REASSESSMENT OF THE RESPONSE TO TSB RECOMMENDATION M11-02

Stability guidance information for sail training vessels

Background

On the afternoon of 17 February 2010, the sail training yacht *Concordia* was knocked down and capsized after encountering a squall off the coast of Brazil. All 64 crew, faculty, and students abandoned the vessel into life rafts. They were rescued 2 days later by 2 merchant vessels and taken to Rio de Janeiro, Brazil.

The Board issued the safety recommendation on 29 September 2011.

TSB Recommendation M11-02 (September 2011)

Sailing vessels rely on the wind to provide propulsion. However, that wind is also the source of significant heeling forces. Consequently, the safe operation of a sail training vessel, such as *Concordia*, requires a comprehensive understanding of the vessel's stability at large angles of heel as well as the balance between the heeling force of the wind and the righting capability of the hull for any given wind condition and sail plan. These aspects distinguish sailing vessel stability from motor vessel stability. A lack of understanding of these aspects, or an inability to assess the margin of safety of the vessel as conditions change, may result in exceeding safe stability limits, possibly leading to the knockdown, capsize and loss of the vessel.

Following its investigation into the loss of the barque *Marques* in 1987, U.K. Maritime and Coastguard Agency (MCA) recommended that research be conducted with a view to developing a set of stability requirements for sail training vessels. The resulting requirements include the provision of squall curves to assess the vulnerability of a vessel to downflooding under the influence of wind speed increases, either due to gusts or squall conditions. The objective of this information is to provide officers with a means to continuously assess the risk to their vessel and to permit timely mitigating action.

Since the adoption of the standard by the U.K., flag states such as Canada, Malta, Sweden, and the Bahamas have also adopted it. Several other flag states, such as the U.S., Poland, the Netherlands and Australia, require vessel designers to perform an initial theoretical assessment of a vessel's stability while under sail. However, they do not require officers to be provided with detailed, vessel-specific guidance information. The lack of such a requirement means that officers must rely on qualitative, experience-based knowledge when assessing risk. However, such reliance cannot ensure that an acceptable, consistent standard of safety is being achieved across the industry, due to the variations in experience and competency.

The squall curves contained in the *Concordia*'s stability booklet indicated that the vessel would be safe in wind speeds approximately twice those experienced in the hour leading up to the occurrence. Although a squall was approaching, the second officer, who was not aware of this

guidance, did not change the sail plan or heading despite the fact that squalls are unpredictable and could involve wind speeds several times greater than those being experienced. Had the squall curves been consulted and acted upon by either the master or the second officer, the sail plan would likely have been reduced and the heading changed significantly thereby reducing the risk of a knockdown.

Assuming that vessel-specific guidance information is provided, it is then essential that officers be competent to make effective use of it. The investigation determined that the second officer held a certificate of competency issued by the U.K. However, the stability knowledge required to obtain such a certificate is basic and does not address all stability issues, including squall curves specific to sailing vessels. Neither had the master nor the commanding officer received specific training with respect to squall curves as presented in the *Concordia*'s stability booklet.

The TSB has identified a safety deficiency in that flag states do not require officers to be knowledgeable in the use of guidance information, such as the squall curves, that may be available.

In light of the safety deficiencies identified in this investigation and given the risk associated with the operation of sail training vessels, the Board is concerned that their officers may not be adequately equipped with the information and training necessary to help them recognize and manage that risk. Furthermore, given the absence of an internationally coordinated approach to advance the safety of sail training vessels, the Board is concerned that the deficiencies identified may continue to place such vessels, crews and trainees at risk.

As an authoritative flag and port state, Canada is well placed to take a leading position in advocating for international standards with respect to the provision of stability guidance for sail training vessels and for the training of their officers on its use. This may best be achieved as a joint program with the U.K. and U.S. authorities and others, and be directed as appropriate to the IMO and STI.

The Board therefore recommends that:

> The Department of Transport undertake initiatives leading to the adoption of international standards for sail training vessels on the provision of stability guidance to assist officers in assessing the risk of a knockdown and capsize, and for the training of officers in the use of this information.
>
> **TSB Recommendation M11-02**

Transport Canada's response to Recommendation M11-02 (December 2011)

Transport Canada Marine Safety (TCMS) indicated that it had participated in the annual Sail Training International (STI) conference that was held in Toulon, France from November 17-19th, 2011 and met with the STI executive and other flag state representatives. STI is an international organization composed of the national sail training organizations of 29 flag state administrations and holds annual conferences to discuss matters related to sail training vessels and programs.

At the 2011 conference, TCMS raised the *Concordia* occurrence and gave a brief overview of the Transportation Safety Board of Canada's (TSB) report, and outlined the resulting recommendations. TCMS proposed the adoption of an international sail training stability standard, and sought STI member support for a joint submission to the International Maritime

Organization (IMO) to recognize the United Kingdom's (UK) stability standard. There was little interest among member countries to make such a submission to the IMO. It was explained that previous attempts had been made to raise other sail training issues at the IMO with no concrete results. Additionally, the flag state administrations that were present did not see a need to adopt an international standard on stability as each was satisfied with their existing national standards and did not feel that an international standard is a priority for them.

As it was clear that there was little support for the adoption of an international standard, TCMS proposed that the STI support the development of a training syllabus for endorsing Officers of the Watch on sailing vessels for STI member countries, which would include techniques to mitigate stability risks, such as squall curves. The STI executive and other member countries agreed that a common training syllabus would be beneficial and made this an action item. This presents an opportunity for international harmonization.

In addition, although member states did not support the development of an international stability standard, they agreed that a common harmonized regulatory approach might be beneficial for sail training vessels that engage in international voyages. Consequently, STI is to establish an international forum through which member countries may discuss and consult on sail training regulatory issues. This forum is to be integrated into the annual conference. Canada is evaluating its capacity to attend the conference annually; however, STI will also coordinate a correspondence group to progress action items and will be asking for Canada's input. It is important for the TSB to note that the preliminary work done to date, as described above, has confirmed that Transport Canada has limited ability to influence international standards for sail training vessels, due to the fact that Canada's fleet of sail training vessels is very small. In addition, those flag states that do have large sail training vessel fleets do not view Canada as having a strong presence on this issue, and are reluctant to provide a platform for Canada to present its views. Nevertheless, TCMS will continue to promote the adoption of an international stability standard through the correspondence group to the best of its abilities.

Transport Canada (TC) considers these actions and efforts, as described above, should satisfy the recommendation of the Transportation Safety Board to "undertake initiatives leading to the adoption of international standards for sail training vessels on the provision of stability guidance to assist officers in assessing the risks of a knockdown and capsize, and for the training of officers in the use of this information".

TSB assessment of the response to Recommendation M11-02 (March 2012)

TC's proposal that STI support the development of a training syllabus for endorsing Officers of the Watch on sailing including techniques to mitigate stability risks, such as squall curves, and STI's support, shows potential to improve the overall training for sail training vessel officers.

TC's response does not indicate any further initiatives leading to the development (and adoption) of international standards for the provision of stability guidance to assist officers in assessing the risk of a knockdown and capsize, as recommended by the Board. Additionally, the Board still believes that, as a highly respected and authoritative flag and port state, Canada continues to be well placed to take a leadership role in advocating for international standards in this regard.

The response to this recommendation is assessed **Satisfactory in Part.**

Transport Canada's response to Recommendation M11-02 (December 2012)

In 2011, shortly after this recommendation was made, Transport Canada Marine Safety and Security (TCMSS) was invited to and attended a flag state seminar hosted by Sail Training International (STI) prior to the start of their 2011 annual conference. Transport Canada took the initiative by sending a TCMSS representative to France to meet with other flag state representatives and the STI executive, and also invited a TSB representative to accompany them.

In order to gauge the level of support for the IMO route, TCMSS used the flag state meeting as an opportunity to make a proposal to other flag state representatives for the joint submission of a paper to the IMO for the adoption of a stability standard that contained guidance to assist officers in assessing the risk of a knockdown and capsize. The intention was that this would provide the tools for and influence the training of sailing officers in the future. This proposal did not receive support from any of the other flag state representatives, including the United Kingdom where the standard and guidance that was being proposed was originally developed. The explanation was that the IMO has higher priorities than adopting specialized sail training vessel requirements. At the same time the STI executive did advise that they preferred to work within their own organization to develop internal guidelines rather than to work with the IMO and create further regulatory requirements. TCMSS's proposal therefore achieved an important result in identifying that working with STI should prove more productive than working at the IMO level at this time.

Subsequently the flag state discussion at the STI meeting changed to the development of a standard for sailing endorsements through the STI (the idea being that stability guidance and training in the use of that information could be incorporated directly into the sailing endorsement syllabus that could then be adopted by STI member vessel operators). While there was agreement that a common approach between countries would be beneficial for the sail training industry, it was clear that flag states would not support an STI sailing endorsement over any endorsement in their own personnel certification regime.

TCMSS was not invited to attend Sail Training International's 2012 Annual Conference held in Riga, Latvia, in November 2012 and was therefore unable to advance this recommendation further in 2012. STI's 2013 Annual Conference will be held in Aalborg, Denmark, in November 2013.

Sail Training International (STI) is a non-governmental organization composed of national sail training organizations and operators with their own interests and agendas. While more detailed stability guidance for sail training vessel officers may be adopted by STI as part of their internal best practices, Transport Canada is not a member of this group and has limited ability to ensure that it is done in a comprehensive or timely manner that would address the TSB recommendation. The Canadian Sail Training Association (CSTA) is a member of STI with direct access to the STI's internal working groups. The CSTA may be the best organization for applying pressure for the adoption of any internal STI standards. However, it must be kept in mind that the CSTA is a very small player on the international stage, having only 7 small sail training vessels that rarely leave Canadian waters.

TCMSS will continue to work with international organizations and operators when and where possible to advocate the adoption of stability guidance to assist officers in assessing the risk of a knockdown and capsize, and for the training of officers in the use of this information.

TSB reassessment of the response to Recommendation M11-02 (March 2013)

The response to this recommendation remains **Satisfactory in Part.**

Transport Canada's response to Recommendation M11-02 (November 2013)

In TC's response of November 2013 they indicated that "In 2011, shortly after this recommendation was made, Transport Canada Marine Safety and Security (TCMSS) was invited to and attended a flag state seminar hosted by Sail Training International (STI) prior to the start of their 2011 annual conference. Transport Canada undertook the initiative by sending (as well as inviting a TSB representative to accompany) a TCMSS representative to France to meet with other flag state representatives and the STI executive.

In order to gauge the level of support for the IMO route, TCMSS used the flag state meeting as an opportunity to make a proposal to other flag state representatives for the joint submission of a paper to the IMO for a the adoption of a stability standard that contained guidance to assist officers in assessing the risk of a knockdown and capsize. The intention being that this would provide the tools for and influence the training of sailing officers in the future. This proposition did not receive support from any of the other flag state representatives including the United Kingdom where the standard and guidance that was being proposed was originally developed. The explanation was that the IMO has higher priorities than adopting specialised sail training vessel requirements. At the same time the STI executive did advise that they preferred to work within their own organisation to develop internal guidelines rather than to work with the IMO and create further regulatory requirements. TCMSS's proposal therefore achieved an important result in identifying that working with STI should prove more productive than working at the IMO level at this time.

Subsequently the flag state discussion at the STI meeting changed to the development of a standard for sailing endorsements through the STI (the idea being that stability guidance and training in the use of that information could be incorporated directly into the sailing endorsement syllabus that could then be adopted by STI member vessel operators). While there was agreement that a common approach between countries would be beneficial for the sail training industry, it was clear that flag states would not support a STI sailing endorsement over any endorsement in their own personnel certification regime.

TCMSS was not invited to attend Sail Training International's 2012 Annual Conference held in Riga, Latvia in November 2012 and was therefore unable to advance this recommendation further in 2012.

A TCMSS representative was invited to and attended the Sail Training International 2013 Annual Conference in Aalborg, Demark (November 14 to 16th 2013) where the Sailing Endorsement Working Group was meeting. TCMSS advocated for the inclusion of stability guidance information (and for the training of officers in the use of this information) in the STI's new sail training endorsement syllabus. It is expected that, by ensuring the proper use of squall curves to assess the risk of knockdown and capsize is incorporated into the sailing endorsement syllabus, the trained officers will appreciate the importance of this information and in this way be influenced to provide the stability guidance on board their own vessels. Eventually, as more and more international sailing officers and crew complete this training, the stability guidance will gain traction with other Flag State administrations to adopt it as part of their own sailing vessel stability guidance. At this time, this is seen as the initiative most likely to succeed in light

of Canada's very limited influence over other flag states and their adoption of any international standards for their sail training vessels.

Sail Training International (STI) is a non-governmental organisation composed of national sail training organisations and operators with their own interests and agendas. While more detailed stability guidance for sail training vessel officers may be adopted by STI as part of their internal best practices, Transport Canada is not a member of this group and has limited ability to ensure that it is done in a comprehensive or timely manner that would address the TSB recommendation. The Canadian Sail Training Association (CSTA) is a member of STI with direct access to the STI's internal working groups. The CSTA may be the best organisation for applying pressure for the adoption of any internal STI standards. However, it must be kept in mind that the CSTA is a very small player on the international stage having only seven small sail training vessels that rarely leave Canadian waters.

TCMSS will continue to work with international organisations and operators when and where possible, to advocate the adoption of stability guidance to assist officers in assessing the risk of a knockdown and capsize, and for the training of officers in the use of this information."

TSB reassessment of the response to Recommendation M11-02 (March 2014)

This recommendation calls for TC to undertake initiatives in two areas—first, towards the adoption of an international standard for the provision of stability guidance; second, towards the development of international training standards for officers in the use of this stability guidance information. To date, TC's responses to this recommendation indicate that they have undertaken two related initiatives:

- In 2011, a TC representative attended a flag state seminar at the STI annual conference and sought STI member support for a joint submission to the IMO to recognize the UK stability standard as an international standard. TC determined that there was little interest in the adoption of an international stability standard and furthermore, that the IMO was not an effective venue within which to address sailing vessel issues. TC then proposed that the STI develop a training syllabus for OOW's which would include techniques to mitigate stability risks, such as squall curves.
- In 2013, a TC representative attended the STI annual conference and advocated for the inclusion of stability guidance information in the STI's new sail training endorsement syllabus, which is under development.

TC's response indicates that although it will continue to work with international organisations to advocate the TSB Recommendation, it maintains that it (and the CSTA) has very limited influence in the sector. Furthermore, TC's most recent activity addresses the training provision of the recommendation, but does not address the requirement to provide stability guidance information to officers on board.

The Board maintains the assessment **Satisfactory in Part**.

Transport Canada's response to Recommendation M11-02 (December 2014)

Transport Canada's response reiterated the information provided in its response of November 2013, and added that in "December of 2014, TCMSS sent a letter to STI advocating for additional requirements to be included in the ISM-Lite Manual, a copy of which was sent to the Board."

TSB reassessment of the response to Recommendation M11-02 (March 2015)

Since the previous assessment of this recommendation in March 2014, TCMSS has sent a letter (dated 29 December 2014) to STI advocating for additional requirements to be included in the STI ISM-Lite Manual, including specific data and guidance on wind heel moment, sail carriage versus wind speed, and squall curves. TC also recommended that there be procedures and checklists for the use of stability information and the maintenance of stability, watertight integrity and seaworthiness, as well as requirements related to the training of officers in the use of stability information. The letter furthermore requests that these recommendations be introduced and discussed at the next STI meeting. At the time of this assessment, TSB was not aware of any response on behalf of the STI to this request.

TC's response indicates that, although it will continue to work with international organizations to advocate the TSB recommendation, it (and the CSTA) has very limited influence in the sector.

The assessment of the response remains **Satisfactory in Part**.

Transport Canada's response to Recommendation M11-02 (December 2015)

There is no update for 2015; TC remains committed to working within the extent allowed by its mandate, along with the TSB, to find a way forward on this recommendation.

TSB reassessment of the response to Recommendation M11-02 (March 2016)

The TSB and TC are collaborating to bring about international change in the sail training community. The adoption of international standards for sail training vessels on the provision of stability guidance to assist officers in assessing the risk of a knockdown and capsize and for the training of officers in the use of this information remains a priority for the Board.

The assessment of the response remains **Satisfactory in Part**.

Transport Canada's response to Recommendation M11-02 (December 2016)

TC remains committed to working within the extent allowed by its mandate, along with the TSB to find a way forward on this recommendation.

TSB reassessment of the response to Recommendation M11-02 (March 2017)

As indicated in 2016, the TSB and TC are collaborating to bring about international change in the sail training community. The adoption of international standards for sail training vessels on the provision of stability guidance to assist officers in assessing the risk of a knockdown and capsize and for the training of officers in the use of this information remains a priority for the Board. The assessment of the response remains **Satisfactory in Part**.

Next TSB action

The TSB will continue its outreach efforts with key stakeholders and will monitor domestic and international activity with respect to the risks associated with this safety issue.

This deficiency file is **Dormant**.