

fact that it is very desirable that a comparatively unimportant part should break when the load it carries reaches a certain figure, which should be well before parts of greater importance become overloaded.

Owing to the excessive and complicated straining action of a dredge, it is difficult to design its component parts so that the whole is of uniform strength, and especially is this the case in dredges with wooden hulls. A certain amount of flexibility is no doubt a good point, but this flexibility should never be so great as to cause certain members to bear stresses which properly belong to others. In a wooden dredge it is next to impossible to keep shafting or clutches in alignment and to remedy this evil all bearings should be provided with adjusting wedges or blocks. Steam piping should be put up with frequent offsets or expansion joints.

Taking the season of 1901 as an example, the cost of operation per working day or night for the different types of vessels is as follows:—

	Repairs and Maintenance.	Fuel.	Wages of Crews.	Estimated Depreciation of Plant.	Total Cost.
7 Yd. Dipper Dredge.. . . .	\$27.53	\$11.05	\$20.30	\$ 5.85	\$64.73
Floating Derrick.. . . .	10.08	5.66	16.46	2.53	34.73
Tug (16" x 32" x 24" Compound)	3.00	7.35	9.24	2.27	21.86
Tug (20" x 22" Simple).. . . .	2.42	4.48	8.47	* .23	15.60
Tug (16" x 18" Simple) .. . . .	4.05	5.20	7.43	* .16	16.84

\*These two tugs, having been in service for many years, their value is rated at a very low figure.