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such systems should improve line-haul reliability, reduce en route delays, and provide better estimates of train arrival times (ETA's). This paper examines the effects of these line-haul improvements on terminal performance. Interviews with officials at six terminals identifies the types of improvements that can be expected, while analysis of operating data quantifies the extent of such improvements. Basically, more reliable train operations and better ETA's would improve train connection reliability and allow more efficient allocation of yard crews and other terminal resources. Better information on

the location of interchange, industry, and local crews will allow more effective supervision of these operations. Overall, a 1-2 hour reduction in average yard times and a 5-10% improvement in the utilization of terminal crews may be achievable. Advanced train dispatching systems therefore do have the potential for improving general freight over and above the effects on hire operations alone. While dramatic improvements in overall service should not be expected, reductions of perhaps 6 to 12 hours in average trip times and substantial improvements in reliability appear to be realistic.

## Session 3-C: Port Planning, Container Technology, and Labor Issues

*Session chair: Robert Hannus, Port of Seattle*

### Capacity Measurement For The High Cube Fleet, by Jeffrey F. Hudson.

**Jeffrey F. Hudson is Vice President, Market Analysis, Transamerica Leasing, Inc., White Plains, New York.**

The rapid increase in the number of high cube (larger than 8.5' high and longer than 40') containers is reducing the relevance of the current fleet measurement scheme - the teu (twenty-foot equivalent unit). As product densities decrease and more manufacturers source and sell their products globally, shippers and steamship lines are searching for ways to gain a competitive advantage. One simple way to accomplish this is to increase shipment sizes by utilizing larger containers. Larger containers can reduce costs for shippers and for the steamship line. The steamship lines and the leasing companies have responded to these new marketplace challenges by adding a large number of high cube 40', 45', 48' and 53' containers.

### Problems of Deep Draft Navigation Benefit Evaluation Procedures, by Kevin Horn.

**Kevin Horn is Professor of Business Administration, University of North Florida, Jacksonville, Florida.**

The purpose of this paper is to address two pragmatic interrelated aspects of deep draft navigation benefit studies: the consistency of recently authorized deep draft harbor studies with the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (Principles & Guidelines, or P&G) and the typical problems that characterize applications of the P&G. The objective of the paper is to clarify the major problems that characterize application of the P&G to deep draft navigation benefit evaluation procedures. The paper illustrates the complexities of practical implementation of the P&G and recommends how to avoid the problems that routinely characterize port planning studies. The paper contains recommendations for how to deal with the problems and pitfalls that the conceptual nature of the P&G does not address.

Four recent deep draft studies are reviewed to assess the adequacy of their analyses with the requirements of the P&G. The studies' implementation of each of the nine P&G steps is reviewed in terms of a practical minimum and probable maximum level of effort relative to the overall guidelines. The studies appear to meet the minimum thrust of the P&G requirements subject to the assumption of large captive hinterlands which negated the execution of certain P&G study steps. Too little analysis appears to have been done on user perceptions and needs. The four studies reviewed should not be regarded as suitable models for other port analyses that cannot presume the existence of large captive hinterlands.

The paper presents the most common problems associated with the clarity and application of the P&G to deep draft projects. Recommendations are made to clarify P&G applications in seven areas: (1) Base Case Conditions; (2) Fleet Analysis and Forecasts; (3) Commodity Analysis; (4) Multiport Alter-

natives; (5) With and Without Project Conditions; (6) Calculate Benefits and Costs; and (7) Conclusions/Finalization.

Substantial improvements are possible in future harbor studies and articulation of the practical problems implementing the P&G. A clearer conceptual framework, reflecting revisions of the P&G, will not necessarily make harbor improvement studies more objective given the wide range of interacting variables and practical problems suggested but not fully articulated by the P&G. Closer adherence to the P&G is required in future studies. The P&G need to be supplemented by clear articulation of the problems and tradeoffs that routinely characterize deep draft navigation benefit evaluation procedures. The P&G lead the planning analyst through the conceptual steps to evaluate deep draft navigation improvements, however, no guidance is provided to address significant practical problems, tradeoffs and interrelationships among the study steps.

### Session 3-D: General Aviation Issues

*Session chair: Scott Ornstein, Reebie Associates,  
Transportation Management Consultants,  
Greenwich, Connecticut*

#### Summary By Session Chair: General Aviation Issues

The first paper presented during this session, "Aviation Safety: The Experience of General Aviation" by Clinton V. Oster, Jr. and C. Kurt Zorn examined the causes of general aviation accidents which occurred in the United States between 1983 and 1986. The authors concluded that while general aviation flights compose the majority of aircraft hours flown in this country, (the other sectors being scheduled domestic jet services, scheduled commuter services and On-Demand Air Taxi services), general aviation accounts for an even higher percentage of aviation facilities. The authors also determined that pilot error was the primary cause of general aviation accidents, followed by equipment failure. They therefore suggest that general aviation maintenance practices and FAA inspection procedures be re-evaluated and improved as necessary.

The second paper presented at this session was "A Method for Identifying General Aviation Airports that are Candidates for Runway Extensions: A Planning Model for State Aviation Systems", which was co-authored by Randall G. Holcombe and Henry B. Burdg. The authors state that an extremely important characteristic of an airport is the length of its longest runway, which determines the type of aircraft that can safely operate at that airport. Extending a runway can increase the utility of an airport, but scarce financial resources dictate that such decisions be made carefully. The authors thus developed a linear regression model to compare airports, resulting in a way that state officials can evaluate proposals for runway extensions.

The authors determined that there are two categories of factors (demographic and airport related) to consider when evaluating such proposals. The authors considered ten demographic factors such as population in the