Project Procurement: Impact of Contract Incentives and Penalties

Mark Allen, Kristina Herring, Jennifer Moody, Chamana Williams
Project Management program, Drexel University, Philadelphia, PA, USA
mha44@drexel.edu, keh95@drexel.edu, jrm339@drexel.edu, Ctw44@drexel.edu

Abstract

The reason for the Project Procurement: Impact of Contract Incentives and Penalties study is to research, analyze, and discuss the impact of contract incentives and penalties on project procurement in support of project management. The co-authors of the study have identified an opportunity to show different points of view and guide the reader through the maze of available information regarding the state of the art in contract incentives and penalties as they relate to project procurement. The environment that affects this opportunity limits the research by the time available leading up to the due date and the sensitivity of information specific to the interviewees’ and survey respondents’ employers. The study’s findings include a determination that the buyer setting specific short- and long-term goals for the seller can mitigate risks associated with over- and under-incentivizing the seller. The study recognized that penalties can be effective in eliciting sufficient motivation in sellers, while incentives should be aligned with project management’s goals. The study concluded that incentives are often the most effective method to achieve time, cost, and performance results but that more research is needed to identify key commonalities in a variety of fields that lend themselves to either incentives or penalties to assist buyers and sellers to determine the “must haves” to achieve maximum mutual benefits.

Keywords: Contract Incentives and Penalties, Project Procurement, Project Management, Project Management Body of Knowledge, Project Management Institute (PMI)
Introduction
The objective of this study is to research, analyze, and discuss the impact of contract incentives and penalties on project procurement in support of project management. The scope of work includes the relationships among project procurement, contract incentives and penalties; contract type; over- and under-incentivizing; and the triple constraint of project cost, time, and scope/quality. The study specifically details project procurement use of incentives and penalties; minimizing project cost and duration by avoiding over- and under-incentivizing; and the impact of incentives and penalties on the triple constraint. The research was limited by the time available leading up to the due date and the sensitivity of information specific to the interviewees’ and survey respondents’ employers. The methodology of the research included major books written on project management and project procurement management; eight professional journal articles; and a podcast. The methodology’s primary research included a co-author’s professional observations; a survey; and three interviews of senior leaders in project management. The paper is structured to include an abstract; introduction; brief literature review; summary of new findings; analysis and discussion of results; bibliography; and appendices.

Brief Literature Review
This study consulted major books written on project management such as A Guide to the Project Management Body of Knowledge and Project Management: A Systems Approach to Planning, Scheduling, and Controlling. It drew from a book that specifically documents project procurement management, The Wiley Guide to Project Technology, Supply Chain & Procurement Management. It also captured best practices of project procurement and contract incentives and penalties as documented in eight professional journal articles; a podcast on project cost/duration; a co-author’s own professional observations; a qualitative survey of diverse professionals; and
three interviews of senior leaders in project management with extensive procurement-related experience.

Project Procurement Use of Incentives and Penalties

Project procurement employs contract incentives and penalties in support of project management. The state of the art of this relationship derives from the types of incentive contracts chosen and the comparative degrees to which they advance project management’s goals and mitigate associated risk. Large-scale projects can have “distant time horizons and require significant up-front commitments, while posing large potential downside losses;” it is necessary for “carefully written contracts that define (as precisely as possible) the legal, financial and technical aspects of the results and behavior desired by the contracting parties” to be created (von Branconi & Loch, 2004, p. 119). Contractual agreements typically can be categorized in one of two categories, fixed price or cost reimbursable, and contain language about the output, schedule, and cost expectations, as well as any incentives for achieving these objectives or penalties for deviating from expectations (PMI, 2013). Incentives can be used in either class of contracts.

The buyer’s objective is to obtain the highest return for the money invested, while the contractor’s aim is to increase profits. If there is deviation from the “true cost,” with a shift to a price that is too low, the “contractor will feel the irresponsible temptation to shirk,” and if it is too high “the client may not react this time, but may find out and retaliate next time” (von Branconi & Loch, 2004, p. 122). Ideally, “the price and the quality of the underlying cost estimates should be perfectly consistent with the technical specifications, including an adequate cost contingency” (2004, p. 122).
Financial incentives have historically been used as a method to promote motivation, ingenuity, cost and resource consciousness, and high performance. Financial incentives aim to use the contractor’s desire to maximize profits by providing an opportunity for the vendor to earn a higher profit by efficiently achieving contractual requirements (Bower, Ashby, Gerald, and Smyk, 2002). Contractual penalties are used as a method to penalize a failure to meet the buyer’s minimum expectations as defined by the contract.

Incentive or disincentive contracting is intended to reward or penalize a vendor based on performance and is generally determined by the buyer and negotiated with the contractors during contract negotiation (Bubshait, 2003). Incentives may be offered for a myriad of reasons but are most frequently made available for early project completion, meeting or surpassing quality standards, complying with safety rules and regulations, or innovations that generate cost savings for the buyer (2003). Disincentives penalize poor performance, which may include but are not limited to a failure to meet schedule, quality, or cost expectations.

Incentives or penalties “will compel contractors to make the extra effort to find solutions to these factors” and may assist “owners to achieve their goals by encouraging and forcing contractors to comply with their requirements” (2003, p. 63). The consensus is that “to ensure that an adversarial relationship does not occur between the contracting parties, the incentive systems should focus on positive incentives, rather than on penalties” (Rose & Manley, 2009, p. 40).

**Types of incentive contracts.** Four major types of incentive contracts demonstrate the variety of tools available to projects (see Figure 1 below).
### Table: Types of Incentive Contracts

<table>
<thead>
<tr>
<th>Incentive Contract Type</th>
<th>Examples</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Price</td>
<td>Guaranteed Maximum</td>
<td>• Most effective when contractor has some control over design phase of project.</td>
</tr>
<tr>
<td></td>
<td>Bonus/Penalty Incentives</td>
<td>• Intent is to reward contractors for early completion or penalize them for late completion of project.</td>
</tr>
<tr>
<td>Reimbursable Contract</td>
<td>With and Without Incentive</td>
<td>• Positive incentive to the contractor to increase cost.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not advisable; project use should be limited.</td>
</tr>
<tr>
<td>Performance Incentive</td>
<td>Cost, Schedule, Quality, Technical Performance, Safety (Limited Use)</td>
<td>• For projects where the performance is of pronounced importance.</td>
</tr>
<tr>
<td>Safety Incentive</td>
<td></td>
<td>• Influence on improving project safety performance but no guarantee of safety success.</td>
</tr>
</tbody>
</table>

Figure 1. Types of Incentive Contracts. (Adapted from Bubshait, 2003, p. 64).

**Fixed Price Incentive Contract types.**  
- Guaranteed Maximum – In this type of contract the vendor is paid a fixed fee and reimbursed costs to the established maximum, with any savings below this maximum number shared between the contractor and vendor (Kerzner, 2013). This type of contract is most effective when the contractor has some control over the design phase of the project as in the design-build contract (Bubshait, 2003, p. 64).
- Bonus/Penalty Incentives – The contract contains language for an adjustment of the total project cost by a formula agreed to by both parties in advance (Kerzner, 2013). The intent is to reward contractors for early completion or penalize them for late completion of a project (Bubshait, 2003, p. 64).

**Reimbursable contract (with and without incentive).** In cost plus incentive contracts “the client’s target cost is introduced into a reimbursable contract and acts as the fulcrum around which the incentive mechanism is driven,” with the goal of promoting “favorable project cost outcomes, savings achieved below the target cost are split between the contractor and client based on a predetermined share profile” (Rose & Manley, 2009, p. 41). In this type of contract, the contractor and client work together to “minimize actual costs, as the contractor is able to maximize their profit margin by sharing the benefits of reduced project cost, and the client is motivated to minimize the total cost paid out” (2009, p. 41).
This type of contract “provides a positive incentive to the contractor to increase cost; therefore, its use is not advisable and should be limited. If this contract type is necessary, then it should be limited to low cost projects, emergency work and short duration projects” (Bubshait, 2003, p. 64).

**Performance incentive.** The performance incentive contract is based on the contractors’ performance evaluation by the purchaser, and tends to be used for projects where the performance is of pronounced importance to the buyer (2003). A performance based bonus is typically used to motivate the contract agents in more areas than cost, and can be applied to multiple mechanisms, including, but not limited to schedule, quality, technical performance, and safety (Rose & Manley, 2009).

The performance criteria and measurement period are established in contractual documents, and the performance assessment tends to be “measured on things that have an effect on the schedule or cost such as quality, safety, technical management, utilization of resources, productivity and responsiveness” (Bubshait, 2003, p. 64). Performance bonus based contracts are intended to “motivate the contract agent by providing them with a financial bonus in addition to their prescribed fee for exceeding minimum acceptable levels of performance, and distribution is generally based on evaluations undertaken after performance has been achieved” (Rose & Manley, 2009, p. 41).

**Safety incentive.** The safety incentives research shows “some influence on improving safety performance; however, their influence will not guarantee the success of the safety program” (Bubshait, 2003, p. 64). At this time research shows only limited support for use of safety incentives.
Projects are unique undertakings, but due to the standardization of methodologies, it has been found that some projects are more likely to include incentive or penalty language. In the following section, the authors will describe some project characteristics or scenarios that are conducive to incentives and penalties within contracts.

**Project procurement contracts and incentives.** Research suggests that incentives are a key tool to successfully encourage desired behaviors and/or results. A review of the literature is indicative that certain project characteristics may generate higher success in using incentives than others. These include, but are not limited to, a defined scope with clear, feasible requirements, and/or defined and measurable performance standards.

Incentives are found useful for projects that have defined scopes that will not be likely to change. The adequacy, completeness, and consistency to the scope of work of the technical specifications and the deliverable deadline “heavily determine future change orders or claims, as [they define] what is a changed requirement” (von Branconi & Loch, 2004, p. 122). Projects with uncertain scope or requirement are likely to be subject to change, making it difficult for the vendor to meet schedule and cost objectives.

Certain government projects where one either achieves the result or not, are not conducive to either incentives or penalties. For example,

NASA projects with specific requirements that must be met to accomplish something are not conducive to contract incentives or penalties. For such projects there is no good, better, or best. They cannot incentivize the work because it must meet certain minimum requirements. For example, a NASA telescope can either focus or it cannot. A space launch vehicle must meet speed requirements. It either can go the required speed or not. (Matt Opeka, a former NASA customer and current NASA contractor, Appendix A, June 4, 2015)

Cost overruns and project delays are some of the key challenges facing projects. The causes of these issues are usually connected to “poor planning, low productivity, inadequate resources,
inaccurate estimates” (Bubshait, 2003, p. 67). To negate this, the buyer may offer cost and schedule incentives for early project completion and budget control.

Qualitative interview findings supported the current literature, with a general consensus that at the end of a project, if the contractors were under or on time and cost, an incentive was received. In some cases, time itself can serve as a reward. In one interview of a construction industry professional carried out for this study, it was found that by being proactive, the buyer allotted an increased time schedule to complete the project. For example,

Additional bonuses may be rewarded as time. In a contract where the vendor is able to complete some of the planning activities or particular tasks ahead of schedule, the buyer may extend the schedule as a reward. This extended schedule does not result in additional cost to the buyer, but may eliminate penalties to the vendor if they fail to deliver on time. (Caleb Moody, Excavating Foreman, personal communication, June 6, 2015)

When defining incentive payments to be made at project completion, it is necessary to define the “project completion” contractually to eliminate variation between contractor and owner perceptions (2003). As incentives are generally offered to encourage the early completion of a project, it is also necessary for the contractor to control costs in their effort to fast track completion as this tends to be one of the performance criteria used. The interview with Caleb Moody supported this finding. In his work, he found

Incentives aren’t there if there is an open-ended project. For projects that have undefined phases, like a housing development, where an organization can pay for x amount of work and is actively looking for investors for the next phase, the company takes on this work to “fill” open time. This is busy work to keep the company afloat until the next ‘real’ project. If another priority comes up, this work is shoved to the bottom because it doesn’t have a due date. (Caleb Moody, Excavating Foreman, personal communication, June 6, 2015)

Incentives may be offered if the contractor achieves the predetermined quality standards. The quality measures to determine this achievement should use standard tools to eliminate subjectivity
If the quality standards are not met, it is possible that the contract will include penalty language.

An example of project characteristics conducive to contract incentives are NASA support service contracts. The human factor plays a larger role in these contracts than in hardware design or hardware build contracts. Cost Plus Award Fee clauses are the most effective approach to providing incentives in support service contracts. The NASA customer can thus “hold the contractor’s feet to the fire”; no performance, no award fee. That’s the incentive, and that’s the penalty. (Matt Opeka, a former NASA customer and current NASA contractor, Appendix A, June 4, 2015)

In another case, quality incentives can be used to encourage achieving more than the minimum standards.

NASA projects that are designing new hardware such as spaceflight instruments with \( x \) number of specific characteristics are conducive to contract incentives and penalties. The NASA customer defines minimum and additional performance characteristics in the hardware design contract. They include an incentive fee based on performance for the additional requirements. That way, the customer is guaranteed satisfaction of the minimum requirements and then pays fee only if and to the degree the additional requirements are met. The more requirements the contractor meets, the more money they get. NASA hardware build projects can also take this approach to procurement. The minimum requirements might be to deliver an instrument that performs certain functions to a minimum tolerance, and the additional, incentivized requirements might be to meet a greater degree of accuracy. (Matt Opeka, a former NASA customer and current NASA contractor, Appendix A, June 4, 2015)

**Project procurement contracts and penalties.** Some research indicates that penalties create an adversarial relationship, and do not encourage partnership. In support of this idea, relational contracts, “informal agreements and unwritten codes of conduct sustained by the value of future relationships,” discourage the use of formal penalties (Ning & Ling, 2015, p. 999). Others argue that penalties are ineffective and that when a project is failing to meet a milestone or deliverable date, it may be due to exigent circumstances. According to one survey respondent,

Penalties don't work. If work is poor, examine scope and specs. If he can't do the work, coach him or bring on more experienced staff, if possible. (Gail K. Regan, retired NASA/GSFC Contracting Officers Technical Representative (COTR), Performance Evaluation Board (PEB) member, Source Evaluation Board (SEB) technical advisor,
Other research contradicts this statement, finding penalties are used more frequently than incentives to encourage the contractor to be proactive, and as a result will increase productivity to meet the project deadlines (Bubshait, 2003). An excavating foreman in the construction industry stated that

Penalties work well for safety and environmental requirements. These are standards that are set not only by buyer but also by the government. For example, in one project, work could only occur during set hours - if any work occurred before or beyond this time, we would be levied with a $15,000 fine for every 15 minutes. This fine was to eliminate driver inconvenience during rush hour but also to protect the workers as there is more likely to be an incident during high traffic volume time. (Caleb Moody, Excavating Foreman, personal communication, June 6, 2015)

Further supporting the use of penalties are projects where the quality standards were required. One survey respondent recommended,

Penalize because you don't want someone to rush the job and cut corners for a bonus. It is more likely you would rather have them agree to a reasonable date to finish the project. You can extend the deadlines with reasonable cause. (John Alvarado, real estate property manager, Appendix B, June 3, 2015)

In other words, by penalizing a delayed delivery, the buyer may be inadvertently encouraging shoddy performance and quality. Alternatively, penalties could be used for failing to meet the required quality standards stated in the contractual agreement.

The foregoing research has led to new findings that the impacts of contractual penalties are mixed, that much of the available research results concern industrial or construction work; but the use of procurement may occur in any or all projects and further analysis is required.

**Project Cost/Duration: Over-Incentivizing Versus Under-Incentivizing**

While the state of the art of project procurement’s use of incentives and penalties derives from incentive contract type, the relationships among the foregoing and over- and under-
incentivizing reveals that associated risks can be mitigated. In alignment with project management’s goals, project procurement can minimize project cost and duration by avoiding over- and under-incentivizing. During incentive selection, project procurement must carefully audit potential benefits and risks against project management’s goals.

Minimizing Project Cost/Duration. When searching for sellers to provide project needs, the buying organization must remain very aware of the time and financial constraints outside vendors place on projects. Dr. Andy Gibbons of the Department of Instructional Psychology and Technology at Brigham Young University has provided an example of this concept:

We had a staff of about 25 people. We had to pay them all. We had to bring them on at the right time, and we had to put them off at the right time. Because if we didn’t, then they would bill against the project and we would use up funds that we didn’t have. . . . Sometimes that comes into conflict with the production schedule (Gibbons, 2011).

Gibbons’ statement is a strong example of the impact outside vendors can have on a project throughout its lifecycle. When services or materials are procured for a project, the ultimate goal is to ensure reaching outside of the organization will minimize the cost and duration of the project. Project organizations can achieve this goal by properly vetting and selecting the most appropriate sellers. Implementing incentives is another way to encourage the chosen to deliver their materials or services under budget and on-time.

Project organizations can promote the desire for minimizing project costs and durations by adding incentives to their contracts. There are a number of contract types that include incentive and award fees. For example, the fixed-price-incentive-fee (FPIF) contract gives vendors the incentive to perform above the basic requirements of the contract and scope of work provided by the buyer. Gregory A. Garrett of the National Contract Management Association Board of Advisors included FPIF incentives when he explained,
Contract incentives are those incentives that use individual judgment, opinions, and informed impressions as the basis for determining the amount of incentive, either positive or negative, in one or more designated areas. These incentives can and often do contain some objective aspects or factors (Garrett, 2007, p. 10).

As Figure 2 below exhibits, incentives can be offered based on varying criteria of rewards; no reward or penalty; or penalties.

<table>
<thead>
<tr>
<th>TYPES OF INCENTIVES</th>
<th>POSITIVE (REWARDS)</th>
<th>NO REWARD OR PENALTY</th>
<th>NEGATIVE (PENALTIES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective Incentives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost Performance</td>
<td>Under Budget</td>
<td>On Budget</td>
<td>Over Budget</td>
</tr>
<tr>
<td>Schedule or Delivery</td>
<td>Early Delivery</td>
<td>On-time Delivery</td>
<td>Late Delivery</td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality Performance</td>
<td>Exceed Requirements</td>
<td>Achieve Contract Requirements</td>
<td>Do Not Achieve Requirements</td>
</tr>
<tr>
<td>Subjective Incentives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Award-Fee Plan/Award-Term Plan</td>
<td>Exceed Requirements</td>
<td>Achieve Award-Fee Plan/Award-Term Plan</td>
<td>Do Not Achieve Requirements</td>
</tr>
</tbody>
</table>

**Figure 2. Varying Criteria for Contract Incentives. (Adopted from Garrett, 2007, p. 12).**

The concept behind offering these incentives is that it will lead to more effort and higher performance from sellers. Unfortunately, this approach can backfire on the buyer, and as a result buyers must beware of over-incentivizing and under-incentivizing as both can lead to project complications.

**Over-Incentivizing the Seller.** Over-incentivizing the seller consists of the buying organization offering numerous incentives for easily attainable goals. Doing so puts the seller in a position where the quality of their work can be compromised. This situation can be detrimental to the project and project organization because it can result in “putting company’s sustainability at risk by paying out too much, incentivizing the wrong behaviors, or possibly driving people to game
the system to meet their targets” (Cancialosi, 2014). The stability and success of the project depends on ensuring tasks are carried out properly.

In an interview, Matt Opeka, a former National Aeronautics and Space Administration (NASA) customer and current NASA contractor, explained some of the repercussions and dangers surrounding over-incentivizing. He affirmed that

The adage ‘Better is the enemy of good enough,’ comes into play. It means that performing to a good enough level meets minimum requirements, and performing at a higher level is imprudent if it costs more or delays delivery. If you want something to meet specific requirements, do not over-incentivize. Making it better becomes extraneous and wastes your money. I remember times when NASA instrument contractors wanted to keep making the hardware better, but spacecraft managers had to cut them off or the project would have failed to meet its goals. If the project over-incentivizes with a fixed-price-incentive-fee contract, then cost would not be at risk but schedule still might. (Matt Opeka, a former NASA customer and current NASA contractor, Appendix A, June 4, 2015)

Mark Allen, one of this study’s co-authors and a former NASA contractor, has added,

The most significant risk of over-incentivizing a seller to minimize contract performance cost is the risk of performance failure due to “cutting corners” (i.e., not following proven industry best practices or at least reasonably mitigating risks of cost-cutting innovations). This risk results from the seller’s desire to maximize profit combined with the buyer’s over-incentivizing the seller to cut costs. While at NASA, I witnessed Government contractors hire minimally experienced staff for low salaries to minimize labor costs. Without diligent training of such staff, contractors experienced poor employee performance that created the risk of poor contract performance.

These real world examples illustrate the need for buyers to be mindful of the quality of work they are seeking from their sellers. Offering too many rewards can detract from the desire of the seller to provide work that reduces cost and duration of the project. The reason is that the seller knows that very little effort can result in profitable reward.

**Under-Incentivizing the Seller.** Under-incentivizing the seller can also have negative repercussions on project procurement. This tactic gives less incentive for sellers to produce quality work, leaving them complacent. This sometimes is the result of the buyer not having enough
money in the budget to offer attractive incentives. Cancialosi suggests that companies “be
generous, but make sure you keep the company on solid financial footing” (2014). It is important
that the incentives offered not negatively impact the project or the project organization. In his
interview, Opeka detailed pitfalls associated with under-incentivizing. He stated,

Under-incentivizing a NASA contractor can mean that the customer might not actually get
the project cost and duration or even the product or service they want. Incentivizing requires
a balancing act between over- and under-incentivizing. Minimum requirements must be met
to accomplish project goals, but under-incentivizing can threaten those minimum
requirements. . . .The answer is to stay focused on specific goals. (Matt Opeka, a former
NASA customer and current NASA contractor, Appendix A, June 4, 2015)

The above research has produced new findings that include ways to combat the pitfalls
associated with over- and under-incentivizing. For example, the buyer setting specific short- and
long-term goals for the seller can mitigate risk. This approach can facilitate on-going monitoring
of the seller. It also can provide consistent positive reinforcement to the seller for exhibiting
behaviors from which the buyer benefits.

*Project Cost, Time, and Scope/Quality: Contract Incentives/Penalties*

While project procurement minimizes project cost and duration by avoiding over- and under-
incentivizing, it implements contract incentives and penalties to overcome the triple constraint of
project cost, time, and scope/quality. Project procurement can use incentives to align seller
performance with project management’s goals and use penalties to elicit sufficient motivation in
sellers. When selecting incentives and penalties, project procurement must focus on their potential
benefits and risks to project management’s goals.

*Project Cost, Time, and Scope/Quality: Triple Constraint.* Ultimately the goal of contract
incentives in procurement is to achieve the project objective of meeting the triple constraint: Cost,
Time (Schedule), and Scope/Quality (see Figure 3 below).
Cost incentives are used to maintain or lower costs to meet project budget and avoid cost overruns. Schedule incentives are used to motivate on time completion of tasks to avoid project delay. Quality incentives are used to balance cost and schedule incentives by requiring minimum standards of deliverable to avoid rework, cost overruns and liability.

Avoid applying schedule incentives to tasks that do not affect critical path as the schedule costs outweigh the gains. Overuse leads to unnecessary quality gates that delay project delivery and increase costs. Best when used in conjunction with quality audits.

**Figure 3. Project Procurement Incentives Balanced for the Triple Constraint of Cost, Time (Schedule), and Scope/Quality**

The role of offering incentives is to induce additional effort and higher performance from sellers. The expectation is that the seller will maintain a high level of output to meet the incentives laid out as motivation by the buyer. This output level can be measured by expectations of contracted delivery times aimed at shortening critical paths and leading to shortening of estimated schedules. The caveat is identifying the point at which lowered costs and contracted schedules start to compromise quality and thus lead to unplanned post-delivery costs and additional time spent remedying defects in deliverables. Andrew Hamilton, Director of Client Services at Achieve IT Solutions, Inc. has summed up that the “dilemma of procurement is that it is an issue of reacting to change rather than identifying all possible changes beforehand” (A. Hamilton, personal communication, June 5, 2015). The use of incentives is to mitigate the effects of changes and
motivate a desire from sellers to accommodate change. The less one expects change to occur, the smaller are the incentives employed as the buyer is confident in the probability of the seller accumulating the incentive in the absence of significant change.

**Cost: Contract Incentives/Penalties.** Cost contract incentives are best used with the clear establishment of cost goals, defined priorities, and the understanding of expected compromises. P. W. G. Morris and J. K. Pinto have indicated that incentives can be “incorporated within both fixed-price and cost-reimbursable contracts” (Morris & Pinto, 2007, Kindle Location 7713).

Both FPIF and cost-plus-incentive-fee (CPIF) contract strategies can be effectively used to incentivize sellers to meet or reduce costs. In FPIF, the seller is motivated to provide an accurate estimate of the targeted cost and to attempt to execute a lower cost to achieve a profit; whereas in CPIF the seller is reimbursed all costs up to an agreed amount after which the seller takes full responsibility. In contrast to FPIF, CPIF provides an opportunity for the seller to increase costs in order to increase profits. Opeka summed up the balancing act required to effectively use cost incentives when he responded in an interview,

> Contract incentives and penalties must be balanced between too much (over) and too little (under) to keep the contractor within cost. Do not under-incentivize, or the contractor may never get to ‘good enough.’ Do not over-incentivize, or the customer may be throwing away money. The answer is to stay focused on specific goals. (Matt Opeka, a former NASA customer and current NASA contractor, Appendix A, June 4, 2015)

**Time: Contract Incentives/Penalties.** Contract incentives can also be applied to time or schedule. The cost of change is schedule disruption, and the control of this constraint is as important as the control of financial cost. The criteria used for incentives in FPIF and CPIF contracts can reflect schedule as opposed or in conjunction with costs. A seller may be incentivized by delivering a specific deliverable on time or ahead of schedule, thus allowing them to seek reimbursement of costs incurred in meeting the schedule. These incentives can be in the
form of Early Completion Bonuses or Award Terms. Due to the uncertainty of change the risks assumed by the buyer can be high, but in recent years companies have been devising additional forms of penalties to discourage sellers from inflating costs due to changes that affect schedule. Opeka again provided valuable insight here;

Contract incentives and penalties can positively or negatively impact schedule. Both must be tied directly to meeting specific goals. The customer must balance incentives and penalties to avoid giving the contractor too little reason to meet schedule requirements. Schedules that lead to launch dates are especially critical. (Matt Opeka, a former NASA customer and current NASA contractor, Appendix A, June 4, 2015)

Conversely harsh penalties can have disastrous consequences. As part of its incentives to exclusive sapphire glass partner, GT Advanced Technologies, Apple proposed a gradual disbursement of capital to GT and an extended award term upon meeting schedule deadlines to allow them to develop the material used as the screens on the Apple Watch. GT used this capital to invest in the needed technology. Unfortunately, the penalty for not meeting the proposed schedule deadlines was the forfeiture of the ownership of the intellectual rights to the technology in which Apple had invested (Wakabayashi & Brickley, 2014). As a result, GT Advanced filed for bankruptcy protection.

Scope/Quality: Contract Incentives/Penalties. There is in project procurement considerable mention of the pitfalls of using cost and schedule incentives. All usually focus on the risk to the level of quality or performance of the deliverables. Mitigation of this risk includes incorporating quality requirements into contracts as well as establishing inspections and audits of deliverables (Kerzner, 2013). This discussion about performance incentives could be expanded. Quality requirements tend to focus on simply achieving specified targets of quality levels that are measured at the end of a process. Alternatively, performance incentives focus on the profit or penalties accumulated with achieving performance standards.
The potential for contractors to cut corners to meet cost and schedule incentives makes it necessary to incorporate quality gates in the incentive process. Hamilton has stressed the need to incorporate quality incentives:

It is important to calibrate the expected quality and to test for the level of performance throughout the process rather than at the conclusion. We associate the cost benefit incentives with the necessary quality incentives to encourage the double return effect of producing efficiently and effectively. (A. Hamilton, personal communication, June 5, 2015).

The foregoing research has led to new findings that incentives should not replace expected minimum standards, a seemingly obvious fact that prior literature appears to have neglected. This study’s analysis has further found that penalties can be effective in eliciting sufficient motivation in sellers, while incentives should be aligned with project management’s goals.

**Analysis and Discussion of Results**

**Project Procurement Use of Incentives and Penalties.** Overall, academic research, professional interviews, and a professional survey indicate that incentives are the most effective method to achieve time, cost, and performance results. For this method to be effective, a project should be clearly defined with minimal change, as any alternations could negatively impact the timeline, cost, or performance of the project. Results of new interviews and a survey regarding contractual penalties were mixed, just as the results in the academic literature were. In scenarios where unofficial norms exist to achieve results, penalties negatively impacted the cooperative relationship between the buyer and seller. In other circumstances, penalties were found to drive required performance or discourage undesirable behavior. These divergent findings indicate that more research is needed to identify key components and characteristics that will lend themselves more readily to either incentives or disincentives in a variety of fields. Much of the available research results concern industrial or construction work, but the use of procurement may occur in
any or all projects. By expanding the research, commonalities may be identified to assist both
buyers and sellers to determine the “must haves” to achieve maximum mutual benefits.

**Project Cost/Duration: Over-Incentivizing Versus Under-Incentivizing.** Academic research as
well as primary research (interviews and a survey) suggest that, to improve project procurement,
it is important that the buyer selects the correct contract type to align with project management’s
goals. According to Kerzner, “To alleviate some of the previously mentioned problem areas,
clients, especially the government, have been placing incentive objectives into their contracts”
(2013, p. 991). When used properly, incentives can aid in balancing the risks and rewards
associated with procurement. Unfortunately, over- and under-incentivizing can cause
complications and result in underwhelming performance. This study’s analysis has revealed,
through primary research not previously performed, a number of ways to combat the pitfalls
associated with over- and under-incentivizing. For example, the buyer setting specific short- and
long-term goals for the seller can mitigate risk. This approach can facilitate on-going monitoring
of the seller. It also can provide consistent positive reinforcement to the seller for exhibiting
behaviors from which the buyer benefits.

**Project Cost, Time, and Scope/Quality: Contract Incentives/Penalties.** Both academic and
primary research shows that, as buyers use procurement incentives, they must remain mindful that
the scope must be maintained. Incentives cannot be distributed for haphazard achievements but
must align with project management’s goals that emphasize key requirements and meet critical
schedule needs. Analysis has deduced that incentives should not replace expected minimum
standards, a seemingly obvious fact that prior literature appears to have neglected. Incentives are
rewards for meeting additional standards, and penalties should be used for punishing in failure to
meet agreed upon results. This study’s analysis has further found that penalties can be effective
in eliciting sufficient motivation in sellers, while incentives should be aligned with project management’s goals.

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References


Appendix A

Qualitative Interview of Matt Opeka on June 4, 2015

The Allen-Herring-Moody-Williams Team conducted the following qualitative interview on June 4, 2015 of Matt Opeka, a former NASA customer and current NASA contractor. Mr. Opeka has negotiated for 53 years with NASA procurement officials and contractors, both as buyer and seller, and regularly has been central to make-or-buy decisions. Now Senior Advisor at SGT, Inc. (a NASA contractor), Mr. Opeka has retired as Senior Advisor and former Program Director of the NASA Goddard Space Flight Center (GSFC) Program Analysis and Control (PAAC) Contract. Before he held those positions, he retired as Director of the Integration and Test facilities at NASA/GSFC, where he began his career in 1962. He has been instrumental in the success of many NASA missions whose flight hardware was processed through his facilities in the 1970s–1980s. This interview focused on the topic Project Procurement: Impact of Contract Incentives and Penalties.

Qualitative Interview Questions

Question 1 (Related to Project Procurement: Impact of Contract Incentives and Penalties study Subsection 3.1)

- **Allen-Herring-Moody-Williams Team** - What project characteristics are CONDUCIVE to contract incentives (e.g., a bonus for finishing a job ahead of schedule) or penalties (e.g., a payment reduction for cost over-run)?
- **Opeka** - NASA projects that are designing new hardware such as spaceflight instruments with X number of specific characteristics are conducive to contract incentives and penalties. The NASA customer defines minimum and additional performance characteristics in the hardware design contract. They include an incentive fee based on performance for the additional requirements. That way, the customer is guaranteed satisfaction of the minimum requirements and then pays fee only if and to the degree the additional requirements are met. The more requirements the contractor meets, the more money they get. NASA hardware build projects can also take this approach to procurement. The minimum requirements might be to deliver an instrument that performs certain functions to a minimum tolerance, and the additional, incentivized requirements might be to meet a greater degree of accuracy. Another example of project characteristics conducive to contract incentives are NASA support service contracts. The human factor plays a larger role in these contracts than in hardware design or hardware build contracts. Cost Plus Award Fee clauses are the most effective approach to providing incentives in support service contracts. The NASA customer can thus “hold the contractor’s feet to the fire”; no performance, no award fee. That’s the incentive, and that’s the penalty.

Question 2 (Related to study Subsection 3.1)

- **Team** - What project characteristics are NOT CONDUCIVE to contract incentives (e.g., a bonus for finishing a job ahead of schedule) or penalties (e.g., a payment reduction for cost over-run)?
- **Opeka** - NASA projects with specific requirements that must be met to accomplish something are not conducive to contract incentives or penalties. For such projects there is no good, better, or best. They cannot incentivize the work because it must meet certain minimum requirements. For example, a NASA telescope can either focus or it cannot. A space launch vehicle must meet speed requirements. It either can go the required speed or not.

Question 3 (Related to study Subsection 3.2)

- **Team** - How does OVER-incentivizing (e.g., with a large bonus) the seller/contractor/vender impact project cost/duration?
- **Opeka** - Over-incentivizing a NASA contractor can impact project cost and duration. If the project employs a Cost Plus contract with too much incentive, the contractor can be encouraged to keep trying to improve deliverables beyond minimum requirements. This approach can unnecessarily squander project funds and throw a project behind schedule. The adage “Better is the enemy of good enough.” comes into play. It means that performing to a good enough level meets minimum requirements, and performing at a higher level is imprudent if it costs more or delays delivery. If you want something to meet specific requirements, do not over-incentivize. Making it better becomes extraneous and wastes your money. I remember times when NASA instrument contractors wanted to keep making the hardware better, but spacecraft managers had to cut them off or the project would have failed to meet its goals. If the project over-incentivizes with a fixed-price-incentive-fee contract, then cost would not be at risk but schedule still might.

Question 4 (Related to study Subsection 3.2)
• **Team** - How does UNDER-incentivizing (e.g., with a small bonus) the seller/contractor/vender impact project cost/duration?

• **Opeka** - Under-incentivizing a NASA contractor can mean that the customer might not actually get the project cost and duration or even the product or service they want. Incentivizing requires a balancing act between over- and under-incentivizing. Minimum requirements must be met to accomplish project goals, but under-incentivizing can threaten those minimum requirements. Better is the enemy of good enough, but if the customer under-incentivizes they may never get to “good enough.” The answer is to stay focused on specific goals.

**Question 5 (Related to study Subsection 3.3)**

• **Team** - How do contract incentives/penalties impact project COST?

• **Opeka** - Contract incentives and penalties must be balanced between too much (over) and too little (under) to keep the contractor within cost. Do not under-incentivize, or the contractor may never get to “good enough.” Do not over-incentivize, or the customer may be throwing away money. The answer is to stay focused on specific goals. For example, if a NASA contractor over-runs cost in building one of three instruments on a spacecraft, the customer may have to cancel one of the other instruments to stay within budget. NASA may thus fail to meet science objectives. Another example dates back to the days before NASA flew astronauts. We flew hardware in low-earth orbits to learn about radiation levels that may later effect humans in flight. In the 1960s, President Kennedy pressed us into the “race to space” against the Russians. We had to get radiation data before the first manned launch, and we were in a race to do it. We could not afford to under-incentivize contractors, have them overrun costs, and lose the race.

**Question 6 (Related to study Subsection 3.3)**

• **Team** - How do contract incentives/penalties impact project TIME?

• **Opeka** - Contract incentives and penalties can positively or negatively impact schedule. Both must be tied directly to meeting specific goals. The customer must balance incentives and penalties to avoid giving the contractor too little reason to meet schedule requirements. Schedules that lead to launch dates are especially critical. Launch windows for spacecraft usually have little or no flexibility, as competing spacecraft are scheduled to use the same launch pad immediately before and after the subject hardware. Also, astronomical windows often dictate when a spacecraft can launch, so balancing incentives and penalties to keep a contractor within schedule can be critical.

**Question 7 (Related to study Subsection 3.3)**

• **Team** - How do contract incentives/penalties impact project SCOPE/QUALITY?

• **Opeka** - Contract incentives and penalties can directly impact project scope and quality. If minimum design requirements are not met, this failure can impact cost and schedule ultimately delay or cancel launch.
Appendix B

Qualitative Survey of Diverse Professionals on June 1-4, 2015

The Allen-Herring-Moody-Williams Team conducted the following qualitative survey of diverse professionals on June 1-4, 2015. This survey focused on the topic Project Procurement: Impact of Contract Incentives and Penalties. Limited quantitative data could be derived from the results, but there are some insightful quotes especially from respondents with project procurement experience. Questions 1 and 2 relate to Project Procurement: Impact of Contract Incentives and Penalties study Subsection 3.1; Questions 3 and 4 relate to Subsection 3.2; and Questions 5, 6, and 7 relate to Subsection 3.3.

Qualitative Survey of Diverse Professionals - Parameters

- The population scope was co-author Mark Allen’s friends, family, and former colleagues on his Friends list in Facebook.
- The population size was approximately 200.
- The sample size was 10 professional respondents.

Qualitative Survey of Diverse Professionals - Results

If you could answer any/all of following questions, I would be so grateful. This survey supports my final assignment for my Project Procurement course. Tx! Mark

Project Procurement Survey

1. What project characteristics are CONDUCIVE to contract incentives (e.g., a bonus for finishing a job ahead of schedule) or penalties (e.g., a payment reduction for cost over-run)?
   - Penalties don't work. If work is poor, examine scope and specs. If he can't do the work, coach him or bring on more experienced staff, if possible. - per Gail K. Regan, retired NASA/GSFC COTR, PEB member, SEB technical advisor, Procurement Specialist, Procurement Assistant to Contracting Officers - 06-04-15
   - Penalties because you don't want someone to rush the job and cut corners for a bonus. It is more likely you would rather have them agree to an reasonable date to finish the project. You can extend the deadlines with reasonable cause. - per John Alvarado, real estate property manager - 06-03-15
   - Depends if one of the parties is government. Government contracts/incentives do not work the same way commercial contracts/incentives work. - Jeffrey Gilmartin, Navy retiree - 06-04-15
   - Penalties - Rick Gibson, Navy retiree - 06-04-15
   - Bonus for finishing ahead of schedule - Irene Abeel, retired Registered Nurse with experience in procurement - 06-04-15
   - Bonus - Evie Fletcher, former Boeing employee - 06-04-15
   - Any incentive should be for a positive result, rather than a penalty for a negative result. - per Ken Shirey, TQM trainer; coach of project Quality Action Teams; with 35+ years in the direct-marketing industry - 06-04-15

2. What project characteristics are NOT CONDUCIVE to contract incentives (e.g., a bonus for finishing a job ahead of schedule) or penalties (e.g., a payment reduction for cost over-run)?
   - Incentives are for work done ahead of schedule and within budget. - per Gail K. Regan, retired NASA/GSFC COTR, PEB member, SEB technical advisor, Procurement Specialist, Procurement Assistant to Contracting Officers - 06-04-15
   - A bonus for finishing the job ahead of schedule but it depends on the job if it is printing documents or software bonuses for finishing early make sense however if it is construction or manufacturing a bonus for finishing early can lead to faulty workmanship. - per John Alvarado, real estate property manager - 06-03-15
   - Bonuses. - Rick Gibson, Navy retiree - 06-04-15
   - Payment reduction for cost overrun. - Irene Abeel, retired Registered Nurse with experience in procurement - 06-04-15
   - Penalties. - Evie Fletcher, former Boeing employee - 06-04-15

3. How does OVER-incentivizing (e.g., with a large bonus) the seller/contractor/vender impact project cost/duration?
   - Over-incentivizing works but may not be practical. - per Gail K. Regan, retired NASA/GSFC COTR, PEB member, SEB technical advisor, Procurement Specialist, Procurement Assistant to Contracting Officers - 06-04-15
• It depends on the costs of the incentives versus the return on the investment. You never want to give away unnecessary incentives. You only want to give enough incentives to get the deal closed. - per John Alvarado, real estate property manager - 06-03-15
• More motivating. - Rick Gibson, Navy retiree - 06-04-15
• Large over incentive may say this "job" is almost impossible to do so no contract. - Irene Abeel, retired Registered Nurse with experience in procurement - 06-04-15
• May not get as good results since they are taking a larger amount of cash ahead of completion. - Evie Fletcher, former Boeing employee - 06-04-15
• Over-incentivizing may mean the job will be rushed as a result and a sloppy project resulted and more time to have the project redone will have to be spent on a do over. - Tye Mullikin, U.S. Naval Sea Cadets officer - 06-04-15

4. How does UNDER-incentivizing (e.g., with a small bonus) the seller/contractor/vender impact project cost/duration?
• Under incentivizing. Don't know how you would calculate that, but if the contractor feels that way, could be bad. Budget should dictate incentives, not subjective beliefs of the govt. - per Gail K. Regan, retired NASA/GSFC COTR, PEB member, SEB technical advisor, Procurement Specialist, Procurement Assistant to Contracting Officers - 06-04-15
• The incentive has to be worth it or the penalty has to be big enough to hurt if you don't meet the deadline. - per John Alvarado, real estate property manager - 06-03-15
• Realization this project can be done and thusly will be before allotted time. - Irene Abeel, retired Registered Nurse with experience in procurement - 06-04-15
• Less interest in providing higher quality results and not reach completion on schedule. - Evie Fletcher, former Boeing employee - 06-04-15
• Under-incentivizing could give the impression that the project isn't "serious", or meaningful enough to you. So if that's the case, might the vendor give less attention to quality? After all, if it doesn't mean much to you, you might not inspect it closely. - per Ken Shirey, TQM trainer; coach of project Quality Action Teams; with 35+ years in the direct-marketing industry - 06-04-15

5. How do contract incentives/penalties impact project COST?
• Penalties don't save $$$ Those funds go back to general treasury, so aren't worth the work. - per Gail K. Regan, retired NASA/GSFC COTR, PEB member, SEB technical advisor, Procurement Specialist, Procurement Assistant to Contracting Officers - 06-04-15
• The penalties against the contractor for failing to meet the deadline are there to cover your unforeseen costs that you incur for not having the product to deliver to your clients. - per John Alvarado, real estate property manager - 06-03-15
• Surcharge for expediting a landscaping project. - per Mark Nacewicz, landscaping contractor - 06-01-15
• Volume discount from supplier of dental materials/supplies for spending over a certain threshold; and loss of discount for below threshold. - per Colleen Whelan, dental assistant - 06-01-15
• Pre-payment discount to dental patients for a treatment plan (i.e., project); and lack of discount for no pre-payment). - per Colleen Whelan, dental assistant - 06-01-15
• Keeps cost down. - Rick Gibson, Navy retiree - 06-04-15
• The cost should be better with incentives. - Irene Abeel, retired Registered Nurse with experience in procurement - 06-04-15
• Positively if finished on time and up or above required standards. - Evie Fletcher, former Boeing employee - 06-04-15
• The reward (aka, incentive) is typically self-funded by cost avoidance. You nailed the three aspects that vie for priority. It is said that you can never get 100% of all three, so what is the emphasis for a given project? - per Ken Shirey, TQM trainer; coach of project Quality Action Teams; with 35+ years in the direct-marketing industry - 06-04-15

6. How do contract incentives/penalties impact project TIME?
• Penalties or fear of them may cause too much attention directed to less important outcomes. Incentives create positive work outcomes. - per Gail K. Regan, retired NASA/GSFC COTR, PEB member, SEB technical advisor, Procurement Specialist, Procurement Assistant to Contracting Officers - 06-04-15
• Time is money and if you are unable to deliver your product you could potentially lose the client. - per John Alvarado, real estate property manager - 06-03-15
• Surcharge for expediting a landscaping project. - per Mark Nacewicz, landscaping contractor - 06-01-15
• Keeps time schedule in line if no other parameters change. - Rick Gibson, Navy retiree - 06-04-15
• This is a toss-up! - Irene Abeel, retired Registered Nurse with experience in procurement - 06-04-15
• Getting it done early should mean no overtime, lower wage costs, earlier revenue stream, etc. For example, if you finish up 5 days early, and that saves me $1,000 in cost, why not split that by providing a $500 incentive ... PROVIDED quality isn't sacrificed? - per Ken Shirey, TQM trainer; coach of project Quality Action Teams; with 35+ years in the direct-marketing industry - 06-04-15
7. How do contract incentives/penalties impact project SCOPE/QUALITY?

- Projects are usually de-scoped because of budget issues not punitive issues or if it determined to be too big. That's usually the result of poor planning by govt. You used to be able to increase scope for "field problems" but that is hardly done anymore. Scope could be increased along with budget. - per Gail K. Regan, retired NASA/GSFC COTR, PEB member, SEB technical advisor, Procurement Specialist, Procurement Assistant to Contracting Officers - 06-04-15

- Incentives impact project scope depending on what the product is if it is in building then the scope of work changes based on what incentive is used. Incentives used as a bonus for finishing early impact the quality because they are in a hurry to finish to get the bonus. Rushing to finish leads to cutting corners and that leads to bad workmanship and bad quality. Penalties for not finishing on time keeps things on schedule and if the contractors know that they must deliver by a certain date they stick to it or discuss an extension before the deadline. - per John Alvarado, real estate property manager - 06-03-15

- Could hurt quality if contractor takes short cuts to finish on time and not penalized. - Rick Gibson, Navy retiree - 06-04-15

- Bonus should lead to quality. - Irene Abeel, retired Registered Nurse with experience in procurement - 06-04-15