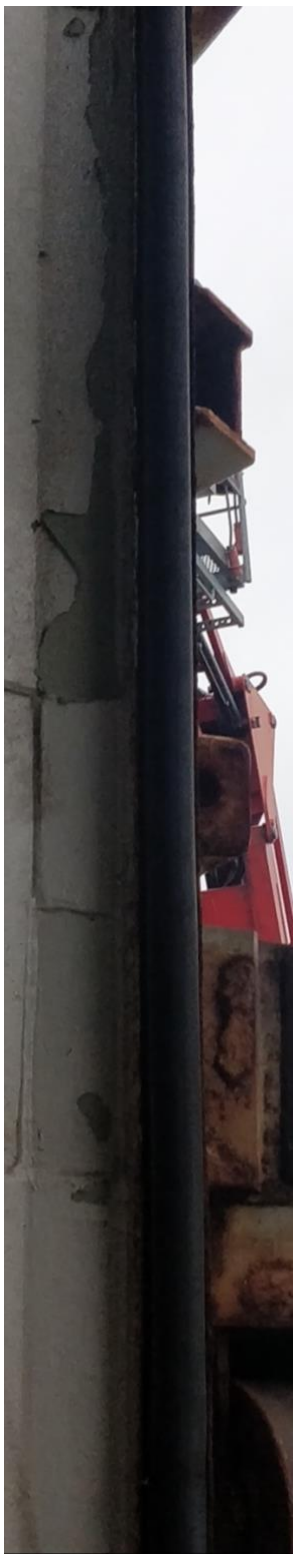

Figure 29 Hatch cover rubber packing/ rubber sealing gasket. (Matti Heinonen 2021)

Figure 30 Hatch cover sealing gasket from mid-ship. Sealing between aft and forward hatch covers. (Matti Heinonen 2021)

Figure 31 Closed hatch cover showing rubber packing against coaming. (Matti Heinonen 2021)

5.2.3 Hatch coaming and draining pipes

Hatch coaming and draining pipes including non-return valve must cleaned and ensure those proper working condition. All loose rust and dirt must be removed that loose scale is not blocking the drainage channel. If the drainage channel is blocked it is more possible that water enters the cargo hold if there is leakage in rubber gasket. Trackway of hatch cover must be checked that there is not any loose scale that can block the drainage channel or rubber gasket. Draining valve must be inspected that the ball inside is moving and working so water can flow out but not inside. (c.f. Paragraph 3.5)

Figure 32 Hatch coaming and trackway. (Matti Heinonen 2021)

Figure 33 Draining pipe. (Matti Heinonen 2021)

Figure 34 Draining valve. Ensure that ball inside is moving. (Matti Heinonen 2021)

5.2.4 Quick acting cleats and cross-joint cleats

Ensure proper working condition of quick acting cleats and cross joint cleats. Quick acting cleats rubber packing should be elastic to ensure that it can be tighten. Quick acting cleats tightness has to be checked before weathertightness test that those are tight enough providing more pressure to hatch cover. Cross-joint cleats should be checked that those are not bend or damaged anyway so that those working properly. (c.f. Paragraph 4)

Figure 35 Quick acting cleat open position. (Matti Heinonen 2021)

Figure 36 Quick acting cleat closed position. (Matti Heinonen 2021)

Figure 37 Cross-joint cleat close position. (Matti Heinonen 2021)

6 Critical examination

This thesis purpose is to give means to freshly joining chief officer's onboard M/V Prima Ballerina to recognize critical points when preparing vessel to cargo hold inspection. Internet sources and interview concerning cargo hold inspection provided good general description about what is inspected and what are the standards in hold inspection.

Due to thesis is limited to concern M/V Prima Ballerina the best research method was to interview masters and chief officers onboard due to their experience about M/V Prima Ballerina to help recognize the critical points due to structural differences between various vessels. By following the pictures and the checklist created it is easy for new joining chief officers prepare to hold inspection and recognize the critical points and be comfortable that everything is checked.

7 Further studies

This thesis purpose is showing the critical points to check when preparing M/V Prima Ballerina for cargo hold inspection. Due all chief officers decide their own way to carry out hold cleaning and maintenance this thesis purpose is not give any direct cleaning instructions or be the manual for maintenance only to help recognize critical points. These kind studies about preparing methods ex. "detergents used for cleaning different cargo residues" could be considered done in future.

References

Prima Shipping Group. (2016). *Primas.* Retrieved December 15, 2020, from https://www.primas.fi/wp-content/uploads/2019/03/PrimaBallerina_pocketplan_vers2016.pdf

Bulk Carrier Guide. (2010). *Bulk Carrier Guide*. Retrieved December 15, 2020, from http://bulkcarrierguide.com/grain-loading-preparation.html

Seven Surveyor. (2013). *sevensurveyor.com*. Retrieved March 1, 2021, from https://sevensurveyor.com/hold-cleanliness-surveyors-inspection-and-requirements/

UK P&I. (2002, 09). *Ukpandi.com.* Retrieved March 2, 2021, from Hatch coaming drains are still proving to be one of the major sources of ingress of water into a vessel's holds, and over which there can be virtually no heavy weather defence if they are either missing or defective in some way.

Spencer, C., Paines, N., Stryken, J., Bhargava, A., Kehagias, J., & Bozier, M. (2011, March). *The Standard Club.* Retrieved March 1, 2021, from https://standard-club.com/media/23964/15056CargoJan2011Bulletinv06.pdf

Bulk Carrier Guide. (2010). Retrieved from Bulk Carrrier Guide: http://www.bulkcarrierguide.com/steel-hatch-cover-testing-procedure.html

Laitsalmi, P. (2020, December). Master M/V Prima Ballerina. (M. Heinonen, Interviewer)

Rautiainen, P. (2021, January). Chief Officer M/V Prima Ballerina. (M. Heinonen, Interviewer)

Skuld/ Anatoliy Frank. (2021). Retrieved from Skuld: https://www.skuld.com/topics/ship/safety/ultrasonic-testing-and-leaking-hatch-covers/

Overseas Maritime. (2018). Retrieved from Overseas Maritime: https://overseasmaritime.com/techno/ultrasonic-hatch-cover-tightness-testing.html

Lloyds's register / The Standard. (2002). *https://maritimeexpert.files.wordpress.com.* Retrieved from https://maritimeexpert.files.wordpress.com/2016/08/mg-hatchcovermaintenance.pdf: https://maritimeexpert.files.wordpress.com/2016/08/mg-hatchcovermaintenance.pdf

Table of Figures

Interviewees

Master M/V Prima Ballerina Pasi Laitsalmi, experience as a master 24 years

Master M/V Prima Ballerina Andrey Näppinen, experience as a master 6 years

Chief Officer M/V Prima Ballerina Pekka Rautiainen, experience as chief officer 3 years

Chief Officer M/V Prima Ballerina Niko Lusto, experience as a chief officer 3 years

Appendices

M/V Prima Ballerina Checklist for Cargo Hold Inspection			
Date:	Cargo to be loaded:		
Three last cargos & cleaning method used			
1.	2.	3.	
To check: dry, clean, no cargo residues, no loose paint or rust scale, damages, proper working condition			
Cargo hold			
Task	Remarks/Notices/Maintenance Requisitions		Check
Side plaiting & Tanktop			
Manholes			
Lashing points on side plaiting			
Bilges			
Tanktop container sockets -Cement intact			
Bulkhead ladders			
Bulkhead attachment holes			

Bulkhead sides & downside		
Cargo hold ladders		
IF Bulkhead not in stored position check forward compartment		
Hatch Cover		
Task	Remarks/Notices/Maintenance Requisitions	Check
Rubber gasket		
Compression bar		
Hatch coaming		
Draining pipes & valves		
Hatch cover paint condition		
Cleanliness of hatch cover joints		
Cross joint cleats		
Quick acting cleats		