

decrease in time using VTLs. There may also be a cost saving from shorter dock or pier rental time for the ship.

As mentioned earlier, stevedoring companies rent the land and the cranes from the port authorities to load and unload ships. OSHA assumes that the crane costs \$500 per hour with a 4-hour minimum rental. In this case, as shown in Table 4, 3.7 hours less of crane rental results in cost savings of \$1,850 per ship unloaded using VTLs.

In addition to the crane rental savings, changes in labor costs must also be considered. Without using VTLs, the container handling involves a labor cost of \$7,875 (15 persons times 11.1 hours times the wage rate of \$47.30). VTL unloading requires an estimated three additional crew members beyond that required for normal unloading, but for a shorter period of time. Since performing the VTL unloading will take 7.4 hours (based on the container ship model), the cost of unloading using VTLs will be \$6,300 (the cost of 18 employees times \$47.30 per hour times 7.4 hours).

Comparing the two, the savings in labor costs is \$1,575 per ship unloaded using VTLs (\$7,875 minus \$6,300).

There may be substantial productivity gains to be realized by other parties. The shipping line gains a 3.7 hour reduction in time to deliver cargo, which translates to a higher return to capital for the ship owners. In addition, the shipper receives the goods 3.7 hours sooner, which could reduce inventory and other costs. The Agency did not estimate savings in port charges paid to unload the ship or in inventory costs to shippers. However, the Agency believes these efficiency cost savings may be significant and seeks comment.

The table below on productivity gains assumes that the containers are pre-stacked VTLs prior to the ships docking to ensure that the productivity gain stems solely from the act of moving the containers and not from any other source. Based on the table of productivity gains, moving two containers at one time would yield the highest marginal productivity gain.

Based on the model and assumptions of cycle times, higher total productivity gains may be possible with VTLs of more than two containers. When moving more than two containers simultaneously, the gain diminishes for each added container. This diminishing gain stems solely from the assumptions in the model of the number of containers per hour and the minutes per lift variables. This analysis is dependent on the estimate of the number of containers per hour that can be moved. The "decreased lifts per hour" column captures a possible measure of where some effect on risk may occur. Fewer lifts may result in less risk. The Agency has preliminarily concluded that, when the proper work practice precautions as specified in the proposed standard are followed, the relative safety risk of two-container VTLs and single lifts are approximately the same. The Agency does not have any data to quantify this portion of risk. The Agency seeks comment on this approach.

TABLE 4b.—PRODUCTIVITY GAINS

Number of containers per lift	Containers per hour	Lifts per hour	Minutes per lift	Decreased lifts per hour	Marginal gain from lifts (minutes)
1	30	30	2
2	45	22.5	2.7	7.5	0.7
3	55	18.3	3.3	4.2	0.6
4	65	16.25	3.7	2.1	0.4
5	75	15	4.0	1.3	0.3

Source: Office of Regulatory Analysis.

Based on the model container ship profile, the Agency preliminarily estimates the benefits of using VTLs are \$3,425 in direct cost savings for stevedoring costs for each VTL related operation. If, as estimated in the next section, VTLs are used for 156 jobs per year, then the total annual cost savings in stevedoring costs would be \$534,300 per year. In addition, the shipper receives the cost saving associated with 3.7 hours less time needed to load or unload containers. This 3.7 hours translates into faster shipping service to shipper and improved productivity for shipping capital. The benefits also include decreased dock, or marine terminal, rental time and port fees associated with loading or unloading the ship. Due to the lack of data, the Agency has not quantified these benefits. The estimates are based on a "per job" basis; that is for a single loading or unloading operation of a container ship.

Costs of Compliance

This section presents OSHA's analysis of the estimated costs of compliance to be incurred by affected employers. This cost analysis is primarily based on the profile of affected workers and industries presented in the Industrial Profile section of this Preliminary Economic Analysis. The first section outlines the provisions of the proposed standard that are expected to impose costs on employers and describes the nature of those costs. The next part presents OSHA's assumptions and preliminary assessments with regard to current compliance, unit costs, life of equipment and programs, baseline data, and other data required to make compliance cost estimates. This section also describes OSHA's model container ship profile. Following the discussion of analytical assumptions and baseline data, this section examines, requirement by requirement, the expected costs of compliance by the model container ship and for the Marine Cargo Handling and Longshoring industries.

Performing VTLs is not mandatory. Employers could avoid using VTLs altogether by simply continuing to lift containers one at a time. Thus, a case can be made that this is a no cost rule with only net productivity gains. The proposal requires liftlocks to be inspected before using them for lifting and annual examinations thereafter. These requirements reflect ILO's loose gear requirements. Many of these costs of the proposal's initial inspection and annual examinations of liftlocks would be absorbed by vessel owners rather than the stevedores (who are the employers of longshoremen).

Provisions in the Proposal With Major Cost Impacts

The most important provisions of the proposal are reviewed in the following paragraphs. Although many new provisions are being proposed, only five may create costs on the regulated community. A proposed provision in § 1917.46(a)(1)(viii)(A) requires container gantry cranes that handle VTLs to be fitted with a LID. This would