

MTM290 CAPSTONE PROJECT

**“To Hire or Contract Out: A Comparative Analysis of Facility
Maintenance Strategies.”**

Submitted by
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¹ The electronic version of this report includes separate PDF files for these reports and the reports in Appendix 2. The paper version will have those documents in these appendices and the pagination will change to accommodate those documents.

EXECUTIVE SUMMARY

Privatization is a common prescription for cost containment in the transportation sector, and contracting out for services instead of hiring more employees is one of the most prevalent means of accomplishing privatization.

While the academic and business literature contains a fairly consistent warning that contracting is no guarantee of cost savings, there are those who strongly advocate contracting, suggesting huge potential savings for transit riders and taxpayers. On the other hand, critics of contracting deride the tendency toward contracting for a variety of reasons, and often attack studies that favor contracting for procedural inadequacies and for failing to include tangential costs related to contracting.

This paper is a case study of contracting in a transportation context, examining facility maintenance schemes at three railroad yards where contractors have dramatically different levels of participation and seeking evidence for or against the proposition that contracting lowers cost. The facility maintenance schemes in use at the three yards range from Yard One where in-house employees maintain the facility, to Yard Two where a variety of contractors provide maintenance, to Yard Three where a single long-term contractor provides both facility maintenance and management oversight of that maintenance.

Based on analysis of each yard’s financial reports, this study supports the conclusion that contracting may offer substantial savings, but it is no guarantee of savings and conversely, contracted services can easily cost more than in-house services. The railroad yard where a variety of contractors perform facility maintenance obtained substantially better cost-performance than both the yard where a single contractor

performed facility maintenance and the yard where in-house employees performed facility maintenance.

Due to the limited sample in this case study and unavoidable methodological weaknesses the author recognizes that there is still a need for further studies.

ACKNOWLEDGMENTS

The Commuter Railroad that generously provided access to their financial records and maintenance tracking system for this study has chosen to remain anonymous for business reasons, but without that company’s cooperation, this study would not be possible and I am incredibly grateful for the access they gave me to their records.

I am heavily indebted to many, but first and foremost I would like to recognize the contribution of my recently deceased aunt, Jewel Wales, whose unfinished Master’s degree was an enduring source of remorse, and who lovingly gave me the support and encouragement I needed to start this program and to carry it through to this capstone project.

There are numerous railroad personnel to whom I am deeply indebted and it is unfortunate that they must remain anonymous. From the bottom of my heart I extend my sincerest thanks to DD for his friendship and the many hours he spent teaching me how to navigate his company’s financial reporting system. I also have to thank RR for his patience and good humor showing me how to create the reports I needed from the mechanical maintenance tracking system. In addition I am more than grateful to HS, CM, AH, TT, KN, RN, and TP for their insights on those many occasions when I had to call with detailed questions about operations at the three yards.

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I owe my sons Nick and Robert a loving thank you for modeling such excellent study habits – you two make me proud and I am glad to briefly catch up with Nick by getting the second Master’s degree in the family – now it is your turn Rob.

Last but not least, I would like to thank my beautiful, pregnant wife Maricor for inspiring me beyond my ability to relate and for wisely reminding me to come to bed and get some sleep during those many late nights trying to get this project finished.

PROBLEM STATEMENT

Privatization continues to be a popular paradigm of cost containment in the transportation sector, and contracting out is the most common form of privatization. Transportation managers, especially in tight fiscal times, frequently face the question of whether to hire employees or to contract work out.

Among many mid-level managers an unquestioned wisdom prevails that contracting temporary workers, even at very high hourly rates is cheaper than hiring employees. Secondly these managers highlight the corollary benefits of contracted labor -- freedom from union work rules, and lowered exposure to liability for employee training and safety. This paper is intended to test the primary motivating premise of this conventional wisdom, that contracting is cheaper than using in-house employees

RESEARCH QUESTION

Based on a comparative analysis of facility maintenance costs at three similar railroad yards where contractors play markedly different roles, this paper seeks to answer the question: Does contracting out instead of hiring employees offer significant **cost** **benefits**?

LITERATURE REVIEW

Privatization Overview

The term “privatization” is relatively new. It was not in dictionaries until the early 1980s, but as a paradigm of reform for an unresponsive and inefficient public sector it quickly gained currency in the 1980s and it continues to exercise considerable leverage

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in the realm of public sector service provision. “Contracting out” is the most common method of privatization. (Seidenstat: 1999)

Contracting out in the public sector context involves a government agency contracting with other government agencies or with private firms to provide services, in lieu of having its own employees provide those services, “through a process of competitive bidding or competitive negotiation, thus developing quasi-market conditions and achieving a desirable degree of flexibility and responsiveness.” (DeHoog: 1984, p5)

From 1987 to 1992 the percentage of county services that were privatized (“contracted out”) in the USA grew by 41.7% from an average of 24% of all county services in 1987 to an average of 34% of all services in 1992. Transportation services are ahead of this curve – by 1992 almost half (48%) of all county transit services were contracted out (Seidenstat: 1999).

Transit continues to be a major focus of privatization advocates who tout huge potential savings and increased efficiency. As recently as 2002 Savas and McMahon wrote that taxpayer savings *average* 38% when transit districts convert public transit monopolies to a competitive bid process. This is an impressive claim, although it should be noted that the normative value underlying this statement is strictly focused on reduced cost rather than improved service.

Reducing New York’s overall bus transit operating costs just 20 percent – much less than the actual experience on competitively contracted lines in other urban areas – would save \$340 million a year in current terms.... enough to nearly wipe out both the city *and* state budget operating subsidies for bus transit. (Savas: 2002, p1-2)²

² The cited article, although presented by authors with academic bona fides, is an advocacy piece, lacking in self-critiques or alternative perspectives on its prescription for the New York transit system, which fosters suspicion about its objectivity.

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On the other hand, DeHoog’s survey of the empirical literature found that the data did not support such a clear-cut case for privatization. She suggests that some earlier studies underestimated some costs associated with contracting out (including administrative and managerial costs; cost escalation due to contractors who bid low then jack up costs over time; the effects of corruption on the bidding process when bureaucrats favor one contractor over another; and the legal and other costs associated with contractor lawsuits). Methodologically she also challenges the use of inter-jurisdictional studies because budget and accounting systems change from one government to another, making direct comparisons more difficult.

Table 1, Summary of DeHoog’s critiques of Contracting Studies²¹

1	Failure to account for administrative and managerial costs
2	Cost escalation in later years due to price escalation
3	Corruption and conflict of interest by managers
4	Legal costs that stem from contractor lawsuits
5	Geographical and accounting differences that could influence results

The research methodology in this paper sidesteps most of DeHoog’s concerns because the research subjects are three very similar railroad yards where the percentage of contracted work in facility maintenance varies, but the geography, corporate culture, and account coding are nearly identical. Additionally, the analysis in this study incorporates the administrative and managerial costs for both contract and in-house employees.

Although there are those who suggest that managerial oversight for contractors is greater than for in-house employees, Marvel and Marvel find comparable levels of scrutiny for both contractors and employees.

Consistent with the contracting literature, our evidence – though only tentative because of the small sample size of for-profit providers – suggests that governments monitor for-profit deliverers intensively. We also found substantial performance monitoring for services that are delivered internally. (Marvel: 2007, p521)

Privatization Theory

While Seidenstat links some of the initial momentum for privatization to the abject failure of the Soviet Union with its centralized government control of the economy, DeHoog credits “a general distrust of government and government officials” that resulted from “the Vietnam War, Watergate, recession, energy shortages, inflation” and a popular perception that “there is little that government can do quickly, efficiently, and effectively.” (DeHoog: 1984. p1-2)

Privatization theory stems from laissez-faire economic theory that posits “the ‘invisible hand’ of market competition compels providers of goods and services to minimize their costs and prices. On the other [hand], public enterprises have a variety of forces that promote gross inefficiency...” (Clark: 1995, p396)

The theoretical superiority of privatization hinges on competition between contractors to introduce market forces. “Indeed the absence of market competition among suppliers may induce firms to consider in-house production even when the product or service is available from a contractor whose own costs are lower than theirs.” (Prager: 1994, p178) Without competitive bidding to introduce market forces, the theoretical advantage disappears.

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DeHoog provides a wide survey of privatization theory, but she also makes the point that even in the 1960s and 1970s there was nothing new about contracting for public services. Local governments had long relied on contracting for certain services such as garbage collection, and she notes that governments at all levels routinely rely on outside engineering services for large capital projects and weapons systems.

Arguments in favor of contracting out include: 1) that bidding competition reveals the true cost of a particular service, because it forces private firms to evaluate both their actual costs to provide the service, and also include in their calculus what their competitors might be willing accept to provide the same service; 2) that it replaces the bureaucratic tendency for budget maximization with a cost-saving motive; 3) that it allows economies of scale and reduction of overhead; 4) that avoiding public unions increases flexibility and reduces personnel costs; and 5) that contracting offers greater flexibility for dealing with part-time, temporary, or specialized needs without the costs associated with hiring a permanent staff.

DeHoog juxtaposes “public choice” or “market-based” theories with critiques of contracting out: 1) that mutually beneficial relationships between contractors and bureaucrats are often not in the interest of taxpayers; 2) that over-reliance on contractors to provide public services undermines non-profit and volunteer organizations; 3) that contractors lack political accountability; 4) that extensive contracting out makes development of public policy more difficult; 5) that contracting out is a means of union busting and driving down wages; and 6) that contracting doesn’t work equally well in all service sectors. (DeHoog: 1984, p9-15)

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Becker, writing from the perspective of a labor attorney, echoes the critique that contracting out is a means of union busting. He views privatization as the public equivalent of industrialists closing factories to move production offshore and considers it an “effort to evade the rules and procedures intrinsic to democratic government.” Contracting out is not “a coherent social policy but [a means] to cut labor costs by circumventing the rights of public employees.” (Becker: 1988, p88)

In spite of all the literature suggesting cost-savings associated with outsourcing, Prager posits that contracting is not an automatic means for government agencies to increase efficiency. “Contracting out of government services, in short, will neither reduce government outlays nor increase government efficiency unless the decision makes economic sense.”

He lists five conditions that must prevail if a government agency is to benefit from contracting out – efficiencies of scale, efficiencies of scope, an overgrown bureaucracy that could benefit from shedding responsibilities, open competition for contracts, and the existence of infrastructure for managing the contracts. (Prager: 1994, p183)

In order to benefit from market forces there has to be competition between contractors in an open bidding process and there has to be a sufficient number of contractors to promote this competition. Prager goes further to suggest dividing work between contractors to prevent over dependence on a single supplier and notes that “the danger of accepting a single bid, if that puts the public authority at the mercy of the contractor, cannot be ignored.” (Ibid, p181)

Comparative Studies (listed roughly chronologically)

DeHoog, summarizing the results of several earlier case studies, generalizes that the studies she reviewed support the perspective from the early 1980s that contracted services result in cost savings.

In the main, what limited evidence there is usually supports the argument that the privately (or outside) supplied services are at least *less costly* (and in a few cases, more efficient) than in-house services. (DeHoog: 1984, p8. Emphasis and parenthetical comments are DeHoog’s.)

While most of the earlier studies find that contracted services result in cost savings, even studies from the late 1970s suggest that there are trade offs with contracted services. In his study of contracting for rural police services, Mehay finds that service levels do not necessarily remain the same.

...the results suggest that contract cities, when compared to independent cities, have been able to lower police manpower and spending levels but that this reduction may be responsible in part for a dilution of basic crime prevention services received. (Mehay: 1979, p68)

O’Toole compared public and private management of municipal waste water treatment facilities, and though he apparently received his data from a contractor who provides such services, he carefully hedges his conclusions – “performance advantages *may* be possible for certain types of communities when contracting is sensibly employed” (emphasis added). But the reverse is also true and if the community is only looking for cost savings O’Toole has words of warning. “Indeed, to the extent that a community considers only the cost side of the ledger, it may pay for its shortsightedness with compliance problems, labor difficulties, or political discord over the longer term.” (O’Toole: 1991, p30)

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Prager’s analysis takes this conclusion a step further in his study of the lessons for public sector contracting based on contracting experiences in the private sector.

Unfortunately, in the case of contracting out, the benefits have been trumpeted loudly while its weaknesses have been muted.... One conclusion will emerge quite clearly: Contracting out is not a panacea. Indeed, at times, instead of stemming the flow of budgetary red ink, it will intensify the hemorrhage. (Prager: 1994, p176)

Domberger et al criticize other studies as examining snapshots in time before and after contracting and their study takes a longer-term view to make up for this inadequacy. They also concentrate only on cost (rather than efficiency or level of service) as they apply an economic analysis of the experience of the New Zealand Army with contracting out work in 1997. The results of their study show a 37% initial savings that decreased to 24% after they factored in the added costs of contract variations (changed contractor costs and work volume). Their study is interesting in that it calculates the sources of the cost decrease:

Our decomposition of the sources of the savings indicates that 19% of the total cost savings are attributable to reduction [in] wages, whereas the bulk of the savings comes from labor shedding (58%) and technical change (23%). (Domberger: 2002, p166)

The authors go on to make the point that the surplus labor the contractor “shed” (let go) may have reflected an earlier perception of the capacity needed to handle surge demands and that the reduction in staff by the contractor “is clearly an additional risk factor associated with the contractor’s operation that may not be priced in the current contract.” (Ibid.)

Van Sylke, studying the privatization of social services, attributes much of the momentum of privatization to political pressure rather than an actual focus on cost savings. He surveys much of the privatization literature and suggests that success at

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contracting is dependent on “the specific types of services, the existence of highly developed and competitive markets, the specificity of the contract, and the ability to enforce accountability and evaluate program outcomes.” (Van Sylke: 2003, p297)

Increased demands for smaller and more efficient government have led many elected officials and agency executives to seek privatization as a vehicle – some suggest panacea – for controlling costs. Yet the privatization of social services in many areas in New York State has transferred public monopoly power and authority to private monopolists, with few increases in performance and accountability. (Van Slyke: 2003, p307-8)

Jensen and Stonecash compare the cost performance of “fixed-price” contracts versus cost-plus contracts in their study of municipal water system maintenance outsourcing and their findings show that cost-plus contracts offer substantial savings. Although they draw their conclusions cautiously, they point to the uncertainty of “reactive maintenance” (emergency repairs to broken water or sewer systems) as a risk factor to bidding contractors, suggesting that this uncertainty may drive up the cost of fixed-price contracts compared to cost-plus contracts where the contractor is less exposed to risk. (Jensen: 2009)

Leland and Smirnova in their 2009 follow-up analysis of earlier studies find that neither public nor private transit systems are more efficient. They explain the changes they found as possibly a function of external (civic) pressure on private transit providers that over time creates the same kind of operating environment than constrains public providers. These pressures, they argue, have reduced profit and led to fewer private operators, which in turn creates upward pressure on cost. “Without any serious competition, transit services remain a monopoly and operate under the same conditions as public providers.” (Leland: 2009, p860)

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What has changed in the 25 years since Perry and Babitsky’s study is that privately owned and managed transit systems are *no longer* more efficient and effective providers than government-owned agencies.... In the case of urban bus transit, it appears that contracting out and privatization fail to yield the significant efficiency and effectiveness gains that many would expect. (Ibid, p862)

Bae, in summarizing other recent empirical studies, indicates that the motivation for contracting services is mainly to save cost, but “Contrary to this general understanding, however, recent evidence shows that there is no relationship between contractual arrangements and cost savings.” (Bae: 2010, p1)

This review of case studies is by no means exhaustive, but the consensus of recent literature seems to favor the conclusion that while contracting can offer a potential for savings, a number of factors also vitiate cost savings in contracted services, especially in circumstances where there is limited competition among contractors.

This paper lends new data to the [debate](#)^[3].

RESEARCH METHODOLOGY AND PROCEDURES

Background on Departmental Responsibilities

This study compares facility maintenance costs at three railroad yards where railroad mechanical personnel service commuter trains and equipment.³ Most of the data comes from corporate financial reports that give accounting details on two functionally distinct departments (the Mechanical Department and the Engineering Department). The Mechanical Department’s maintenance tracking program (Work Management System – see Plate 1 on the next page for an example report) is the source of data about hours worked by the Mechanical Department personnel at each yard.⁴

The *Mechanical Department* is responsible for maintaining rolling stock – passenger cars, locomotives, and train sets. The Mechanical budget covers the cost of performing inspections and maintenance on passenger rail rolling stock, including salaries for managers, wages for craft people, utility costs, tools, parts, consumables, and so on. The Mechanical budget also covers purchase and maintenance of mobile equipment like welding machines and forklifts that the Mechanical Department uses in the course of repairs to rolling stock, but the Mechanical budget generally does not cover maintenance of fixed assets like drop tables, buildings, and cranes.⁵

³ As noted in the Acknowledgments, the Commuter Railroad that graciously provided financial records for this study has asked to remain anonymous for business reasons. In keeping with that request, this paper disguises the names and locations of the three rail yards with pseudonyms (“Yard One,” “Yard Two,” and “Yard Three”), but they are three currently operating commuter rail yards located in the same region of the country with very similar geography, weather, and missions.

⁴ See Appendix 1 for redacted copies of the corporate financial reports and see Appendix 2 for redacted copies of the Mechanical Department’s Work Management System (WMS) hourly totals for the three yards.

⁵ There are some notable exceptions as will be discussed below.

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**Plate 1, Example from Work Management System,
Last Page from a Report Showing Total Hours for Yard One in FY09**

Timesheet Facility Overview Report

		ADMIN	CARSH	ENVIR	LOCSH	LOCSV	PMCAR	SANDI	STATN	Total
NHVC	Total							8.00		8.00
PC01R	Repair				32.00					32.00
	Total				32.00					32.00
PC027	Repair				112.00					112.00
	Total				112.00					112.00
SEA	MofE Facility and Overhead	8.00								8.00
	Total	8.00								8.00
ST004	Repair				166.93					166.93
	Total				166.93					166.93
ST007	Repair				46.00					46.00
	Total				46.00					46.00
ST008	24 Hour Inspection							9.00		9.00
	Repair				124.00					124.00
	Total				124.00			9.00		133.00
ST009	24 Hour Inspection							11.00		11.00
	Quarterly Inspection-Loco				8.00					8.00
	Repair				126.00					126.00
	Total				134.00			11.00		145.00
Total		22,345.48	93,209.14	4,109.69	69,457.35	136.00	104,921.76	328,780.61	3,741.17	626,701.20

Requested By:

Data Date: 4/25/2010

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The *Engineering* budget pays for facility maintenance only, using a work force that is entirely separate from the Mechanical Department work force. Although there may be some minor exceptions, the Engineering budget pays for maintenance of all fixed infrastructure and yard equipment (drop tables, air compressors, tracks, buildings, heating and air conditioning, and similar types of facility equipment). For the purposes of this analysis the Engineering numbers do not include funding for capital projects (new buildings, new tracks, or capitalized major equipment purchases for example), because

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the nature of capital improvements is irregular, and would reduce the accuracy of comparisons between the Engineering budgets at the three yards.

In spite of some small organizational differences between the three yards and some minor variations in their business models⁶, the same company runs all three yards, so a similar corporate architecture, similar financial account coding, similar mission, and similar work force are evident in the Mechanical Departments at all three yards. The front line Engineering structure at each yard shows considerable variation, which is the main reason these yards are of interest to this study, but again they are all under the same corporate umbrella, so, especially at the Engineering management level there are strong similarities and the account coding framework is nearly identical.

The yards also share similar infrastructure – for example, each yard has a wheel truing machine, a specialized multi-million dollar milling machine where Mechanical personnel re-profile worn steel wheels. Other pieces of major yard equipment at each yard include a Drop Table where mechanics change 4,000-pound steel wheels and 10,000-pound traction motors on a regular basis, yard air compressors to provide air for trains and pneumatic tools, and water treatment systems to remove oil and solids before waste water goes to the sanitary sewer. The Mechanical Department uses the buildings and yard equipment to service cars and trains, but when that equipment breaks or needs

⁶ Yard One services its own passenger equipment and is also under contract to service equipment owned by a regional passenger rail service; Yard Two earns the bulk of its revenue from a contract to service equipment owned by a regional passenger rail service but it also services one of its company’s trains; Yard Three is working under contract to a regional passenger rail agency to maintain the agency’s equipment exclusively.

routine service or inspection, the Yard Engineer is responsible for coordinating that maintenance and paying for it from the Engineering budget.⁷

Note on “Contracted Services”

This paper uses the terms “contract services” and or “contractor” as the rail industry uses them, to indicate hiring the employees of a privately owned outside agency on a short or medium term basis to provide services that would otherwise be performed by in-house employees. The relationship between the company and these private service providers may or may not result from a formal bid process or a formal contract. For example, the Engineering Manager at any of the yards can call a contractor directly out of the phone book to perform minor tasks without initiating a formal bid process or issuing a formal contract as long as total cost of the job is below prevailing wage regulations (often \$2000 for construction projects).⁸

⁷ The Engineering budgets at Yard Two and Yard Three are organized a little differently than this description suggests because the Engineering manager spends some Mechanical Department funds to augment the Engineering budget. At Yard Two about a quarter of the Engineering budget comes from the Mechanical budget under a line item called “Building Maintenance.” Since the Mechanical Department does not supplement the Yard One Engineering budget in this way, this paper recodes these “Building Maintenance” funds at Yard Two and Yard Three from Mechanical to the Engineering budget.

⁸ See for example California Prevailing Wage regulations at <http://www.dir.ca.gov/DLSR/PWD/index.htm>; or Davis-Bacon Act regulations at <http://www.dol.gov/whd/programs/dbra/whatdbra.htm>.

Engineering Department Workforce Differences⁹

Although the Engineering Managers (or Yard Engineers) at all three yards work within the same corporate structure, there is no uniform approach to yard maintenance. Each Yard Engineer employs a strikingly different workforce to perform facility maintenance.

At ***Yard One*** a single Yard Engineer has about twenty-six in-house craft employees to perform the vast majority of facility maintenance.¹⁰ Outside contractors perform some specialized maintenance work,¹¹ but in-house employees perform nearly all the routine maintenance and repairs in the yard. In the 2009 fiscal year (FY09) for example, the Yard One Engineering Manager spent \$146,838 on Building Maintenance Services (outside contractors) amounting to only 6% of the \$2.46 million budget for facility maintenance at Yard One. As an example of different approaches to staffing at the three yards, at Yard One the Engineering Manager assigns a single employee full-time responsibility for operating and maintaining the Water Treatment System and a second employee staffs the Train Washer full-time.

Yard Two employs a completely different staffing strategy. There is a Yard Engineer and an Assistant Engineer who hire about 20 individual contractors on an as-

⁹ Operational details about the three yards were learned in the course of the author’s work in this industry and in a series of informal telephone interviews with managers at each of the yards.

¹⁰ Yard One is authorized to have 29 Engineering craft employees (union-represented Carpenters, Pipe Fitters, Electricians, Track Inspectors, Machinists and so on), but due to considerations such as turnover and medical leave, this number does not always reflect the actual staffing level. In fiscal year 2009 there were only 26 employees, although by the 2010 fiscal year this was brought up to the authorized level of 29.

¹¹ Specialized contractors include certified crane inspectors, certified back-flow prevention services, certified fire protection technicians, as well as some construction gangs who specialize in rarely needed services like installing chain-link fences.

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needed basis to perform all the necessary facility maintenance work. A crane contractor maintains the cranes, a firm specializing in pumps provides maintenance to the fuel and lube systems, two electrical contractors vie for work changing lamps, or making electrical repairs, and so on. There is only one long-term contract at Yard Two – a three-year contract with an environmental firm that provides a certified operator of the water treatment system who also provides minor maintenance on the Water Treatment System and the yard Train Washer.¹²

In a departure from the facility maintenance schemes at the other two yards, **Yard Three** has contracted with a single long-term contractor who staffs the yard with three full-time employees to perform routine and preventive facility maintenance. The contractor also provides supervision and management of its employees and is allowed to bring in specialized sub-contractors if needed (although when the contractor brings in sub-contractors there is no added compensation to the contractor). One of the three employees is a certified water treatment operator, and water treatment work consumes about 60% of that employee’s time with the remainder applied to other facility maintenance tasks.

¹² Initially the contractor at Yard Three provided two employees but increased the number to three when contractual service levels could not be met with two. This increase in personnel did not increase the cost of the contract. The scope of the contract covers routine and preventive maintenance but not major repairs, which add to the contract on a cost-plus basis.

Table 2, Overview of the Structural Differences between Facility Maintenance Schemes at the Three Yards

Yard	# of Managers	Approx Craft Hrs/Week	Union Yes / No	Description
Yard 1	1	1040	Yes	One Engineering Manager coordinates the activities of approximately 26 in-house union employees who perform facility maintenance.
Yard 2	2	140 ¹³	Mixed ¹⁴	One Engineering Manager and one Assistant Manager hire a variety of contractors, often on a job-by-job, ad hoc basis. Jobs over \$2000 require two bids.
Yard 3	1	80-120 ¹⁵	Yes	One Engineering Manager supported by the contractor’s management and supervision oversees a single multi-year contract with a facility maintenance contractor that staffs the facility with two or three hourly maintenance employees. This contract resulted from a competitive bid.

Craft hours in Table 2 (above) are approximate, but are fairly simple to calculate for Yard One and Yard Three since both yards have reasonably stable numbers of facility maintenance employees. Computations are as follows: *Yard One* - 26 employees at 40 hours each and *Yard Three* – 2 or 3 employees at 40 hours each. Estimating maintenance

¹³ The figure of 140 hours per week for Yard Two is estimated from a total “Building Maintenance Services” FY09 cost of \$612,691 less 10% estimated for parts and supplies, divided by 52 weeks at \$75/hour average contract labor rates.

¹⁴ Some contract employees are union represented, some are not.

¹⁵ The service contract is for preventive maintenance at a fixed price. Originally the contractor started with two fulltime employees on site, but later increased the number to three without increasing the contract amount. Emergency repairs are performed on a cost-plus basis. The contracted amount includes supervision and management of the contract employees.

hours for *Yard Two* is more difficult because the Yard Engineers hire most contractors on an as-needed basis.

On an annualized basis, these differences in staffing levels between the three yards are dramatic. Yard One, for example, with 26 employees, accumulates over 50,000 hours of facility maintenance annually even if you deduct three weeks of vacation for each employee. On the other hand, the three full-time mechanics that maintain Yard Three accumulate a total of 6,240 hours annually. Even though Yard One about two-and-a-half times bigger than Yard Three, it has over eight times as many available hours for facility maintenance.

Even assuming productivity differences between the two work forces, if all other things were equal in terms of price (and the results of this research confirm that proportionate to their yard sizes the cost ratios are reasonably close), the opportunity to get more hours for the same cost is something to consider as an advantage to the in-house employee scenario. This comparison of workforce available hours is not a subject of the present inquiry, but seems to the author an area worthy of follow-up research.

Engineering Manager Comments

The Engineering Manager at Yard Three expressed overall satisfaction with the maintenance agreement that staffs his yard with three full-time employees of a single contractor. Asked for ideas about how to improve the system, the manager suggested that the maintenance agreement should not cover just parts for preventive maintenance (like air filters and light bulbs), but when a pump or something major goes out, replacing it

should be under the contract also so the Yard Engineer does not have to dip further into the Engineering budget to replace defective equipment.

The Engineering Manager at Yard Two expressed dissatisfaction with the contracting arrangements there. With no regular maintenance personnel or clerical support and with regulations and liability issues preventing contractors from performing certain key activities such as flagging,¹⁶ the two Engineering managers often work long hours performing their own work as well as flagging for contractors and performing minor maintenance tasks when contractors are unavailable. When major failures occur the Managers are often under stress trying to find a contractor who is available to respond. Asked for suggested improvements, the Manager at Yard Two wanted a couple of in-house employees.

The Engineering manager at Yard One has “a very good rapport with the unions” and consults with them when planning work. When asked for improvement suggestions, the Yard Engineer mentioned a frustration with the people in corporate labor relations who voided local labor agreements, depriving his employees of some overtime pay and mileage on late night emergency calls, thus giving them a disincentive to respond to emergencies.

Two Main Premises of the Study

There are two main premises underlying this study and underlying the use of “size” factors to determine the “benefit” in this **cost-benefit analysis**[4]. The first premise is that approximately the same level of facility maintenance occurs at each of the three

¹⁶ “Flagging,” means protecting a track so that workers are not in danger from train movement. It calls for locking track switches, putting tags on locomotives, and

yards. Each yard is under tremendous pressure to get its trains out on time, and consequently there is constant scrutiny ~~of~~ from the Engineering Manager to support those operational objectives by keeping facility equipment and infrastructure in good operating order. There is no way of testing this premise short of conducting extensive audits at each of the three yards – an effort that, however desirable, is not possible with the resources available to the author of this study.

A second premise of this paper’s research methodology is that the more Mechanical activity there is in a particular railroad yard and the broader the scope of Mechanical operations, the more demand these Mechanical activities put on the Engineering Department’s facility maintenance role. Again, there is no obvious mechanism for testing this premise.

An argument could be made that even in the absence of use, equipment will need preventive maintenance. For example, light bulbs will burn out at approximately the same rate whether the bulbs are illuminating intense activity or light activity, or a crane will need OSHA-required quarterly inspections whether the Mechanical Department uses it twice a day or once a week, but again, this research project does not have a tool for direct comparison of the facility maintenance *output* by each Engineering crew. Such a tool is not available in part for the same reason that the three facilities are of interest to this study – they each have very different work forces so a uniform mechanism for output comparison would be especially problematic and is nevertheless beyond the means of this study.¹⁷

¹⁷ The Mechanical Department employs a system of maintenance tracking called the Work Management System (WMS is the source of information on the number of Mechanical personnel hours at each of the three facilities). A similar system for tracking



Relative Sizes of the Three Yards

Based on the FY09 budget, Yard One is about seventy percent larger than Yard Two, and Yard Two is forty-three percent larger than Yard Three. It seems too obvious to need mentioning, but since the three yards are different sizes, a direct comparison of facility maintenance costs is not useful for the purposes of this study. Facility size will

Engineering productivity might improve the results of a study like this, however, 1) there are probably legitimate questions about the accuracy of the self-reported productivity that such maintenance tracking systems depend on, and 2) such a system works in part because timecard accounting is tied to information each mechanic inputs about the work they performed, thus relieving Supervisors or Clerks of this responsibility. Such a system modified to capture the work of contractors would put additional cost burdens on facility maintenance budgets for additional contractor training and reduced work day productivity.

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be key to comparing facility maintenance costs, however, since size of the facility will be a way of measuring the output of the facility maintenance crew.

Chart 1 (above) shows the relative sizes of the three yards in two ways – with a yellow bar graph indicating the relative sizes of the budgets (using the dollar scale at left) and a blue graph with stars indicating the total number of Mechanical Department personnel hours during the last six months of FY09 (measured on the hours scale at right). This paper uses only the last six months at each of the yards because Yard Three only started using this reporting tool in the second quarter of the 2009 fiscal year.

Facility Maintenance Costs – The X Factor

The first factor this paper uses to compare facility maintenance regimes at the three yards is the cost for facility maintenance at each yard. The company’s financial tracking program reports the actual Engineering expenditures at each yard as of the end of the 2009 fiscal year (September 30, 2009). The “year to date” column on that report represents the final totals for the 2009 fiscal year. For comparison purposes this paper also uses financial reports covering the first six months of the 2010 fiscal year.

There are a number of minor accounting differences between the three yards, but for the sake of more accurate comparisons between the yards, this paper will recode two line items – “Janitorial Services” and “Building Maintenance Services.” Management at Yard One, the largest of the three yards, requires each department to pay for its own janitorial services, while at Yard Two, and in the 2010 fiscal year at Yard Three, the

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Engineering budget captures all janitorial costs at those yards.¹⁸ Additionally, Yard Two and Yard Three both supplement the Engineering budget using a “Building Maintenance Services” line item in the Mechanical budget.¹⁹ So to equalize as near as possible the three yards, this paper moves “Janitorial Services” to the Mechanical budgets and shifts “Building Maintenance Services” to the Engineering budgets.²⁰

In addition, Yard Three accounts for administrative and managerial costs in a separate budget and one of their managers is responsible for a separate facility, so this paper moves 80% of the Administrative budget for Yard Three into the Yard Three Mechanical budget. Other than the above outlined changes, this paper presents the numbers from the Engineering budgets for each yard as they were in the corporate accounting system.

Note that on Plate 2 (below) next to “Line of Business” the form says “Operating excluding Reimbursables” which represents a reporting filter that selects out capital and reimbursable projects. Capital upgrades are intermittent in their nature and would distort the results if one facility or another were constructing a building or adding a major piece of equipment that is not simultaneously matched by an equivalent project at the other yards.

¹⁸ This likely results from the extensive contracting that Engineering already does at Yard Two and at Yard Three, so a natural corollary is to have Engineering contract for janitorial services also.

¹⁹ At Yard Two this supplement from the Mechanical budget provides about 25% of the total Engineering budget.

²⁰ A reasonable argument could be made to remove Janitorial Services altogether, but unfortunately, that line item also covers janitorial supplies that are used to service rolling stock in Yard Two, so removing that line item seems potentially more problematic than shifting those costs to Mechanical, which is the largest consumer of those services in any event.

Plate 2, Example from the Corporate Financial Report showing Adjustments to the Yard Two Engineering End-of-year Budget for Fiscal Year 2009.

Commuter Railroad Financial Gateway
Detail Expense Account Variance Report for Yard Two FY09 Engineering
 Line of Business: Operating excluding Reimbursables
 Fiscal Year Levels as of September, 2009

Variance Dollars/(Worse)	Percent Variance	Account	Account Name	Year to Date		B
				2009 September YTD Actual	2009 September Current Budget	
(4,041)	(58.3)	500001	Salaries	126,012	81,582	
(1,097)		500007	Mgt Salary Expense Accrual	2,255	0	
64		500014	Overtime Wages	165	0	
(1,842)	(46.9)	502039	Employee Benefits Allocated	67,936	46,867	
33	100.0	504001	Travel - Mtgs & Conference	11	400	
0		504002	Travel - Training	15	0	
0		504003	Travel - Payroll Generated	8	0	
0		504071	Travel - Business	195	650	
0		506122	Software Maint. and License Agmt	0	500	
0		507144	Computer Hardware Purchase	291	0	
0		507145	Office Supplies & Expenses	71	0	
0		508177	Maint & Repair-Other Equipment	1,356	3,800	
217	100.0	508178	Small Tools	1,214	2,600	
234	82.5	508188	Utilities - Water/Sewer	525	849	
1,244	14.8	508189	Janitorial Services & Expenses	89,681	76,400	
			Janitorial to Mechanical budget	(89,681)		
(17,253)	(73.8)	508193	Building Maintenance Services	376,944	280,496	
			Bldg Maint Serv Xfer from Mechanical Budget	235,747		
(1,487)	(28.3)	508195	Building Material	67,204	63,000	
0		509174	Safety Equipment	0	1,600	
0		520600	Hand Held Tools/Portable	1,115	8,800	
0		520626	Rolling Stock Material - Non-Consumables	0	0	
0		520642	Locomotive-Mechanical	50	0	
6,284	91.4	530751	Road Maintenance Services	20,240	82,499	
0		555607	FELA Costs Allocated	10	0	
(17,644)	(31.9)	840300	Expenses	755,297	650,043	
			Corrected FY09 Budget	901,363		

Table 3, The X Factor, A Comparison of Facility Maintenance (Engineering) Costs at the Three Yards²¹

Facility Maintenance Costs	FY09	FY10	Growth Rate
Yard 1, Facility Maint	\$2,463,583.00	\$2,580,288.00	4.7%
Yard 2, Facility Maint	\$901,363.00	\$1,035,484.00	14.9%
Yard 3, Facility Maint	\$1,079,598.00	\$1,166,850.00	8.1%

²¹ 2010 fiscal year number is the first six months of 2010 doubled for comparison to FY09. As discussed earlier, this methodology, while practical for the purposes of this paper, undoubtedly introduces error by assuming the second half of the year will be identical to the first half.

Yard Size – The Y Factors

To analyze the cost-benefit of the various facility maintenance staffing strategies, this paper will compare the ratios of *facility maintenance cost* (the X factor) to two *productivity factors* (Y factors) that gauge the amount of “benefit” based on the *size* of each Mechanical facility. The first of these Y factors (Y₁) is simply each yard’s *Mechanical Department operating cost*. The second Y factor (Y₂) is the total number of *Mechanical Department personnel hours* at each yard. The Y₂ factor is used as an alternative size measure for comparison and validation purposes.

Table 4, The Y Factors, Size Comparisons and Growth Rates of Mechanical Department Operations at the Three Yards²²

Description	FY09 Actual	FY10 First 6 Mos	Growth Rate	FY09 Size Relative to Yard 1	FY10 Size Relative to Yard 1
Yard 1, Mechanical Cost	\$33,933,247.00	\$17,460,811.00	3%	100%	100%
Yard 1, 6 Mo. Mech. Hrs	313,410	316,131	1%	100%	100%
Mean of Size Factors for Yard 1				100%	100%
Yard 2, Mechanical Cost	\$19,377,598.00	\$10,558,205.00	9%	57%	60%
Yard 2, 6 Mo. Mech. Hrs	174,843	182,835	5%	56%	58%
Mean of Size Factors for Yard 2				56%	59%
Yard 3, Mechanical Cost	\$13,529,973.40	\$7,308,179.00	8%	40%	42%
Yard 3, 6 Mo. Mech. Hrs	106,625	104,729	-2%	34%	33%
Mean of Size Factors for Yard 3				37%	37%

²² General notes for Table 4: FY09 “Mechanical Cost” reflects Mechanical Department operating expenditures for the full fiscal year from October 1, 2008, to September 30, 2009; FY09 “6 Mo. Mech. Hrs” (person hours for all Mechanical Department staff as tracked in their “Work Management System”) includes only the last six months of the 2009 fiscal year due to Yard 3’s late adoption of the reporting tool; all data for FY10 both financial and Mechanical Department operating hours, are for the first six months of the 2010 fiscal year October 1, 2009, to March 31, 2010; the “Mean of Size Factors” measure is simply the average of the other two percentages.

Table 4 illustrates size changes between FY09 and FY10. The results are fairly consistent for both years, except Yard Two has grown a little more quickly than Yard One or Yard Three.²³ One evident trend at Yard Three begs the question, why does Yard Three’s Mechanical budget grow eight percent but its Mechanical work hours shrink by two percent?²⁴ This reduction in Mechanical work hours at Yard Two is worrisome because it will show up in this analysis as increased facility maintenance cost per mechanical hour worked – which is one of the measures of cost benefit employed in this paper.

Mechanical budget and Mechanical labor hours are not perfect or complete measures of the need for facility maintenance; they are an approximate reflection of facility maintenance demand. They also do not fully accommodate the possibility that facility maintenance at one facility may be better or worse than facility maintenance at another facility. [5] Analyzing the true productivity and or quality of work at each facility is beyond the scope of this project, but future research incorporating these parameters would certainly make a worthy follow-on project.

²³ The author writes this research paper during the third quarter of the 2010 fiscal year, so comparisons between FY09 and FY10 are based on extrapolating the FY10 data from the first six months of the fiscal year. This process of doubling the first six months of FY10 creates an unavoidable potential for error, because funds are typically not spent uniformly throughout the fiscal year and different managers have different burn rates for their budgets. It might be a worthy follow up project to revisit these numbers at the conclusion of FY10.

²⁴ Such a question is beyond the scope of this paper, but may be an indication of some management issues at Yard Three that the author hopes will not adversely affect the outcome of this study.

Size Factors Not Used

~~Critics of the approach used in this paper could argue that~~ Among the possible alternatives.... acreage is another appropriate size measure, but other than periodic track inspection costs which are already incorporated into existing measures of facility maintenance cost, acreage did not seem particularly relevant.²⁵ Passenger cars and locomotives assigned to each facility could also be a relevant measure if it were fairly easy to calculate and factor out the amount of maintenance performed at outlying facilities, but it is not, and once again this measure seems less relevant than direct measures of the actual work performed at each yard.

The aggregate cost of buildings and facilities is another measure of yard size this paper excludes and that critics could argue is a relevant measure of the need for facility maintenance, but the methodology for computing previous capital expenditures in current comparably inflated dollars, as well as factoring in a variety of capital improvements and the increasing maintenance needs of slightly older facilities was beyond the scope of this study.

FINDINGS AND DISCUSSION

Results of Yard Comparisons

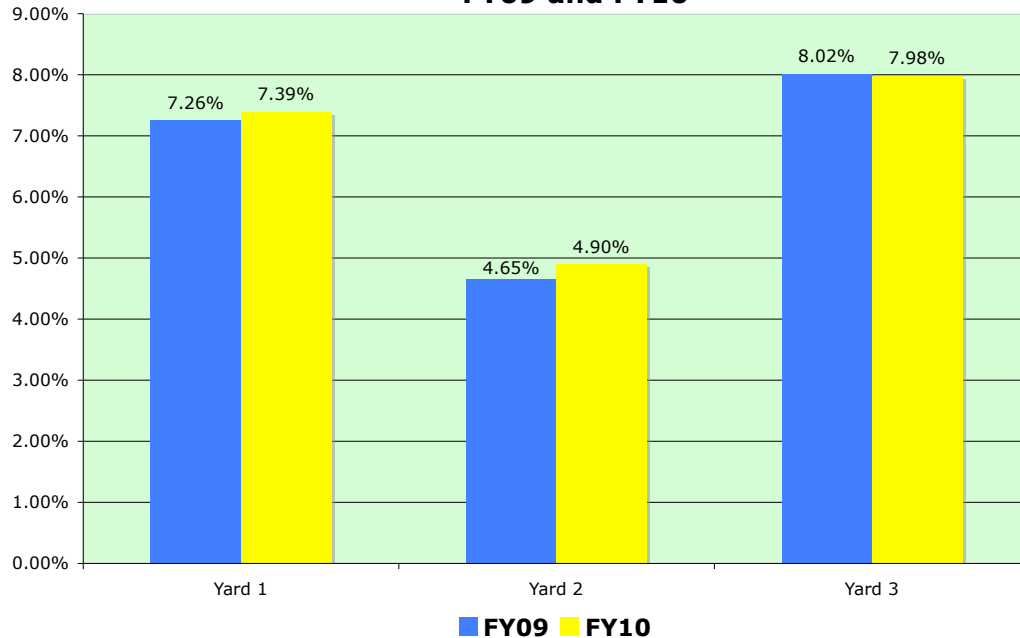
The results of this study echo the findings of privatization literature generally. Given our small sample, and a variety of potential errors, it is important not to overstate the findings, but this study reveals what appears to be substantially lower cost for Engineering services at Yard Two than either Yard One or Yard Three obtained.

²⁵ For the record, Yard One is approximately 40 acres and the other two yards are each about 20 acres.

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Somewhat surprisingly the in-house Engineering crew at Yard One shows a lower a lower cost basis than the contracted facility maintenance at Yard Three.

Chart 2: Facility Maintenance Cost as a Percentage of Yard Operations FY09 and FY10

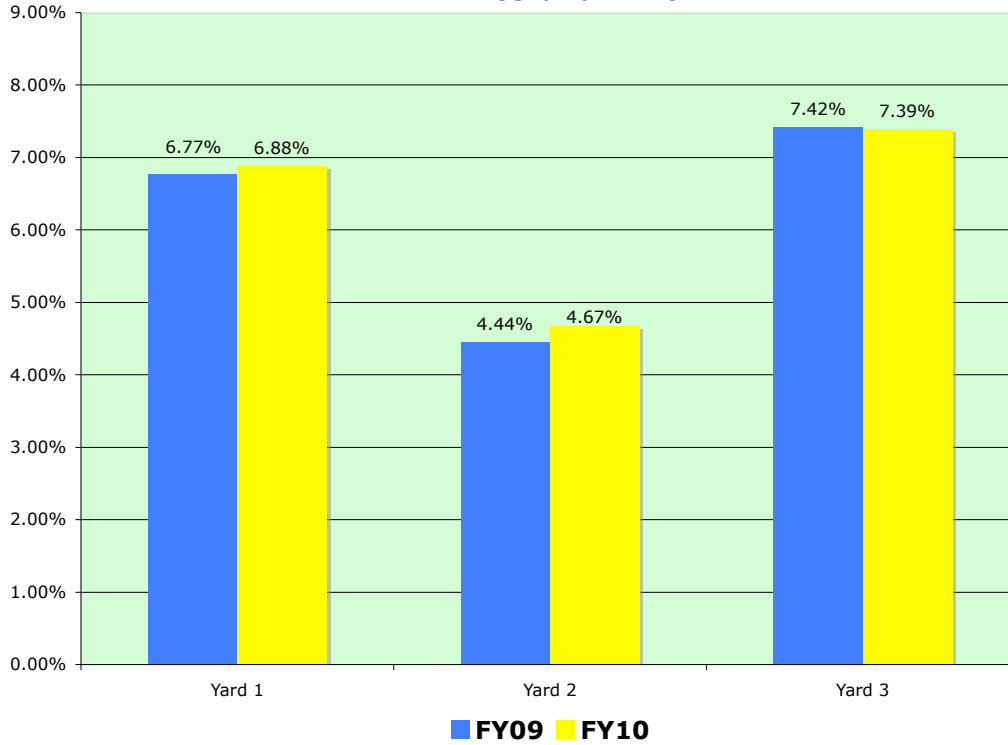


The Y_1 Size Factor

The formula used for the Chart 2 analysis (above) is X / Y_1 ,²⁶ so that Engineering’s facility maintenance cost appears as a percentage of the Mechanical Department’s operating cost. The result is a simple bar chart showing the differences between the three yards for whole 2009 fiscal year and the first six months of the 2010 fiscal year.

²⁶ As a reminder, X is facility maintenance cost from the Engineering Budget, and Y_1 is Mechanical’s operating cost.

Chart 3: Facility Maintenance Cost as a Percentage of Mechanical and Engineering Budgets Combined FY09 and FY10



An alternative way of showing the same data appears in Chart 3 where the costs of Mechanical and Engineering are combined so that facility maintenance appears as a percentage of the total yard operating cost according to the formula $X / (X + Y_1)$. Both graphs are based on the same information and reveal the same differences between the three yards, although the percentages shown in Chart 3 are possibly more useful at the level of regional-level planners looking at the total cost of each yard and percentage of that amount allocated to facility maintenance.

Facility maintenance cost stratification is clearly evident between the yards with Yard Two showing substantially lower ratios of Engineering’s facility maintenance cost to Mechanical’s operating cost. Combining the results from the 2009 and 2010 fiscal

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years based on the same formula used in Chart 3 $\{X / (X + Y_1)\}$, Yard Two averages about 4.5% Engineering cost ratio while Yard One is about 6.8% and Yard Three is about 7.4%. Given such a small sample, it is not clear how much weight to give these results, or what conclusions can be drawn, but these findings will be more fully discussed below.

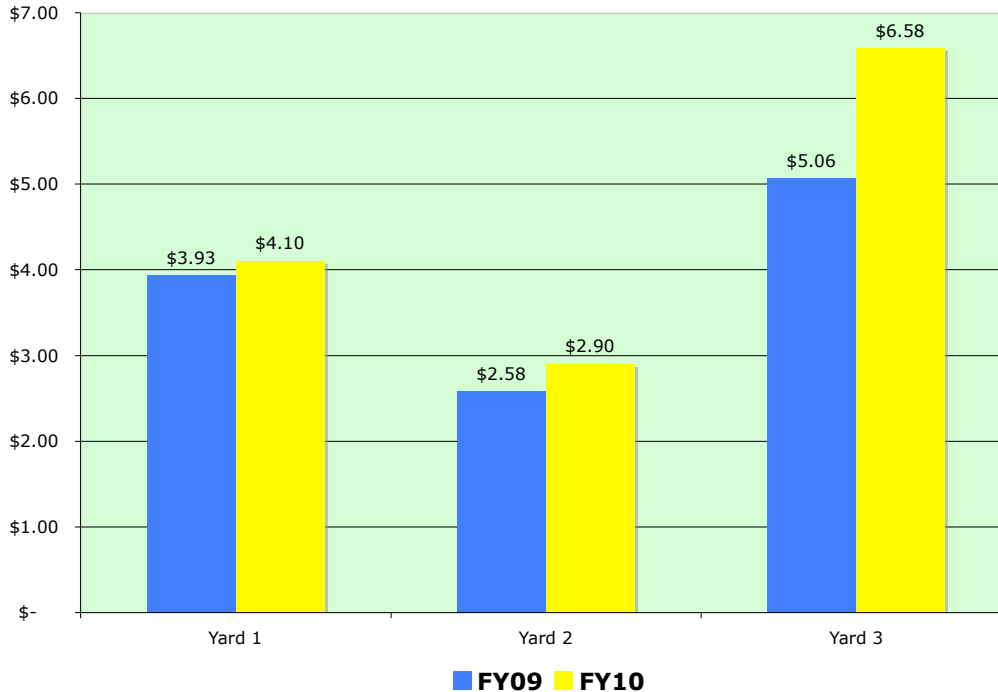
Table 5, Data used in Chart 2 and with some modifications in Chart 3

	FY09	1/2 FY10
Yard 1, Mechanical Costs	\$33,933,247.00	\$17,460,811.00
Yard 1, Engineering (In-House Employees)	\$2,463,583.00	\$1,290,144.00
Engineering as % of Mechanical	7.26%	7.39%
Yard 2, Mechanical Costs	\$19,377,598.00	\$10,558,205.00
Yard 2, Engineering (Ad Hoc Contracting)	\$901,363.00	\$517,742.00
Engineering as % of Mechanical	4.65%	4.90%
Yard 3, Mechanical Costs	\$13,468,796.40	\$7,308,179.00
Yard 3, Engineering (Single Contractor)	\$1,079,598.00	\$583,425.00
Engineering as % of Mechanical	8.02%	7.98%

The Y₂ Size Factor

A second approach to gauging the cost of facility maintenance at the three yards is to divide the total annual cost of facility maintenance by the number of hours of Mechanical Department activity at each yard. Chart 4 illustrates this analysis, following the formula X / Y_2 and represents the results as facility maintenance dollars per hour of Mechanical activity. As noted earlier in this paper, the decline in Yard Three Mechanical Department hours in the 2010 fiscal year without a corresponding drop in facility maintenance cost shows up fairly dramatically on this chart.

**Chart 4: Facility Maintenance Cost
shown in Dollars per Mechanical Staff Hour
FY09 and FY10**



Discussion

The main finding of this research is that the yard where contractor competition is greatest, where the majority of work occurs as a result of a smaller scale and less formal contracting process, is also the yard where the cost ratio between facility maintenance and yard operations shows the lowest cost basis. As noted in the section of Engineering Manager comments, this may come at a higher price for local management in terms of stress and work hours, but the results appear to provide financial benefits.

Yard Three, where a single contractor is responsible for facility maintenance, shows the highest cost basis, and is possibly an example of the overdependence on a single contractor that Prager warned about. While the details of the bid process for that contract are confidential, if the greatest value for money is the goal, it might be prudent to

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follow Prager’s advice to break the contract into separate pieces to reduce dependence on any one contractor.

What is perhaps the most surprising result of this study, especially for champions of contracted services is the half percent cost advantage shown by the in-house employees at Yard One when compared to the cost of contracted maintenance at Yard Three. Returning to the earlier discussion comparing the staffing levels at Yard One and Yard Three, if *ceteris paribus* (other things are equal), then having many more employee hours available should be an advantage to Yard One. However, if the findings of this paper are correct, Yard one also has a cost advantage over Yard Three so the apparent difference is possibly magnified.

One clear weakness of this research, that seems evident in retrospect, but eluded me until this research was nearly complete, appeared during a critical look at the question of causation. Each facility is allocated funds at a fairly high level in corporate management, what if the differences in Engineering budget for facility maintenance, and possibly even Mechanical budget for rolling stock maintenance are not as connected to the means of performing that maintenance as they are to the strategic priorities of upper level management?^[6] There is no doubt some self-fulfilling prophecies are involved when budget managers give one facility less resources as a way of forcing managers to achieve greater efficiency or fail.

One rebuttal to this critique is that when an Engineering Manager cannot meet the department’s obligation to keep the yard in “good working order” and can demonstrate that budgetary restrictions are the issue, then typically budget managers authorize upward revisions to the budget. Secondly, even if it is true that the lower funding levels may

point to lower corporate priorities, the means used to accomplish the facility maintenance goal as examined in this paper, is evidently able to meet that goal at each of the three yards.

A second weakness in the current research design revolves around the influence of unionization. Yard One and Yard Three are both fully unionized in spite of the different sizes of their workforces. Yard Two is more difficult to characterize with probably about a third of the contractors who regularly perform facility maintenance represented by unions. Is the difference in performance between the three yards explained by wage, benefit, and work rule differences? If so, does Yard Two’s superior cost performance come at the expense of contract employees who work without benefits or job security?

The data necessary to fully answer this second critique was not collected for the current research, but the Water Treatment operator at Yard Two, for example, is non-union, and receives significantly higher pay than the in-house employees in Yard One with equivalent benefits. The area where the Yard Two operator falls short of the in-house employees in Yard One is in job security. If the Engineering Manager cancels the Water Treatment contract, the operator will scramble for another operator position or face layoff, likely giving the operator a strong incentive toward productivity. Research focused on the impact of unionization in this context seems like it would make a worthy follow-on study.

As in many other research papers on this topic, the conclusions that can be drawn from this research must be hedged due to methodological weaknesses and a relatively small sample size. The author welcomes follow-on research designed to test the question

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of causation as a potential weakness in the current study, as well as further case studies of privatization since the results of this study are so mixed.

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Appendix 1

Attaching PDF files to this Word document was more difficult than anticipated.

Please see separately attached PDF financial reports for the 2009 fiscal year entitled:

- Yard1-FY09-EngineeringFinal.pdf
- Yard1-FY09-MechanicalFinal.pdf
- Yard2-FY09-EngineeringFinal.pdf
- Yard2-FY09-MechanicalFinal.pdf
- Yard3-FY09-EngineeringFinal.pdf
- Yard3-FY09-MechAdminAdditive.pdf
- Yard3-FY09-MechanicalFinal.pdf

Files for 2010 are:

- Yard1-FY10-Engineering 6mos.pdf
- Yard1-FY10-Mechanical 6mos.pdf
- Yard2-FY10-Engineering-6mos.pdf
- Yard2-FY10-Mechanical-6mos.pdf
- Yard3-FY10-Engineering-6mos.pdf
- Yard3-FY10-Mechanical-6mos.pdf
- Yard3-FY10-MechanicalAdmin-6mos.pdf

Passenger Rail Service Financial Gateway
Detail Expense Account Variance Report for **Yard 1 Engineering, FY09**
Line of Business: Operating excluding Reimbursables
Fiscal Year Levels as of September, 2009

Percent Variance	Account	Account Name	Year to Date			
			2009 September YTD Actual	2009 September Current Budget	Variance Better/(Worse)	Percent Variance
	9.7 500001	Salaries	81,885	82,866	981	1.2
	500007	Mgt Salary Expense Accrual	391	0	(391)	
	500008	Other Time Worked	2,519	0	(2,519)	
	500009	Guarantee & Layover	288	0	(288)	
(8.4)	500010	Wages	1,069,851	1,106,075	12,224	1.1
(40.4)	500011	Vacation	83,286	102,162	18,877	18.5
(3.3)	500012	Holiday	53,726	55,204	1,479	2.7
(249.3)	500013	Other Wages	11,771	9,937	(1,835)	(16.4)
60.8	500014	Overtime Wages	14,723	16,555	1,832	11.1
	500025	Entitlement Payouts-Agreement	5,422	0	(5,422)	
9.4	502039	Employee Benefits Allocated	622,517	691,783	69,267	10.0
100.0	503057	Special Awards & Acknowledgement	57	1,000	943	94.3
	503163	Courses/Seminar Fees	0	2,500	2,500	100.0
100.0	504001	Travel - Mtgs & Conference	0	1,500	1,500	100.0
	504002	Travel - Training	487	0	(487)	
90.5	504003	Travel - Payroll Generated	1,005	1,816	811	44.7
	504061	Travel - Air Transportation	924	0	(924)	
	504071	Travel - Business	163	0	(163)	
(62.3)	507143	Office Equipment	8,304	4,003	(4,301)	(107.4)
100.0	507144	Computer Hardware Purchase	448	1,200	752	62.7
	507145	Office Supplies & Expenses	1,526	2,502	976	39.0
100.0	507146	Printing & Photography	0	250	250	100.0
100.0	507164	Meetings	0	250	250	100.0
(87.3)	507167	Delivery & Distribution	1,072	1,020	(52)	(5.1)
	507175	Audio-Visual Equipment	114	0	(114)	
100.0	508176	Equipment Rental	1,509	1,898	389	20.5
(30.6)	508177	Maint & Repair-Other Equipment	101,519	120,193	18,574	15.5
(173.4)	508178	Small Tools	18,299	7,608	(10,691)	(140.5)
	508179	Shop Equipment Miscellaneous	162	0	(162)	
	508183	Other Building & Space Rent	51	0	(51)	
	508184	Utilities - Electricity	129	1,147	1,019	88.8
	508188	Utilities - Water/Sewer	2,586	0	(2,586)	
(1200.4)	508189	Janitorial Services & Expenses	13,650	6,629	(7,021)	(105.9)
(505.6)	508193	Building Maintenance Services	146,838	48,001	(98,838)	(205.9)
100.0	508195	Building Material	6,561	3,799	(2,762)	(72.7)
	509002	Routine Non-Hazardous Chemical Disposal	12,975	0	(12,975)	
72.5	509005	Environmental Services	2,110	18,000	15,890	100.0
100.0	509007	Emergency Environmental Response	0	1,000	1,000	100.0
	509008	Spill Prevention & Response Supplies	4,871	2,400	(2,471)	(102.9)
(309.4)	509009	Emission Control System Ops	42,244	27,999	(14,245)	(50.9)
(600.7)	509174	Safety Equipment	8,369	8,250	(119)	(1.4)
	530723	Switch & Turnout Mat-Steel	0	2,620	2,620	100.0
100.0	530725	Ballast	2,195	2,500	305	12.2

Reynolds – “To Hire or Contract Out”

Appendix 2

Please see separately attached PDF reports from the Work Management System whose titles are:

WMS yard 1 fy09 last6mos hours.pdf
WMS Yard 1 fy10 6mos hours.pdf
WMS yard 2 6mos fy09 hours.pdf
WMS yard 2 first 6 mos fy10 hours.pdf
WMS yard 3 6mos end of fy09 hrs.pdf
WMS Yard 3 first 6 mos fy10 hours.pdf