Collision during STS berthing operation

Case One:

Before cargo ship-to-ship (STS) transfer operations at sea could begin, two tankers had to make fast to one another while underway and making way; known as a “run-in”. The larger 243m long tanker was the constant heading ship, making a speed of about 4.2 knots, and the smaller 172m long tanker was manoeuvring ship, which had four large Yokohama fenders made fast along her port side. The manoeuvring ship approached the constant heading ship’s starboard side from astern, and then paralleled her course and matched her speed at a distance of about 1 cable abeam.

The STS Superintendent was on the manoeuvring ship and had the con, while standing at the outboard end of the port bridge wing. The master was close by him relaying orders by voice and by a hand-held radio to the third officer and helmsman inside the wheelhouse. The third officer was relaying the ship’s speed and acknowledging the helm orders by hand-held radio to and from the master, and was also operating the telegraph as instructed. The helmsman had been at the wheel for 1.5 hours and had been steering course orders rather than specific helm orders.

Due to a delay caused by re-rigging the fenders earlier that afternoon, the run-in was now to occur in darkness, as agreed by the masters of both tankers. The sea state was slight, with a light wind on the starboard bow, and it was a moonlit night. The exterior bridge wing helm indicator illumination was very poor and could not be seen from the superintendent’s position.

When the manifolds of the two ships were in line, the superintendent began giving specific helm orders to bring the tankers closer to one another so that mooring lines could be passed between them. Initially, he gave a “port 10” rudder order, which was acknowledged on the radio by the third officer and by direct voice from the helmsman. When the interior bridge rudder indicator showed that the rudder had reached 10 degrees to port, the helmsman shouted “port 10 now”. As the bow began to swing to port and towards the other ship, the superintendent ordered “midship” and then “starboard 10” to counter the swing. The helmsman shouted “starboard 10 now”. However, the port swing did not stop.

The superintendent then ordered the helm to “starboard 20” and then to “hard to starboard”, and an increase in speed, but the rate of turn to port increased. Realizing that something was wrong, the master repeated the orders to the third officer and helmsman. The bridge wing indicator was checked at this time and found to be reading “port 20”. The helmsman then applied starboard helm and the rate of turn to port decreased, stopped and then the ship began to swing to starboard. However, after having made an alteration of course of nearly 30 degrees to port, the port side of the forecastle inevitably collided with the other ship, causing structural damage. Fortunately, there were no resulting injuries or pollution.

Case two:

In a similar accident, the constant heading ship and the manoeuvring ship had reached a stage at which they matched courses and speed and were about 10m abeam of each other. The superintendent and master were on the port bridge wing of the manoeuvring ship, with the OOW and helmsman inside the wheelhouse.

The superintendent asked for “stop engines”, which was carried out. The master, who was relaying the superintendent’s orders to those within the wheelhouse, then talked by hand-held radio with the chief officer, who was on the fo’csle. The superintendent asked the master for “Dead Slow Ahead”, which was executed by the officer in the wheelhouse.

Shortly afterwards, the helmsman reported that he was unable to steer and the officer reported that the engine was now running astern. The ship’s port quarter was closing the other vessel’s starboard quarter, so the superintendent asked for ever increasing ahead movements together with port helm orders.

Despite the superintendent’s actions the two ships collided, causing structural damage in way of both vessels’ boat decks.

Figure 1: Bridge steering console

Figure 2: Poor illumination of bridge wing instrumentation

The Lessons learnt:

1. In the first case, the helmsman had been concentrating for 1.5 hours on steering ordered courses, and it was increasingly important to keep these as accurate and steady as possible as the ships approached each other. When the superintendent's instructions changed from courses to steer to specific helm orders, the helmsman was relatively able to relax as he had only to move the wheel to the desired graduation on the wheel's boss (see photograph). This led to a lapse in concentration and resulted in him mistakenly applying opposite helm.
It is necessary to change the helmsman at frequent intervals so that concentration is maintained.

2. In the critical stages of bringing two ships together, it is essential that orders are relayed and executed correctly, and that any error is immediately identified and countered. The ambient noise and the distance between the originator of the orders and those carrying them out can be such that they are not easily heard. Each situation requires careful consideration to ensure sufficient personnel are available to verify that orders are relayed, received and acted upon correctly.

3. Bridge wing instrumentation provides an important tool for checking that helm or engine orders have been correctly executed.
The instrumentation needs to be regularly maintained and checked to ensure its functionality, particularly before critical operations such as those described above.
A poorly illuminated indicator is of little value at night (see photograph).