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## A COMPARATIVE HISTORY OF ALTERNATIVE SHIP PROCUREMENT POLICIES

by

Jo Ann E. Argersinger

Serial T-380  
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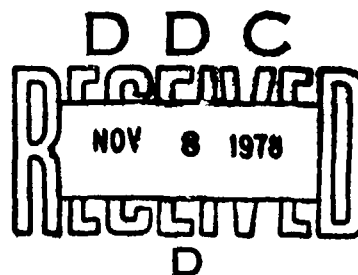
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Scholars, among others, have given considerable attention to procurement policies and practices. As a result of that emphasis, numerous studies have been produced--most of them critical in nature. The oft-cited weaknesses and problems in defense procurement are not only complex but frequently contradictory and include such aspects as inadequate funds for proper acquisition methods, incompetent management (both public and private), the absence of competition, excessive competition, too much rigidity in procurement policies, and too much flexibility in those same procedures. Clearly, however, there are two constant problems that characterize procurement policies, especially for the Navy's shipbuilding programs. One is the problem of definition of such terms as "reasonable profit," the other is the consistent inability to enforce procurement policies once adopted. The explanation for the continuation of these problems, particularly the one involving enforcement, raises serious questions about the efficacy of procurement regulations and about the goals and objectives of the Navy as well as the various shipbuilding industries.

An examination of the Navy's shipbuilding program since the early 1950s not only reveals the consistent problems of definition and enforcement but also demonstrates a third trend of increasing concentration in the

shipbuilding industries. Indeed, as early as 1956, a Congressional report noted this tendency toward centralized control in the industries as well as the "concentration of procurement on the large dollar contract" [1]. For the most part, however, in the early 1950s the chief concern of the Navy was the maintenance of a rather substantial shipbuilding mobilization base. Therefore, until 1953, major contract awards were made on a noncompetitive negotiated basis to those "distressed" yards regarded as in need of business [2].

The outbreak of the Korean War, however, helped to lift that depression in the shipbuilding industries and insure the expansion of major construction programs. Still procurement was handled not on a formally advertised but on a negotiated basis--an approach preferred by the Navy for its flexibility. Such systems as the DDG-2 were awarded on a competitive negotiated basis and reflected the type of flexibility that the Navy desired. The DDG-2, for example, involved 23 destroyers that were awarded to five different builders in eight separate contracts over a span of four fiscal years, from 1957 to 1961. Such diversity among contract recipients, the Navy argued, could not be insured by using the formal advertisement approach. In the late 1950s, then, the Navy still remained concerned about maintaining a wide mobilization base in the shipbuilding industries.

Congressional forces, however, did not share the Navy's faith in the negotiated procedures and urged, as early as 1956, the use of more formal advertising in contract awards. By 1960 the Navy was soliciting competitive bids on most standard new construction, but the actual contracts were still negotiated. In 1961, the Department of Defense (DoD) under Robert McNamara's leadership began pressuring for the increased use of publicly advertised bids. The emphasis on formal advertisement helped lead to the emergence of the firm-fixed-price type of contract. Moreover, the firm-fixed-price contract, according to numerous reports, helped contribute to the extraordinary rise in the number of claims filed by shipbuilders in the 1960s for price increases. General Counsel for the Navy during the Eisenhower administration, F. Trowbridge Vom Baur, declared that "the shift in emphasis from Procurement by Negotiation to Procurement by Formal Advertising which took place during the McNamara

administration" figured prominently in the rise of claims, "particularly in connection with shipbuilding." The McNamara policy, continued Vom Baur, reflected McNamara's belief that a large number of operative shipyards was not necessary and served to drive contractors dependent on government construction "into fierce competition with each other." Indeed, according to Vom Baur, formal advertising "compelled all . . . shipbuilders . . . to bid strenuously on every contract against each other," forced "every successful bidder to carve his price to the bare bone--in order to have a chance to become the successful bidder," and insured that "the low bidder would have only the meagerest of profit margin in his bid" [3].

Just as the DDG-2 represented the 1950s procurement policies, the DE-1052 provides a good example of the 1960s firm-fixed-price approach to procurement. The first 26 ships of the DE-1052 class were authorized in fiscal years 1964 and 1965 and were awarded to four shipyards on a multiyear basis. The final 20 ships of 1966 and 1967 were given to a single yard, Avondale. The lead yard involved in the DE-1052 was Todd and it immediately encountered construction difficulties. Todd ultimately filed a claim against the Navy totaling \$114 million of which it received \$96.5 million.

A comparative quantitative study of the bid information was made for the DDG-2 and the DE-1052. Given the popular conviction expressed in numerous reports and testimonies that formal advertising of the 1960s allowed for only extremely small profit percentages, considerable divergence was expected in profit estimates between the DDG-2 and the DE-1052 bids. In fact, however, although the average profit was somewhat higher for the entire DDG-2 system, certain DDG-2 estimates were as low as and even lower than the DE-1052 expected profit of 3.57% of the total price. One DDG-2 profit estimate was 3.33%, another 3.57%. Clearly, then, if the 3.57% profit estimate of the DE-1052 represented "only the meagerest profit margin," as Vom Baur indicated, then the development was neither necessarily new nor caused by the formal advertising or firm-fixed-price contracts characteristic of the 1960s. After all, apparently even during the golden era of flexibility or in the days of negotiated competition, similar profit margins were also found among the bids of the DDG-2 system.



Furthermore, it is interesting to note that with the possible exceptions of profit estimates and total costs, little similarity could be found within the various bids. Using such indices as labor hours, labor dollars, and overhead costs for such variables as hull structure, communication and control, and design and engineering, the simple statistical measurement, the standard deviation, was frequently much higher than the mean computed for the variables--an impressive indication of the remarkable variability found in the DDG-2 and the DE-1052 bid files. Although this extreme variance precluded more sophisticated quantitative analysis, it did raise questions not only about the accuracy of such figures but also about the attention given and importance attached to the figures estimated for the various categories. Indeed, perhaps the total price represents more than the sum of its parts.

Other explanations, in addition to Vom Baur's "bare-bone" profit theory, have emerged to account for the cost overruns and the extensive number of claims filed that characterized 1960s procurement. In the early 1960s, for example, design and building procedures became decidedly more complex. Not only were more ships authorized but increased attention was given to such new technical and design requirements as resistance to shock damage and reduction in the level of noise produced by the ship. Moreover, the Navy increasingly directed its efforts toward Anti-submarine Warfare (ASW) and ships like the DE-1052 figured prominently in ASW capabilities. According to the Navy in 1963 and 1964, these destroyer escorts would be equipped with "the most advanced ASW detection devices" such as SQS-26 sonar, a variable depth sonar, an anti-submarine rocket (ASROC), a drone anti-submarine helicopter (DASH), and ASW torpedoes. In short, the DE-1052 would represent a careful integration of "electronics, sonar, and armament" [4].

Coupled with these technical changes were shifts in the management of the shipyards themselves as well as the Bureau of Ships refusal to pay for cost increases as it had in earlier years. These new developments combined with new contract procedures to create an atmosphere of uncertainty and formality. The differences in procurement between the 1950s and the 1960s have been aptly summarized by former Comptroller General Elmer Staats. In the

past, Staats argued, fixed-price contracts were used "only for ships with relatively firm specifications" yet the new, more complex ship hardware involved "significant unknowns" and neither the Navy nor the shipbuilders "knew very much about what was involved when the contracts were awarded." Under fixed-price contracts, he concluded, "the price could no longer be increased to absorb the additional costs as it could have under flexible cost or incentive-type contracts and the shipbuilders have resorted to claims as a means of increasing the contract prices" [5].

A report later issued by the General Accounting Office (GAO) confirmed Staats's earlier contentions and added that vague government specifications in change-orders as well as problems encountered with the transfer of lead-yard plans to other builders explained the proliferation of claims. Yet, in a specific evaluation of the Todd claim for the DE-1052 system, the GAO reaffirmed its 1958 findings of inappropriate contractor claims, inconclusive Navy evaluations, and thoroughly unsubstantiated awards for claims. GAO announced its concern for the Navy's lax enforcement of price-change procedures and directives and found particularly troublesome the Navy's failure even to question the basis of the DE-1052 claims. It ultimately concluded that Todd's claim concerning labor hours was highly dubious and based on imprecise and vague "engineering judgments" and that Todd's entire proposal "seems to have been based on the assumption that all additional costs over the amount that the contractor was willing to assume responsibility for were the result of Government actions" [6].

It is not, then, altogether clear that formal advertising, at least for the DE-1052, necessarily had the deleterious effects on shipbuilding that have been assumed. What is clear, however, is that formal advertising altered the atmosphere in which awards were made, that the 1960s period of procurement was characterized by considerable formality in Navy-industry relations, and that the Navy and the builders were dissatisfied with procurement policies. In part, this formality stemmed from management changes that resulted from the acquisition of a number of yards by aerospace firms: Lockheed took over Puget Sound Bridge and Drydock in 1959; Litton acquired Ingalls in 1961; General Dynamics bought Quincy from Bethlehem in 1964;

Tenneco acquired Newport News in 1968; while Ogden Corporation took over Avondale in the mid-1960s. Gordon Rule noted the implications of these rather significant changes in his Congressional testimonies, declaring that "now, the whole scene has shifted. These are not private concerns anymore. They are parts of big conglomerates; the Littons, the Tennecos, and those people." As a result of such changes, Rule continued, shipbuilding industries were no longer family affairs and the relationships between the Navy and the companies accordingly suffered. Before the trend towards conglomeration, Rule added, the Navy could expect cooperation from companies for change-orders during ship construction without the fear of claims. That expectation on the part of the Navy, however, was not fulfilled by the newer corporate managers of the various holding companies. Instead, Rule maintained, that when "these hardheaded conglomerates . . . go into a plant, . . . they are not going to think of the family tie, [the] 'Hello, Joe' relationship. They want to make the yard pay off and you can't blame them, and I think they are looking for every dollar that they can get" [7].

A good example of the increasing difficulties in the 1960s between the Navy and the shipbuilders is the Navy's reaction to Todd's early warning about problems with the DE-1052--a warning that was largely ignored by the Navy. Indeed, according to Gordon Rule, Todd notified the Navy of three possible problem areas "in accordance with the conditions of the contract." But the Navy did not respond in kind. In effect, Rule asserted, the Navy's letter said "drop dead" and "get on with the contract." That very day, Rule declared, Todd began preparing its \$114 million claim [8]. Obviously, at least in this instance, the Navy no longer demonstrated its paternalistic tendencies characteristic of the 1950s.

In view of the cost overruns, substantial claims, schedule slippages, and the breakdown in communication and cooperation that occurred throughout the 1960s, it should not be surprising that procurement changes were in the making. In 1967, before the House Appropriations Committee, McNamara lamented the backward state of the shipbuilding industry. "The root cause of the trouble," he argued, was neither wages nor labor inefficiency but inadequate modernization of facilities. In sum, he declared, "the American shipbuilding industry is generally technically obsolete . . . ." To remedy that problem, McNamara supported a number of programs including multiyear and bulk procurement. But more important to McNamara, among others, was total package procurement—a device used most prominently for the FDL system and regarded as a means to provide builders with incentive to modernize and standardize their equipment and techniques [9].

Also important in this impetus toward modernization of the shipyards was the procurement approach referred to as "Concept Formulation/Contract Definition" (CF/CD). This approach was designed to provide a more comprehensive and thoughtful procurement policy that emphasized available technology in an attempt to get better and cheaper ships. According to DoD Directive 3200.9 of July 1965, during the concept formulation stage and before any actual development, considerable study was to be given to the necessary requirements of a particular system and possible alternatives in achieving such requirements. This process largely represented the exploratory and advanced development phases. The end product of the CF process is a Technical Development Plan which selects one or more of the studied approaches and offers a detailed analysis for further development and procurement [10].

During the contract definition phase, two or more contractors compete in the preparation of comprehensive and detailed proposals that include performance schedules and costs. This process is funded by the government. The government then selects the best offer and awards a contract on a fixed-price or fixed-price-incentive basis. It was hoped that CF/CD would place a high premium on evaluating available technology and discerning any problem areas before actual commitment of development funds [10]. The procedure was applied most notably to the two systems, the LHA and the DD-963, both awarded to Litton.

It was soon apparent, however, that CF/CD was not the panacea that had been assumed. To be sure, along with package procurement, CF/CD did provoke some attempts at modernization. Litton, for example, modernized its facilities for the LHA production, as did Avondale for the DE-1052, and the National Steel plant in San Diego for the LSTs. Moreover, as McNamara obliquely noted, efforts toward modernization also encouraged the concentration of prime contracts into the hands of fewer and fewer builders. In 1967, Secretary of the Navy Nitze attempted to assuage Congressional fears of the growing concentration by declaring that the newer procurement policies would not "result in the dominance of our defense and economic policy by a limited number of contractors." But he also commented that the Navy's preference for modernized yards would, of necessity, involve only the largest yards with expansion and specialization capabilities. Indeed, he added that making the desired technical and managerial changes might require the smaller companies "to merge" [11]. Moreover, a survey of contracts awarded in the 1970s indicates this trend toward fewer, more specialized yards. By the late 1960s, then, the Navy was no longer concerned with the survival of a large number

of shipyards but with enhancing the production capabilities of a very few yards now owned by rather large conglomerates.

Although CF/CD and total package procurement did insure that only a few yards received prime contracts, it did not succeed in reducing costs or delays. Certainly the GAO has confirmed that in its lengthy analysis of Litton's LHA and DD-963 problems [12]. Reasons for the failure of CF/CD to remedy past abuses have been well documented. It has been argued, for example, that basic misconceptions formed the basis of this procurement approach, that technical risks cannot be detected before actual hardware development, that fixed-type contracts failed to encourage builders to control costs, and that CF/CD in general provided an inflexible approach to systems procurement, for it called for competition in price not technical competence [10, Nash, pp. 17-18].

But even more fundamental to CF/CD's failure is the absence of enforcement [13]. Under Secretary of the Air Force John McLucas noted this problem when he declared:

Contract Definition (CD), as originally conceived, was intended to provide an orderly transition from development through deployment of major systems by ensuring that technology was in hand, costs reasonable, test and evaluation criteria established, and that all pieces of the system would fit together before commitment to full procurement. Unfortunately, these criteria were seldom met at the time scheduled for contract definition. In practice, CD all too often proceeded anyway and resulted not in complete definition, but in a paper plan for how the system could be built. Worse still, in some cases CD was considered only a milestone in the procurement cycle, with uncertainties ignored or suppressed as the price of getting on with the job. We were left with the form of CD without its substance [14].

The failure of CF/CD is also apparent in the proliferation of studies of various techniques for cutting costs and increasing efficiency and

competition, ranging from "design-to-cost" to "should cost," "direct technology licensing," and "parallel undocumented development." Indeed, in some respects parallel development represents not only a government-funded concept formulation stage but also a government-funded engineering phase that allows for hardware competition through the prototyping stage [15]. Finally, greater flexibility than found in CF/CD has been supported in the acquisition of major weapon systems. Reliance on negotiated contracts, for example, instead of formal advertising has been suggested as has the notion that fixed-price contracts frequently contribute to poor management decisions by both industry and government [16]. In short, then, to some extent procurement policy suggestions have come full circle--back to the 1950s emphasis on flexibility and paternalism in procurement. In the 1970s, however, fewer and fewer yards will benefit from that flexibility.

What emerges from this rather involved procurement scenario is a number of complex observations. First, it is not altogether clear that either fixed-price contracts or formal advertising make unrealistic competitive and technological demands on the shipbuilding industries. Although further study is needed, quantitative evidence from the DE-1052 shows no dramatic cut in profit estimates based on the bid estimates for the DDG-2 system of the 1950s. Moreover, detailed GAO studies seem to indicate that technical unknowns accounted for only a small part of the explanation for claims filed, particularly in the case of the Todd claim for the DE-1052. Finally, component parts of the various bids for a particular system vary so much that they do not make acceptable predictors for total costs. Only the total costs and the profit estimates resemble each other in the bid files. Yet prime contractors reported to the GAO that advertised contracts

proved least profitable and almost always involved losses. Moreover, not surprisingly, they overwhelmingly preferred situations where the government greatly assisted capital investment through progress payments, cost reimbursements, equipment, and facilities. Indeed, with such assistance, profit rates in the late 1960s and early 1970s for the top DoD contractors differed little from those for commercial endeavors. For example, returns on total capital investment for the top DoD contractors were about 11.0% and for top commercial industries, 12.6%; returns on equity investment (capital shares, deferred-investment tax credits, retained earnings, etc.) closed the gap even more, 21.4% to 22.8% [17]. Formally advertised contracts did not necessarily involve smaller profits in terms of percentages of total cost but perhaps meant smaller returns based on less government-supplied capital [17, pp. 1-3].

What is needed, then, is a re-evaluation of procurement objectives and priorities and a subsequent revision of regulations and procedures based on actual not false objectives. It seems clear that certain members of the Navy as well as shipbuilders do not like the atmosphere created by formal advertising. Price competition accounts for only a small percentage of Navy or DoD dollars yet there is considerable opposition to the entire notion of that type of competition. Admiral Hyman Rickover, for example, has stated that "competition is the exception, not the rule" in defense procurement. But more importantly, he noted that "defense procurement regulations are primarily oriented toward treating most defense procurements as competitive" [18]. Clearly, if price competition were the top priority, it would best be served by formal advertising not negotiated contracts that are characterized by price leaks, considerable arbitrary power on the part of the contracting agency, and "virtually no pricing safeguards" [18, Welch, p. 36]. Furthermore, little enforcement of competitive devices can be expected given naval antipathies to such practices. Indeed, at least one Navy official, Rear Admiral Thomas Davies, speaking before the National Security Industrial Association, indicated his belief that price competition was virtually impossible:

Our cost estimates . . . are incorporated into the budgets.  
Our cost estimate let's say is a hundred million dollars and that



goes into the budget. The responders to the RFP [Requests For Proposals] already know what we've estimated . . . , so what they produce is a one hundred million dollar solution. We then get a choice between 98.5, 99, and 99.5 . . . , which are the bids that come in eventually from the people who want to fill in the details of this very cleverly optimized Navy solution. We then look at ourselves and say, 'See, we said it was going to cost a hundred million dollars. Our estimates were exactly right.'

The next step, of course, is to . . . have the historical overrun which runs it up to maybe 175 million dollars and so our estimators then who are crouching in the caves somewhere in the Pentagon . . . say 'By God, we missed so . . . we'll multiply [everything] by 1.75 and that'll make sure we don't miss on the next estimate.'

So the next estimate and the next runthrough of this cycle for the next ship . . . comes out to be 175 million dollars and we get bids of 174.5 and we say to ourselves again, 'Aha, we're right!' and sure enough, it overruns to 250 million dollars. This is the Chinese learning curve [20].

But price is not Davies's major concern but rather the results of all that money and commitment. He laments, for example, that after about 26 million dollars for each DE-1052, the end product was not an advanced ASW ship but a 4000 ton ship that resembled a "free balloon" in that it is "a very airy, space filled thing but not much on it to do anything." It is for this reason that Davies, among others, stresses technical expertise and hardware competition through such devices as prototyping. Indeed, Davies even argues that private industry not the Navy should use its imagination in forecasting "future tactical strategic situation[s]" since the Navy, he says, has been "batting about zero" in that field [20; 10, Nash, pp. 20-21].

What is left is clearly a rather substantial dilemma involving qualitative as well as quantitative decisions. Price competition through formal advertising apparently has little chance of widespread adoption. The Navy and the builders obviously prefer cooperation to competition. Hardware competition, however, apparently provides a more acceptable course because it theoretically stresses the Navy's priority of a high-quality product and satisfies the industrial desire for government-supplied capital. Moreover, it has been argued that a shift in competition from price to prototyping

would allow for increased confidence in estimating performance and cost factors and that the cost of "prototype competitors would be a small price to pay if it enabled" the Navy to make more successful economical and technical judgments about a particular system. But these same proponents of prototyping have also demonstrated that the type of procurement little affects production outcomes in that proposed systems are almost always produced [21]. Given that, it is not altogether clear that prototyping would serve as a deterrent to full development of unwise weapon systems. In short, prototyping might provide a better gauge to pricing and technical performance but at substantially increased costs, especially if it fails to preclude further production of an ultimately undesirable system. It is also clear that prototyping can be used only for ship subsystems.

Finally, procurement regulations must be applicable to the actual policies followed and if the present regulations are to be kept, then considerably more attention must be given to competition and formal advertising; otherwise, the regulations need substantial revision and the stated goal of competition must be revised to stress cooperation and negotiation. In short, what is needed are procurement regulations that accurately reflect the goals and types of procurement policies actually pursued and do not simply reflect such false ideals as competition.

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