VSMS

Vessel Safety Management System

Process Description

Marine Integrity Reviews and Audits

Seashore Maritime Services can assist the vessel owner in designing and implementing a safety management system aboard their vessel. In addition to this, we can perform a Marine Integrity review and audit of the existing system and recommend improvements.

Warranty Surveys and Inspections

Seashore Maritime Services performs inspections and surveys to ensure that contractors have followed instructions for loading and unloading cargo, to establish the condition of marine equipment and to establish the condition of the vessel in general.

Suitability and On-Hire Surveys

Seashore Maritime Services accesses and recommends the type of transport, and the most economical to move the cargo.

We undertake inspections / surveys of transport vessels and carry out pre-charter inspections as necessary to confirm suitability. We also carry out On-hire Surveys and Off-hire Surveys subject to charter agreements.

Major Vessel Casualties

Seashore Maritime Services investigates and reports on damages to vessels for insurance companies and / or marine underwriters to. We also make recommendations on costs and repairs.

Marine Management and Consulting

Seashore Maritime Services provides Technical Representation and Production Management and Monitoring Systems in the marine industry. We develop the environment necessary to: efficiently manage the production aspect of a marine project; create a management system to manage the work; manage and maintain consistent quality throughout the construction; and faciliate safe working sites and practices throughout the construction/refit.

Seashore provides the overall planning and monitoring of the project; identifies variances; optimizes "work arounds" resulting from extra work; generates EAC reports required to monitor and control the project; issues and updates the support and master schedules; and reports progress and generating critical path networks. We provide Works Report for Schedule Analysis, Cost Estimates and Constructability Studies.

VSMS Summary

Seashore Maritime Services Limited has developed a software program for the comprehensive management of all aspects of vessel operations. Founded on the Oracle® database software, the Vessel Safety Management System (VSMS) is task-focused and notifies users of the actions necessary for safe vessel operations. VSMS is a cloud-based software with stand-alone capability so that constant connection to the Internet is not required during operations.

Key to the successful implementation of VSMS is the accurate and complete profiling of the operational requirements affecting the vessel(s). Marine industry operations are subject to a broad range of requirements intended to ensure safety. Among these requirements are those of regulatory entities, classifications societies, insurers, clients and the owners and/or operators. All of these requirements are embedded into the VSMS program during system implementation. The program is thus able to notify the responsible individuals, through a role-based structure, of the requirements associated with specific tasks. In most cases, these notifications are linked to Standard Operating Procedures (SOPs) and checklists which are contained within VSMS.

Similarly, VSMS manages maintenance requirements through proactive notifications. The documents necessary to support the maintenance and crew-repair of specific equipment are also available from VSMS.

Rather than simply providing notifications of required actions, VSMS actively tracks the responses to the notifications, highlighting those to which the response was not in accordance with the established requirements, or which have been postponed or ignored.

VSMS has two primary areas of interest. The first is the management of all elements of the assignment of the vessel and crew and the second is the operation of the vessel during an assignment. For example, when a vessel is proposed to undertake an assignment, VSMS reviews the vessel's certifications and approvals which are necessary for that assignment and provides a notification of any which will not be valid during the proposed assignment. Similarly, VSMS reviews the required personnel certifications and other requirements necessary for the assignment and provides a notification of which potential crew members meet the requirements. VSMS also determines whether these requirements will be valid during the proposed assignment.

VSMS does not simply determine whether vessel, equipment and personnel certifications are valid for a proposed assignment. The program also actively monitors the certifications and notifies designated persons well in advance of expirations so that renewals can be obtained.

During the course of the assignment, VSMS notifies the crew of the actions necessary to meet established procedures, including occupational safety and health (OSH), and provides the documentation to complete tasks. All task-based notifications are managed through the Ship's Operations element of the program where tasks can be re scheduled and monitored during the course of an assignment. Additionally, VSMS also monitors the data logged by the crew, or received from sensors, and notifies the crew of required maintenance. In addition to vessel operational data gathering, monitoring and recording, VSMS can also obtain and process data about ship-board industrial and other processes. Seashore has successfully developed a VSMS - integrated system for tracking and reporting on shellfish production on a large offshore trawler.

A key feature of VSMS is the ability for officers and shore-based management to have ongoing oversight of operations, and especially to focus on situations when established procedures are not being followed.

Because VSMS provides a continuing record of how procedures are being followed, the program offers an opportunity for operational improvement. Data mining the operational history provides an opportunity to identify issues that have the potential to seriously impair the safety of an operation.

Similarly, reviewing the maintenance and crew-based repair data offers the opportunity to identify trends and undertake pre-emptive actions related to the vessel-based equipment.

There is also a growing expectation by regulatory and other entities that vessel owners provide data demonstrating that the vessel is consistently operated in conformity with established requirements. This is a significant enhancement from having proper procedures in place with occasional audits to confirm compliance. VSMS provides to the owner the information required to meet such expectations.

VSMS Overview

VSMS is an enterprise-level program which facilitates the ship and shore-based management of all aspects of vessel operations. It is readily scalable to meet the requirements for the operations of single- or multi-vessel fleets .

Based on the Oracle® database software VSMS proactively notifies vessel operators of the actions necessary to be in conformity with all regulatory and other requirements for the safe operation of a vessel.

During the initial setup of the program, information about a wide suite of operational matters is entered into the program: vessel and crew certification information; standard operating procedures and checklists; occupational safety and health; machinery and equipment maintenance schedules and procedures; and other company-specific information. VSMS uses this information to provide notifications of the actions needed to meet operational requirements.

In addition to providing a reminder of required actions, VSMS can also assist the person respond to the notification by providing access to associated documentation such as approved procedures, instruction manuals and diagrams, as well as illustrations and photographs.

The notification is "cleared" and the response archived when the person responding to the notification confirms that the required action has been completed. If a certification is required for the person performing the action, VSMS checks to ensure that this person has the valid certification required.

In some cases, an action may be put forward to another watch, or for when the vessel is next in port. In these cases, VSMS initiates a new notification for that rescheduled action. If an action is put off too many times, VSMS adds it to the list of notifications which have not been resolved. This list is a key management tool for both ship and shore-based management to evaluate the adequacy of day-to-day ship-board operations.

An effective safety management system (SMS) requires much of the same information as is required for VSMS. If the documentation needed for a SMS has already been prepared, the setup of VSMS is rather easy. If not, the information gathered for VSMS will also largely provide the information needed for a SMS.

Certification Management

Regulatory, underwriting and classification entities have established detailed requirements for vessel operations. These requirements apply to the vessel and its equipment as well as their operation. Also, subject to these requirements are the personnel associated with the vessel's operation, maintenance and repair.

Meeting these requirements, and documenting that they have been met, requires the systematic management of large volumes of data. Similarly, maintaining the currency of all the certifications for a multi-vessel fleet also requires the management of a large amount of information.

VSMS maintains two principal types of data related to certifications. The first is the vessel, equipment and personnel certifications and other documents, usually stored in pdf format, and/or other files. The second is the digital information associated with these files, such as the type of certification, issuance, and expiry dates, issuing authority, etc. Access to these suites of data is always available either on-line via the cloud or off-line on vessel or from shore-based computers.

A strength of VSMS is that it continually tracks this certification data and provides a series of notifications in advance of expiration of certifications. The client determines the timing and recipients of these notifications.

VSMS also checks the certifications database and provides a notification if certifications are due to expire during the planned assignment period.
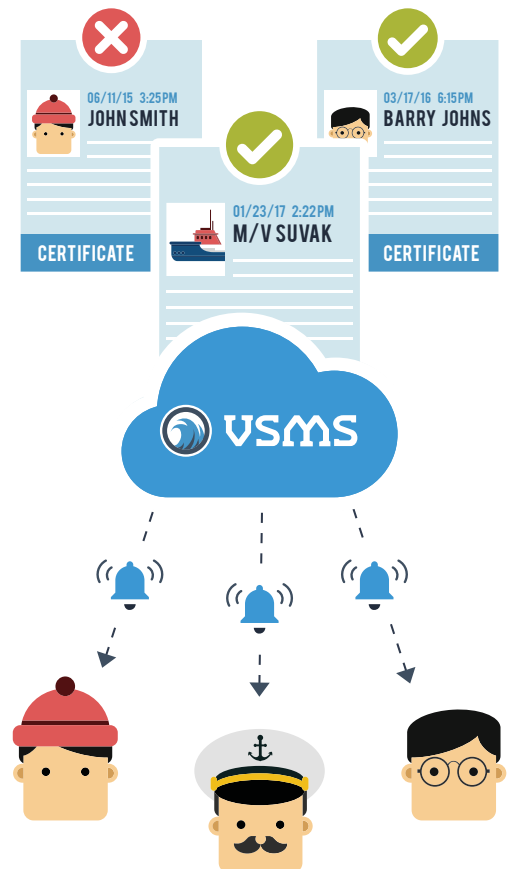
Vessel Utilization Planning

A typical planning time frame is a five-year rolling plan for each vessel. During this five-year period, the vessel shall be unavailable during two dry dockings, the dates and durations of which must be planned and flexible due to dry dock and vessel availability. Additionally, the expiration of certain vessel certifications will also limit vessel flexibility.

As well, each vessel requires the allocation of time for annual inspections and certifications. But, as with dry dockings, flexibility of these dates and durations are also limited due to the expiration of certifications. Prior to the annual inspection, time is usually required for repair and maintenance during a vessel refit.

The time remaining after scheduling these three activities, which in VSMS is identified as vessel unavailability, represents the time available for vessel assignments. After the vessel availability has been established company management schedules vessel assignments.

Vessel assignments vary in duration. In some cases there may be many short assignments, as would be the case of a cargo vessel meeting contractual requirements for a number of clients. In other cases, a vessel may have a contractual arrangement for several months. With each assignment, there

could be one or many voyages. VSMS considers each trip between two ports to be a separate voyage.

It is necessary to differentiate between various types of voyages – because different voyage types require different Standard Operating Procedures (SOPs) and checklists. Different voyage types may also require different crewing arrangements to meet the requirements of the safe staffing requirements established by Transport Canada or other regulatory entities.

Vessel Assignments

5.1 Overview

The life of a commercial vessel is divided between carrying out, and preparing for, specific operational assignments and other activities. These other activities include periods of inactivity between operational assignments, such as lay-ups, and also include repair and maintenance activities needed to maintain the vessel's operational fitness.

VSMS is designed to assist shore-based and ship-based personnel manage the activities associated with all elements of a vessel's life.

The tasks associated with the preparation for operational assignments are primarily the responsibility of the shore-based personnel while the ship-based personnel have primary responsibility for carrying out the operational assignments. However, neither group can adequately carry out their responsibilities without the collaboration of the other.

Both shore- and ship-based personnel share the responsibility for the activities when the vessel does not have, nor is preparing for, a specific assignment.

5.2 Assignment Process

The manager of the shore-based team has the lead for establishing vessel assignments. An assignment could be of short or long duration and may require modifications to the vessel or to operating procedures in order to meet the needs of a client.

Prior to the establishment of an assignment, shore-based personnel will determine the requirements of a client. The initial step in the establishment of an assignment is the determination if a suitable vessel is, or can be made, available during the time frame required by a client. If so, a member of the shore-based team makes a provisional assignment in VSMS.

One of the key elements of the vessel assignment process is to enter into VSMS the preliminary information associated with the voyages necessary to complete the assignment. Among this information are items which are client-specific, and which are additional to the vessel's regular equipment and operating procedures.

A piece of information needed at this time, and which is to be entered into VSMS, is the type of voyage.

The crewing and operational requirements vary based on the size of the vessel, and how far from shore it will be operating. This information is essential because it will determine the crew certifications needed

to undertake the voyage(s), based on the vessel's safe manning certificates from Transport Canada. Entering the names of potential officers and crew will enable VSMS to determine whether these persons meet the certification requirements for the proposed voyage. Additionally, VSMS determines whether the required certifications remain valid for the duration of the proposed voyages.

As part of this assignment process, shore-based personnel confer with the ship's personnel to determine whether any of the outstanding items listed in the VSMS ship operations folders need to be resolved in order to meet the contractual requirements.

If any actions are required as a result of that review the timing of the actions is modified in VSMS. For example, a task that was scheduled in Ship Ops to be done at the next dockside refit, may now need to be removed from that folder and rescheduled in another folder, such as the next port call, to enable its completion in time for this assignment. Reminder notifications and due dates of all such items should be reviewed.

If the vessel's normal equipment and operational procedures cannot meet the requirements of the client, it is necessary to determine whether modifications can be made to meet the requirements and whether the vessel owners will approve such an expenditure.

If the modifications cannot be made, or if the decision is made not to undertake the modifications, the assignment is cancelled and that vessel time again becomes available. If modifications can be made, the details of these modifications are established and entered into the assignment folder established when the assignment was established.

VSMS generates reminder and due-date notifications for the items in the ship operations folders, which shall also contain pdfs and/or other files of items such as operational and maintenance information for assignment-specific equipment.

Assignment-specific checklists shall also be in pdf form because they would otherwise become part of the regular vessel operations. These checklists should be printed on the vessel and the checklist elements then verified and signed upon completion. These completed documents should then be scanned and saved in the assignment folder and thus become part of the assignment record.

In the unlikely event that a client-specific piece of equipment is to become part of the vessel's regular equipment, its installation should be scheduled in the appropriate folder under ship ops (such as next port call or next dockside refit) and the operations and maintenance requirements included in the ship's VSMS software.

Vessel Assignments

5.3 Assignment of Master and Crew

At some time before the commencement of the assignment, the Master who will be responsible for carrying out that assignment is appointed. As part of the process to choose a master, the qualifications of the person being considered are compared with the certifications required for the planned voyage(s).

One of the first responsibilities of this person will be to conduct a thorough review of the assignment and verify that all elements necessary to carry out the assignment are satisfactory. The Master, in consultation with shore-based management, identifies potential crew members and confirms through VSMS that their certifications meet the requirements for the planned voyage. If not, another crew member is identified, or the recertification of the original crew member is scheduled.

This is a multistage process where the initial objective is for preliminary crew determinations – primarily to identify certification issues. The next step is the actual assignment of crew members for a specific assignment – and even then, there may be crew changes between voyages. It is the actual sign-in of crew members on the vessel which triggers a considerable number of checklists specific to their presence and function on the vessel.

If the Master is satisfied that the review by the VRO is complete, and that all identified deficiencies have been resolved, he/she shall proceed with getting ready to undertake the first (and perhaps only) voyage associated with the assignment.

If the Master determines that there are either outstanding deficiencies or new ones have been identified, he/she decides whether the voyage(s) can proceed with those deficiencies, resolution of which will be scheduled in ship operations. If the decision is to proceed, the Master continues with preparations for the voyage(s).

If the Master determines that some or all of the deficiencies, considered critical deficiencies, must be resolved before the commencement of the voyage, the voyage(s) may have to be delayed until the deficiencies are resolved. All deficiencies, both critical and non-critical, are entered into ship ops and, upon resolution of the critical ones; the Master may proceed with preparations for the voyage(s).

Vessel Readiness Status

In addition to outstanding deficiencies, the other aspect of a vessel's capability to carry out an assignment is its current readiness status. Various owners have different criteria for classifying the status of a vessel, most commonly including: Cold Layup; Warm Layup; Standby; Departure-Ready; and Voyage.

A vessel in layup status would generally need some considerable time before undertaking a voyage, one in standby would usually be ready to move quickly to departure-ready status.

In VSMS, departure-ready status denotes the circumstances when a vessel is ready to undertake a specific voyage. It could be the end point of a long readiness process, or immediately following completion of another voyage.

VSMS differentiates between standby status and departure-ready status in that a vessel in standby status is generally ready for assignment while departure-ready status signifies readiness for a specific voyage, or voyages.

While in Voyage status the vessel is undertaking a specific voyage. Transition to the Voyage status occurs only from the departure-ready status. When the status of a vessel is to be changed, VSMS provides the appropriate SOPs and checklists to assist that process.

The VSMS database contains the full suite of SOPs and checklists associated with each vessel. During the initial implementation of VSMS Seashore Maritime Services' staff consult with personnel of the owner/operator to determine which of the SOPs and checklists apply to each change of vessel status.

Additionally, there are SOPs and checklists which facilitate maintaining a vessel in a particular status.

Vessels undergoing dockside refit or dry docking require additional SOPs and checklists specific to those activities.

Voyage Planning, Assessments and Familiarization

When a vessel achieves departure-ready status the preparations for the actual voyage(s) occurs. VSMS sends notifications to the assigned officers based on the planned sailing date from the vessel assignments. Acceptance of these notifications initiates readiness for the upcoming voyage(s).

To change the status of a vessel, officers and crew will usually be required. Their arrival on the vessel is noted in the ship's log(s) and recorded in VSMS. Depending on a number of factors, such as how long it has been since their assignment to the vessel, VSMS will provide notifications of familiarizations and other crew-related actions which may be required.

Most of these items will be the direct responsibility of the Master, the Chief Officer or the Chief Engineer who will be responsible for overseeing the crew assigned to the various work positions. Familiarization and safety briefings, emergency drills, muster stations and crew watches and specific work duties are but some of the matters associated with the arrival of a crew member. As well, it is necessary to ensure that supernumeraries receive appropriate familiarization training prior to the vessel's departure

An essential step is the entry into VSMS of a detailed Voyage Plan. Most of the time, the entry of this information will

take place over an extended period time as the details of the assignment and associated voyage(s) are established. However, it must be completed before the voyage.

In addition to preparing the Voyage Plan, both the Master and Chief Engineer independently make assessments of the vessel's readiness to immediately undertake the planned voyage. Some of those assessments can be delegated, but some will require the personal decisions of those officers. When these activities have been satisfactorily concluded, the vessel is then ready to undertake the voyage.

Emergency Preparedness

When the status of a vessel changes to standby or departure ready, VSMS starts the pre-determined certification monitoring for Life Saving, and Fire Fighting Equipment.

As well, the program also issues notifications of the required emergency drills. VSMS monitors the composition of the crew list.

If established parameters are exceeded, such as a more than 25 percent of crew change, VSMS issues notifications of the drills and other actions required.

In addition to providing notifications, the VSMS also provides access to the SOPs and checklists associated with these emergency preparedness requirements and maintains the record of the responses.

CREW CHANGE

25%

MUSTER STATION
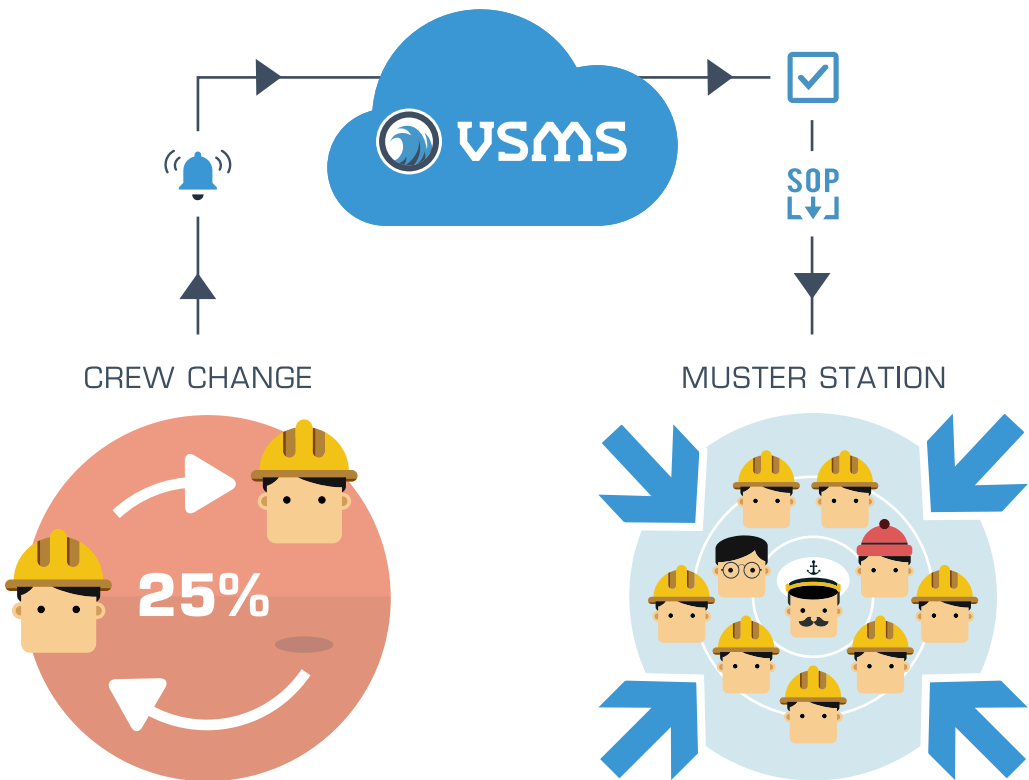
Voyages

It is the voyage which moves the VSMS focus from planning to implementation. Throughout the voyage, VSMS notifies the responsible ship's personnel of the actions needed to safely and effectively operate and maintain the vessel. The success of this process is directly related to the extent to which the associated information was entered into the program.

Assuming that the VSMS database contains adequate and accurate information, the program will not only provide notifications of the necessary steps, but will also make available the SOPs and other documents. As well, VSMS provides the checklists to ensure that all steps are carried out, and maintains a record of those actions.

Where maintenance or repairs are to be carried out, VSMS can provide access to a variety of supplementary documents, such as manufacturers' manuals, diagrams and other instructions to assist in carrying out the work.

Most voyages have six typical stages: Pre-Departure, Departure, Underway, Pre-Arrival, Arrival, and Post-Arrival. Each of these stages has a variety of associated actions and for each stage and VSMS provides notifications as well as the of the SOPs and checklists.

One of the key factors determining which SOPs and checklists are associated with post-arrival is the vessel's next task. If it is to immediately undertake another voyage, the list of those requirements will be comparatively short. If the vessel is to be brought back to Departure-Ready status, that will involve a longer list of requirements. Similarly, the process of putting the vessel in standby or layup will be quite extensive.

VSMS does not change what is required to safely and effectively operate a vessel. Regulatory, flag state, insurance and manufacturer entities each prescribe requirements that are usually supplemented by requirements established by the owners of a vessel. Without VSMS, the shore- and ship-based personnel would have to use their memories and other processes, including paper information and records, to ensure that all requirements are met. VSMS reminds personnel of the actions required as well as associated SOPs, checklists and other information. The program also maintains a record of the actions taken.

Safety Management System (SMS)

Safety management systems (SMS) allow marine transportation companies to identify hazards, manage risks, and develop and follow effective safety processes for vessel operations. The VSMS program facilitates compliance with the mandatory safety rules and regulations, as well as the codes, guidelines, and standards recommended by the IMO, classification societies, and concerned maritime organizations.

Transport Canada's recommended SMS contains twelve sections, or chapters, which detail how a vessel should operate on a day-to-day basis. These include the procedures to be followed in case of an emergency, how drills and training are conducted, measures required for safe operations, who is the designated person, etc.

The document should be prepared by the vessel owner or authorized representative in consultation with the vessel's officers and crew. Once entered into VSMS, the SMS chapters provide a framework for the safe operation of the vessel.

If a SMS document has not been prepared prior to the implementation of VSMS, the program facilitates the preparation of an SMS by prompting personnel to gather a broad range of information, including vessel and equipment specifications, operating procedures and other information, and then entering this information into VSMS.

VSMS is also a valuable tool whereby the vessel owners can demonstrate to regulatory agencies, class societies and underwriters that the requirements are being consistently met.
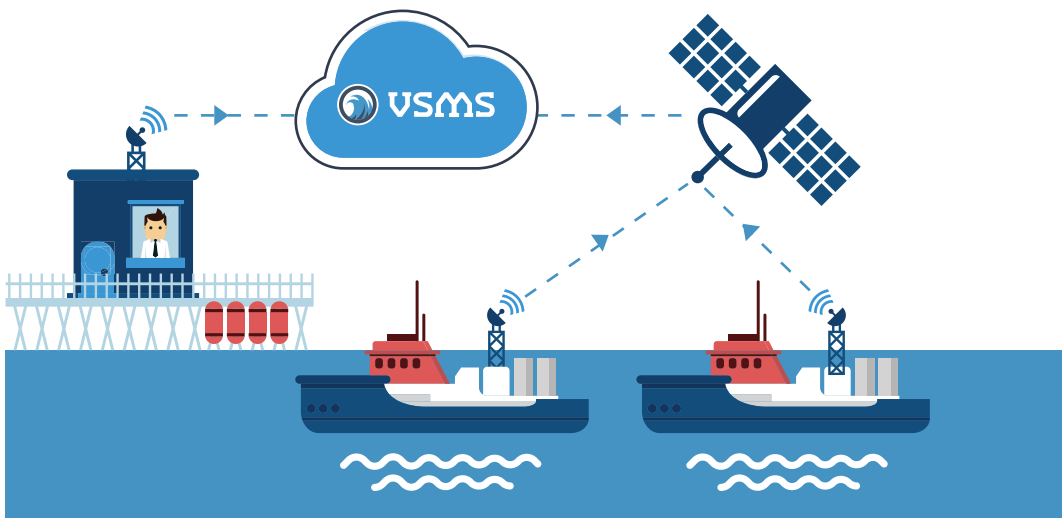
Logs

The handwritten log has traditionally been the principal means of recording the important facts about the operation of a vessel. In a few jurisdictions, there is growing acceptance and use of digital logs which record essentially the same information – but in a digital format.

Modern technology provides the opportunity to easily gather large quantities of a broad range of data. However, to use this data to produce knowledge requires effective analysis. The VSMS has been designed to record both human-inputted data, as well as data provided by sensors or other data-collecting tools.

Being an Oracle®-based program, VSMS can readily analyse large quantities of data and provide comprehensive, but concise, reports for both ship and shore based personnel.

When regulators, classification societies and underwriters eventually accept electronic logs, VSMS is already positioned to meet that requirement. For the present, VSMS data records and their analysis, offers the marine industry a tool to manage and make effective use of all of the information associated with a ship's operations.
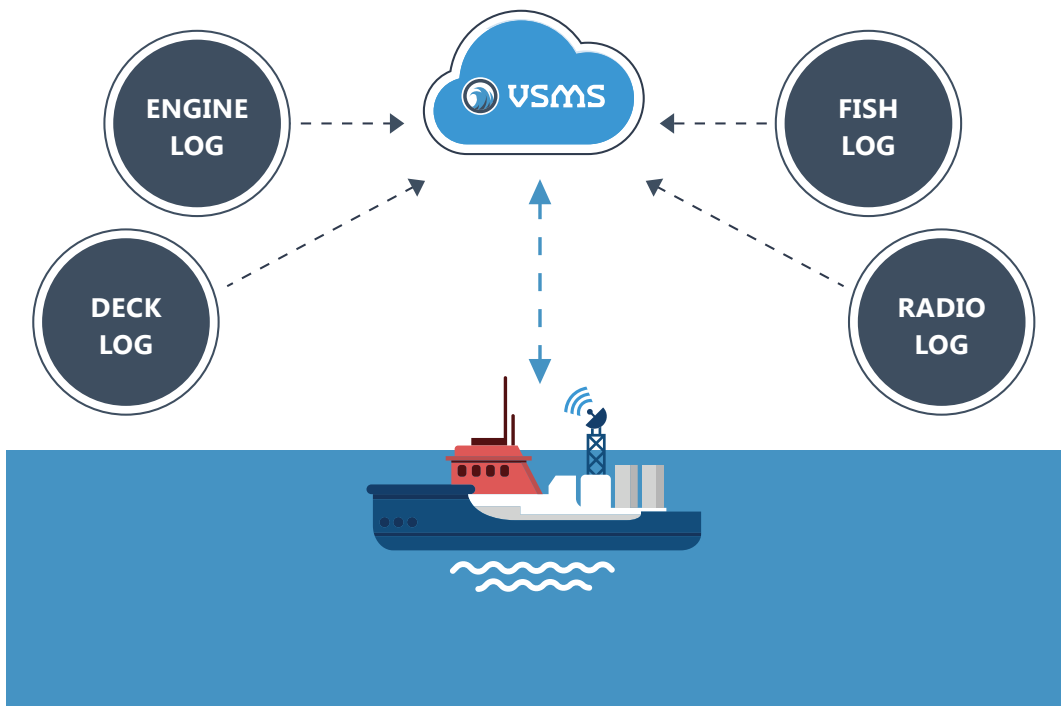
Oversight and Audits

Operations on a modern medium to large vessel are frequently complex and there is a great deal of associated information which should be recorded. Much of this data provides a valuable record and is very useful for the effective and efficient management of the ship. However, the review of extensive handwritten records covering a year or more is time consuming and the analysis is unlikely to yield the comprehensive results desired.

The recording of responses to all notifications by VSMS provides to senior ships officers and onshore managers a powerful tool to evaluate whether a vessel is being operated in accordance with established requirements. The VSMS data record is readily searchable and can provide valuable information about areas requiring attention. Being cloud-based, this data is equally available to ship- and shore-based reviewers and provides an opportunity to identify issues before they become significant problems.

Similarly, one of the principal challenges associated with an audit of a vessel is that a visit only provides a "snapshot in time" of the vessel operations, which may or may not be representative of usual operations. Audits can confirm that appropriate SOPs and checklists are in place, but it is difficult to confirm that they are routinely used.

VSMS provides to the audit process a powerful tool to sift through the data related to the operation of a vessel over a long period of time. The results of queries can highlight areas where nil or inappropriate responses suggest areas requiring more detailed examination.

VSMS can provide a broad range of documentation and analysis through custom reports. The program can also provide checklists for auditors doing a paper audit as well as for physical inspections and surveys on the vessel. The auditor can use the query section of the program to send a series of questions to pertinent personnel while doing the audit.

With regular use of the VSMS remote oversight capabilities, shore-based managers have an ongoing opportunity to evaluate vessel operations.

Other Features

13.1 Inventory Management

VSMS actively monitors the inventory of spare equipment, parts and supplies assigned to a specific vessel and notifies designated personnel when the inventory of an item reaches a pre-determined minimum level. This inventory can either be on the ship or assigned to the ship and stored at a shore facility. A requisition is used to approve the removal of the item from the vessel-specific inventory and to enable VSMS to track the inventory levels. The program issues a notification when the inventory of an item falls below a predetermined level.

Also stored at the shore facility is an inventory of spare equipment, parts and supplies not assigned to a specific vessel. Requisitions are also used to transfer items from this inventory to a vessel-specific inventory. As with the vessel-specific inventory, VSMS monitors the inventory levels and notifies designated personnel when the inventory of an item reaches a pre-determined minimum level.

13.2 Shipboard Communications

VSMS can be used as the hub of ship-board communications. E-mails and other communications to crew members can be managed through the program.

Besides automatically providing notifications, instructions and procedures to assigned roles within the system, VSMS can also provide instructional information, such as vessel familiarization for new crew members and supernumeraries. This information can be presented to them directly on tablets or laptops, as well as on ship-board TV screens.

13.3 Electronic Data

VSMS has a broad capacity to accept and utilize data provided by ship-board electronics associated with functions such as engine and equipment operations, navigation, and industrial processes. Because these data streams are equipment-specific, it is frequently necessary to install an interface to enable the use of the data.

Similarly, VSMS can utilize data from a variety of personnel-management and other software. Again, an interface is usually required in order to accept the data for use in the Oracle® environment.

In addition to this information being immediately available to ship-based personnel, because VSMS is cloud-based this information is also available to shore-based personnel whenever the ship has access to the internet.
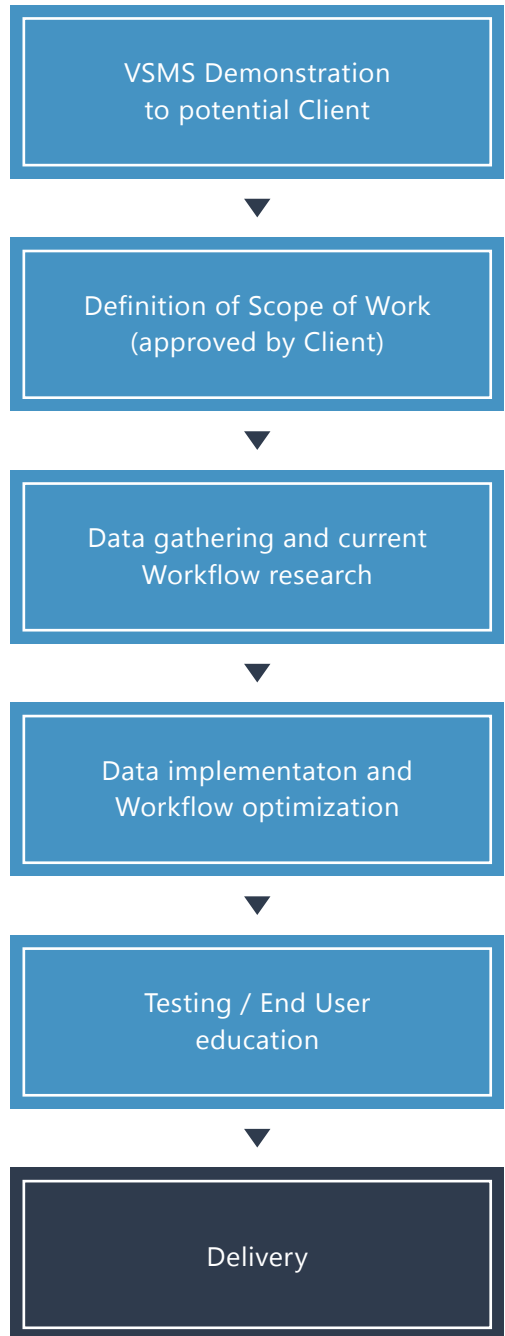
Implementation

Being a cloud-based program running on a high-capacity network server, VSMS clients can use ordinary Windows®-based desktop and tablet computers. The minimum requirement on the vessel is a modest offline server with a touch screen, running an offline version of the VSMS software. On most vessels, the addition of at least one tablet would be useful. Depending on the size of the vessel, additional computers and/or tablets would give greater flexibility for accessing VSMS.

The offline version of VSMS enables the program to operate without Internet access. The program synchronizes with the primary program when Internet access is available. When the connection is through a satellite phone or other device with limited data transfer only key pieces of data are exchanged. When the vessel has a high-speed connection, full data exchange occurs.

Shore-based desktop computers and tablets use the Internet for connection to the primary VSMS program.

The usefulness of VSMS is directly proportional to the amount of vessel-specific operational data provided to the program. In order for a feature to be used to assist in vessel management, the information pertaining to that feature must be added to the program.

VSMS Demonstration
to potential Client

▼

Definition of Scope of Work
(approved by Client)

▼

Data gathering and current
Workflow research

▼

Data implementaton and
Workflow optimization

▼

Testing / End User
education

▼

Delivery

Seashore Maritime Services Limited and associated companies, employ a team of skilled marine technicians and information technology professions who understand the industry and have developed VSMS as a unique solution to the challenge of safe and efficient vessel management.

Through the use of Oracle® database management software, VSMS offers a comprehensive, very flexible tool to assist both vessel-based and shore-based personnel meet the industry's increasing management needs.

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