SVERIGES ÅNGFARTYGS ASSURANS FÖRENING
The Swedish Club
Est. 1872

The Swedish Club Highlights

September 2005

Main engine damage

- an update of the 1998 study

During mid 1998 The Swedish Club presented the findings of a 10-year study of main engine damage claims (1988-97). This report sets out the results of a follow-up study, spanning the six-year period 1998-2004. The primary finding is that medium speed engines still account for a disproportionate number of major machinery damage claims. Furthermore, the average cost of main engine claims (on a per year/vessel basis) is four times higher for medium speed engines, compared to low speed engines.

The objectives of this latest survey were: to update the analysis published in 1998; identify new claims trends; and review and (where appropriate) reinforce the Club's Engine Damage Prevention Programme. The fundamental aim is to reduce the incidence and cost of main engine damage.

For the purposes of comparison, the new investigation followed the same methodology adopted for the earlier survey. Only claims costing USD 10,000 or more (deductible included) were considered. It should be borne in mind, however, that the costs cited understate the true scale of the problem, as claims falling below the deductible (averaging USD 116,000 in the case of main engine claims) tend not to be brought to the Club's attention. All costs are adjusted to 2005 levels.

Overview

The Swedish Club provides members with a range of covers, including P&I, FD&D and H&M. As at September 1st 2005, the Club had 1,459 vessels entered for H&M, 741 for P&I and 347 for FD&D.

Insurance is a significant cost element for vessel owners and operators. In most cases, insurance costs are second only to crew costs. Main engine claims represent an expensive cost component. For this reason, The Swedish Club has a proactive policy, directed at raising awareness of engine damage problems and encouraging manufacturers to respond with new and more effective measures to reduce the incidence of damage.

Figure 1a. H&M Claims by number, 1988-1997

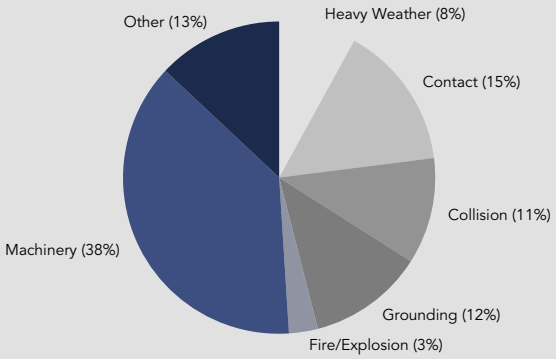


Figure 1b. H&M Claims by cost, 1988-1997

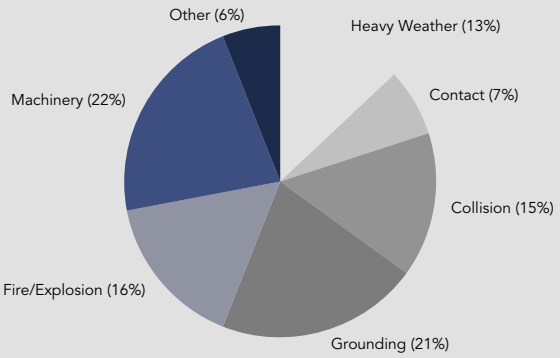


Figure 2a. H&M Claims by number, 1998-2004

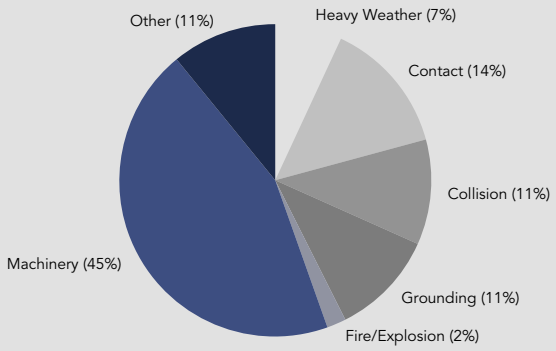
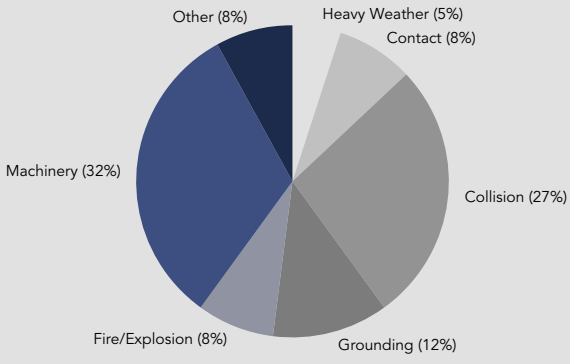


Figure 2b. H&M Claims by cost, 1998-2004



H&M claims

The Club's H&M claims in the 1988-1997 and 1998-2004 periods are shown in Figures 1 and 2, respectively.

Seven claims categories are represented. It can be seen that machinery claims have risen significantly since 1998, both in terms of numbers and cost. Machinery claims accounted for 38 per cent of H&M claims in the earlier study, increasing to 45 per cent in the second study period. Machinery claims costs represented 22 per cent of total H&M claims costs in the earlier analysis, rising to 32 per cent in the second period. That said, the reader should be aware that the proportion of machinery claims numbers and costs has increased largely due to contraction in other H&M claims categories, such as groundings and fire/explosion incidents. Indeed, the average cost of machinery claims has fallen over the past six years.

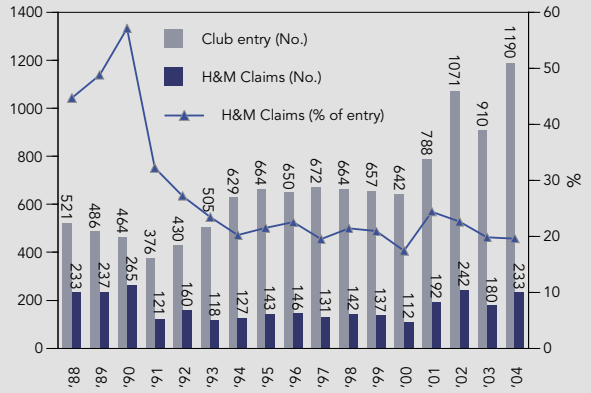
More specifically, the average cost of engine damage claims has fallen from USD 335,000 to USD 301,000 since 1998 – suggesting that the Club's vigorous loss prevention activities in this area have had some beneficial impact. Nevertheless, main engine claims remain very costly. Clearly, much work remains to be done on this front.

Across the seven H&M claims categories, The Swedish Club recorded 1,238 major claims in the 1998-2004 period (Table 1), as against 1,681 in the 1988-1997 period. The cost totalled USD 483 million – a sharp contrast to a figure approaching USD 700 million reported in the 1998 study. The average H&M claim cost USD 390,000, as against USD 491,000 for the ten years to 1997. The H&M claims trend (claims number/club entry) is shown in Figure 3.

Table 1. H&M claims, 1998-2004

Claims type	Number	Total cost (USD)	Avg. Cost (USD)
Heavy Weather	83	25.040.827	301.697
Contact	172	41.037.341	238.589
Collision	130	129.829.551	998.689
Grounding	133	58.028.719	436.306
Fire/Explosion	24	36.932.101	1.538.838
Machinery	558	151.134.439	270.850
Other	138	40.991.227	297.038
Total	**1238**	**482.994.204**	**390.141**

Figure 3. H&M claims and trends 1988-2004



Machinery claims

The average cost per machinery claim has fallen from USD 294,000 to USD 271,000 over the past six years. As mentioned above, this trend is reflected in the main engine damage statistics, with average cost falling by around 10 per cent, to USD 301,000.

As in the previous survey, machinery claims were grouped into six categories (Table 2). There were 558 machinery claims in the 1998-04 period, costing USD 151.1 million. Main engine damage remains by far the largest category, contributing 46 per cent of total machinery claims cost (51 per cent in the earlier study) and 14.4 per cent (11.5 per cent) of total H&M claims cost.

Main engine claims

Figure 4 is an overview of the main engine claims trend over the 16-year period embracing both studies. The trend line has broad similarities to that shown in Figure 3 (for all H&M claims). Main engine damage claims involved, on average, 4.8 per cent of vessels entered with The Swedish Club. The total cost of main engine damage over 1988-2004 approached USD 165 million. The latest survey records 232 main engine claims costing USD 69.8 million.

It is disappointing to find that medium speed engines continue to be over-represented in the claims statistics. Figure 6 shows that, while 18.7 per cent of entered vessels had medium speed engines, these ships accounted for 46.9 per cent of engine damage costs. The corresponding statistics for the earlier study (Figure 5) are 24.2 per cent and 58.2 per cent, respectively. It is apparent that the Club still faces a significant loss prevention challenge in this area.

Figure 6 shows that the proportion of entered vessels with low speed engines has increased significantly, while the number with medium speed engines has decreased. In addition, there has been a substantial decrease in the number of vessels with steam turbines. No major claims involved these engines in the 1998-2004 period. Furthermore, Figure 6 underlines the very expensive character of gas turbine breakdowns (although this statement must be qualified, due to the relatively small population of entered vessels equipped with gas turbines).

Table 2. Machinery claims, 1998-2004

Claims type	Number	Total cost (USD)	Avg. Cost (USD)
Main engine	232	69.744.597	300.623
Steering gear	66	15.636.563	236.918
Aux. engine	120	27.257.436	227.145
Boilers	65	18.138.065	279.047
Propulsion	63	17.798.483	282.516
Other	12	2.559.295	213.275
Total	**558**	**151.134.439**	**270.850**

Figure 4. Main engine claims and trends 1988-2004

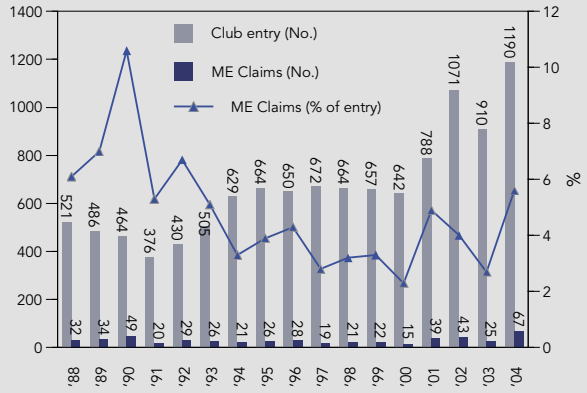


Figure 5. Percentage of Club entry and damage cost by engine type, 1988-1997

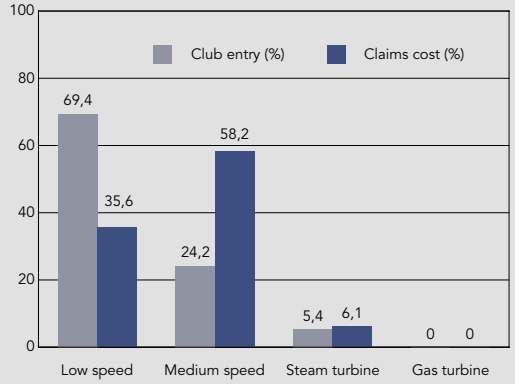
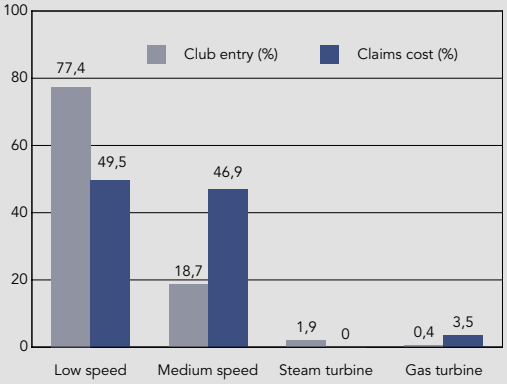


Figure 6. Percentage of Club entry and damage cost by engine type, 1998-2004



Observations on specific makes

The latest survey exposed a redistribution of claims amongst the four most common low speed and medium speed engine makes (Figures 7 and 8). The identity of the eight specific makes surveyed is protected by the codes LS1-LS4 and MS1-MS4. The identity of these makes is available to Club members exclusively and upon request.

The two surveys offer a broadly similar picture, with the important exceptions of LS2 and MS4. LS2 experienced a significant increase in claims, with two types of damage accounting for 34 per cent of this make's total damage cost. Furthermore, a specific LS2 model accounted for nearly 30 per cent of this make's total claims cost.

MS4 also saw a major increase in claims over the past six years. Once again, there were two main damage types, producing 84 per cent of claims and 66 per cent of cost (although it should be noted that a relatively small claims population is involved).

Figure 9 offers an alternative depiction of main engine claims costs: total damage costs in relation to the total number of Club entries over the survey period. This approach yields the average cost of main engine claims per year/vessel. Figure 9 delivers a stark message: the claims cost (year/vessel) for ships with medium speed engines is four times higher than for ships with low speed engines.

The extreme is represented by the cost for gas turbine-equipped vessels: 14 times higher – although this reflects the small population of entered gas turbine ships and some very expensive gas turbine claims.

Figure 7. Percentage of Club entry and damage cost by engine make, 1988-1997

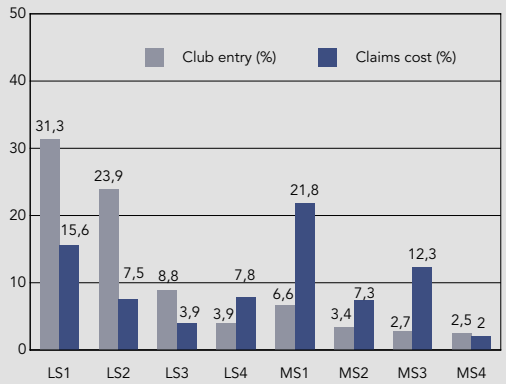


Figure 8. Percentage of Club entry and damage cost by engine make, 1998-2004

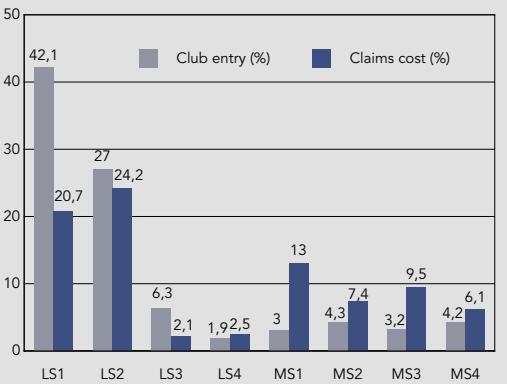
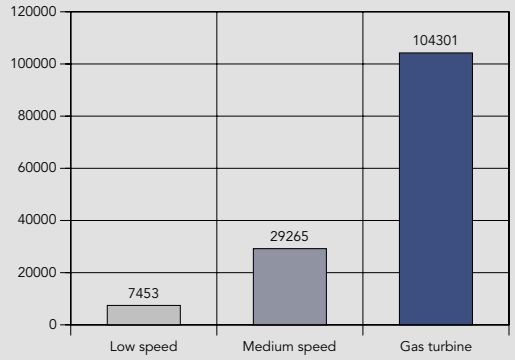


Figure 9. Average cost for main engine related damages per year and vessel by engine type (USD)



Types of main engine claim

Table 3 focuses on the eight most common main engine claims types. In terms of numbers and total cost, turbocharger damage remained the most common and costly claims category, accounting for 84 of the 232 claims and USD 17 million of the USD 69.8 million total cost. 63 of the 84 turbocharger claims involved low speed engines.

Crankshaft and connecting rod failures represented the second most common and expensive damage category. In fact, in terms of average cost, these failures produced the most expensive claims (USD 647,000 per damage). This is a significant decrease, however, on the USD 875,000 average cost reported in the earlier survey.

Tables 4 and 5 show the five most common claims for low speed and medium speed engines. Turbocharger damage is the most common and expensive failure event for low speed engines. Crankshaft and connecting rod damage is the most expensive medium speed engine failure category. There were 21 such claims in 1998-2004, costing USD 13.6 million.

Table 4 also shows that, on an average cost basis, damage to the Journal or Bearings is the most expensive claims type (at USD 324,000).

Table 3. The eight most common types of claims (all engines)

Claims type	Number	Total cost (USD)	Avg. Cost (USD)
Turbocharger	84 (36,2%)	16.983.474 (24,4%)	202.184
Crankshaft, Connecting rod	23 (9,9%)	13.949.870 (20,0%)	606.516
Cylinderliner	17 (7,3%)	4.267.795 (6,1%)	251.047
Entablature, Staybolts	17 (7,3%)	3.505.803 (5,0%)	206.224
Journal, Bearing	15 (6,5%)	6.653.302 (9,5%)	443.553
Fuelpump, Gears	12 (5,2%)	3.161.929 (4,5%)	263.494
Camshaft, Coupling	10 (4,3%)	3.804.377 (5,5%)	380.438
Piston, Pistonrod	9 (3,9%)	2.702.420 (3,9%)	300.269

Table 4. The five most common types of claims (low speed engines)

Claims type	Number	Total cost (USD)	Avg. Cost (USD)
Turbocharger	63 (42,6%)	14.057.056 (40,7%)	223.128
Entablature, Staybolts	17 (11,5%)	3.505.803 (10,2%	206.224
Cylinderliner	15 (10,1%	3.810.363 (11,0%	254.024
Journal, Bearing	9 (6,1%	2.916.201 (8,4%)	324.022
Piston, Pistonrod	7 (4,7%)	1.609.588 (4,7%)	229.941

Table 5. The five most common types of claims (medium speed engines)

Claims type	Number	Total cost (USD)	Avg. Cost (USD)
Turbocharger	21 (25,6%)	2.926.417 (8,9%)	139.353
Crankshaft, Connnecting rod	21 (25,6%)	13.593.961 (41,5%)	647.331
Camshaft, Coupling	8 (9,8%)	3.451.850 (10,5%)	431.481
Journal, Bearing	6 (7,3%)	3.737.102 11,4%)	622.850
Fuelpump, Gears	5 (6,1%)	765.436 (2,3%)	153.087

Summary: main conclusions

1. The average cost of main engine damage claims has fallen by some 10 per cent since 1998, but these claims remain very costly.

2. Medium speed engines still present a disproportionately large risk of damage and claims. Vessels with medium speed engines accounted for 18.7 per cent of Club entry yet generated 46.9 per cent of total main engine damage cost.

3. Turbocharger damage remains the most common and expensive damage category across all engine makes, accounting for 84 of the 232 major main engine claims, at a cost of USD 17 million. Turbocharger damage involving low speed engines resulted in 63 major claims, totalling USD 14.1 million.

4. Crankshaft and connecting rod failures produced the most expensive damage to medium speed engines. The 21 failures cost USD 13.6 million.

5. One low speed engine make is involved in a significant increase in claims share; two types of failure accounted for 34 per cent of the make's total damage cost.

6. One medium speed engine make experienced a substantial rise in claims share, again centred on two specific types of failure accounting for almost 84 per cent of claims and 66 per cent of total damage cost for this make.

The Club will continue to share engine damage information with members and draw the attention of manufacturers to the survey results. Upon request, Club members have full and exclusive access to the comprehensive data relating to leading engine makes and models.

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