IMPLEMENTATION OF PROJECT BUNDLING

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Project bundling (PB) is a process through which transportation agencies use a single contract award to contract for the construction of multiple bridges or roadways. Users aim to combine multiple projects into a single contract for continued development. The practice began to gain wide acceptance in the U.S. about five years ago; and, with the support of the Federal Highway Administration (FHWA) Every Day Counts initiative, more and more agencies are now considering and applying PB. As its use increases, agencies are developing statutes, rules, procedures, and guidelines for implementation. The FHWA formed a technical working group (TWG) to support the wider application of PB, and both authors are members of this group—the lead author acting as TWG Chair, and the second author as a TWG member. This paper explores the FHWA works to popularize a contracting process that shows great potential. It also provides a compelling case study of one its early successes.

Keywords: Economies of scale, Single contract, Single permit, Every Day Counts.

1 INTRODUCTION

In its Bridge Bundling Guide, the Federal Highway Administration (FHWA) quotes one of its subject matter experts as saying that agencies employing project bundling (PB) are uniquely positioned to “gain . . . efficiency by using the same components and basically putting together the same [project] multiple times.” Construction PB is such an intuitively efficient process that, when the first returns from its U.S. applications came back as strongly as they did, most people wondered why the industry has not been using it all along. Since the idea of bundling a few small highway and bridge construction projects into a single contract is indeed a simple one, they asked themselves why no one had thought of it before it gained popularity in the mid-2010s. In fact, though, someone had. Spanish transportation agencies had implemented it in the early 1990s, but have discontinued its use. Today, the FHWA is encouraging the practice as part of its Every Day Counts initiative, and the number of agencies taking up the practice is growing.

Early U.S. research shows that, due to the increase in efficiency and quality effected by the repetition of tasks inherent to project bundling, and due to the cost savings from its powerful economies of scale, the Indiana DOT expects to save $108M in construction costs over the next four years. Additionally, the city of Oakwood, Georgia, reduced their asphalt milling costs by 80 percent using project bundling (D’Angelo et al. 2022).

2 DEFINITION, RESEARCH METHODS, REASONS FOR PB

The FHWA defines PB as a set (or bundle) of projects that are planned for preservation/preventive maintenance, rehabilitation, or replacement in a timely and efficient manner. Although this definition was formulated in 2017, it is already obsolete. Bundling can
easily be used for new construction projects, a mixture of project types, or even a combination of vertical and horizontal construction projects; however, research has also shown that, as with the application of most systems, the fewer the variables at play, the better the system works.

In this discussion, the research methods for assessing PB cost and time savings claims come from two publications (Qiao 2019) written by the TWG leader, also the lead author of this paper. The general research methodology entailed interviews with subject matter experts and case study development and analysis. Case studies are presented in the FHWA’s Bridge Bundling Guide (D’Angelo 2019) and its Advanced Project Bundling: A Reference for Getting Started (D’Angelo et al. 2022).

PB is important for the following reasons:

- The U.S. infrastructure is in poor condition. (The American Society of Civil Engineers gave the U.S. infrastructure a “C- on its last report card.)
- The U.S. needs more projects built faster.
- Some agencies are short of funds and looking for ways to save money.
- Economies of scale can make projects in a bundle cost less than each one individually.
- Some agencies must spend some of their funds quickly or lose the m.

Table 1 presents a summary of PB benefits and issues (considerations).

Table 1. Benefits and Considerations for the use of PB.1

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Considerations</th>
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<td>Save costs (economies of scale)</td>
<td>Pay finance costs</td>
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<td>Coordinate NEPA approval.</td>
<td>Establish mutual dependence.</td>
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<tr>
<td>Expedite project delivery.</td>
<td>Navigate state procurement restrictions.</td>
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<tr>
<td>Start construction earlier.</td>
<td>Face funding-annual program impacts.</td>
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<tr>
<td>Coordinate construction staging.</td>
<td>Overwhelm local industry capacity.</td>
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<tr>
<td>Reduce burden on agency staff.</td>
<td>Overwhelm agency capacity.</td>
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<tr>
<td>Use project delivery and procurement innovation.</td>
<td>Accommodate federal fund use.</td>
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<tr>
<td>Apply technical/engineering innovation.</td>
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<tr>
<td>Capitalize on funding and finance innovation.</td>
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<tr>
<td>Exploit local partnering-shared services</td>
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<tr>
<td>Take advantage of increasing construction workforce opportunities</td>
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<tr>
<td>Take advantage of increasing opportunities for small and disadvantaged business.</td>
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Intuitively, PB makes good sense. So, what are the logistics for establishing such a program? Figure 1 illustrates the project bundling process, which involves 10 steps that are not necessarily consecutive. Indeed, bundling is typically an iterative process.

The first step is to decide how success is defined in a particular agency or project environment. The second step is to develop the project goals and objectives iteratively, as more detailed information becomes available over time. Step three is to identify potential funding sources or financing options. The fourth step is to use the established goals to create a guiding coalition and to select a project manager. The risk assessment in step five depends on an understanding of the opportunities supporting the PB goals and objectives, and requires awareness of any threats to achieving them.

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1 “Guidebook”
Choosing projects suitable for a bundle, and identifying which would best fit together is the sixth step. The seventh step involves selecting the best delivery system for mitigating or eliminating the most risk. The agency must base this choice on an up-to-date risk analysis and a fulsome understanding of the project goals, thoroughly assessing the advantages and disadvantages of the many project delivery systems available. The agency must also determine its procurement methodology (e.g., low bid, best-value, or Quality-Based-Selection), giving due consideration to incorporating the Alternative Technical Concepts process into the procurement system chosen. The bundling of environmental reviews, preliminary designs, and permitting actions (as appropriate) in the eighth step can be beneficial. For example, seeking any sort of permit or approval for a group of bridge projects will likely require less effort than will numerous individual reviews. Once an agency has reached this step of the process, it is ready for the culminating ninth step—the one that has been the focus all along—assembling the bundle, and letting the contract. After quality assurance and civil rights requirements have been incorporated into the contract documents, the agency is finally ready to build the projects. As the post-award activities commence and proceed, a continually updated risk assessment can help the agency determine its best use of resources. Finally, capturing lessons learned is vital to the continuous improvement and optimization of the bundling program (D’Angelo 2019).

**Step 1: Define Project Success:** Because transportation agencies have many reasons to bundle, they develop a number of measures for success. The critical question is, “What does the agency need?” Research indicates that agencies that have bundled their projects most often cite four precipitating motivations: speed, cost savings, efficiency, and quality (D’Angelo 2019). Of course, the need for speed arises from innumerable pressures and circumstances. If the motivation is cost savings, research and experience have shown that repetition of processes is key to saving money, just as it is a boon to the other three project drivers—speed, efficiency, and quality. Naturally, cost saving will also result from smaller support staffs and economies of scale.

**Step 4: Coalition Building and Outreach:** Public agencies should engage stakeholders early in the process to gain support for a bundled project or program. This may include outreach to internal units, elected officials, construction industry organizations, designers, other stakeholders, and the public. Outreach may involve anything from simple notification to intensive training. During this step in the project bundling process, the agency should prepare a documented communication plan that lists the specific organizations needed for project support and those affected by it. This plan should also recommend the content, type, methods, and frequency of communication to these organizations.
Step 5: Risk Assessment: Involving stakeholders in a formal project/program risk identification process will greatly enhance the agency’s understanding of its opportunities and any threats to its goals and objectives. Following this step should generate a risk management plan and an initial project or program risk register. Risk analysis is not a one-time activity, but rather a continuous effort throughout the life of the project or program. When the risk register is updated regularly, it becomes an excellent communication tool as the project or program progresses.

Step 6: Project Selection: The agency must use its own rhyme and reason to sort projects into bundles, and it can use a number of criteria to separate the projects in its work plan into project bundles. Following are some of the common project characteristics to consider at the beginning of the bundling process: (D’Angelo 2019)

- industry capacity
- project timeframe
- environmental permitting
- utilities & right-of-way
- project size
- geographic location and proximity.

Selecting projects for a bundle is one of the most vital components of ensuring success and achieving agency goals. Spending time and effort up front to select the proper projects for the bundle pays dividends in the end. Typically, projects are bundled best when their aggregation least complicates the contract; although, in its increasing use, the method is showing remarkable flexibility in handling bundles of different project sizes and types. Still, agencies should take advantage of measures that simplify the design and procurement process, and that increase efficiency in design and construction. Above all, a project bundle should be strategic. The goal is NOT to make as many bundles as possible; nor is it to bundle as many projects as possible. Indeed, during the selection process, agencies will recognize that many projects are not good candidates for bundling. The questions to ask while compiling a bundle are as follows:

- Will placing this project in a bundle make this project more efficient?
- Will putting this project in a bundle make the other bundled projects more efficient?
- Will bundling this project make it more attractive to more bidders?
- Will placing this project in a bundle make the other projects within the bundle more attractive to more bidders? Minchin and D’Angelo (2021)

While geographic proximity is an obviously salient consideration, it is far from the only one. Many successful bundles have been forged without it, as long as getting from one project to another is not too onerous. Being of similar size and type can also bind projects into successful bundles. To consider work type as a bundling criterion, agencies must focus more narrowly on project types within a given work type, e.g., bridge work or road work:

- preservation of bridges
- rehabilitation of bridges
- replacement of bridges
- expansion of bridges
- preservation of roads
- rehabilitation of roads
- replacement of roads
- expansion of roads.

Funding can also serve as the basis for successful bundling. If projects within an agency’s work plan are funded by several different sources, it might prove convenient to bundle the projects being funded by one of those sources. The twin processes of NEPA and environmental permitting provide another foundation on which to build a bundle. Many agencies dread these processes, and the prospect of knocking out these headaches for several projects all at once can prove to be a strong incentive to bundle them.

Case Study: Osceola County, Florida: PB can help an agency meet its needs, no matter its definition of success. An early example of project bundling in the U.S., this case study examines a situation in which getting projects underway very quickly was paramount. A new county administration team in Osceola County, Florida inherited a program that had completed only one highway project in 18 years and had accumulated over $1B in funds from six years of

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bond sales. A newly elected, hostile County Commission gave the new team 12 months to get seven projects under construction or face replacement. The commission issued this “impossible” order to ensure failure, so that it could bring in its own team. The members of the existing team were in a desperate position, where any misstep would have been fatal for their careers.

They turned to two methods that they had never used: PB and the Construction-Manager-as-General-Contractor (CM/GC) delivery system. PB and CM/GC allowed them to accomplish the impossible. The team bundled 18 projects under six contracts by the deadline and had 11 projects underway. The effort was dubbed “The Osceola County Miracle,” and Engineering News Record named the Public Works Administrator one of the Top 25 Newsmakers in the U.S. at the beginning of 2010 (Minchin et al. 2014)

3 CONCLUSIONS
Project Bundling (PB) is off to a great start in the U.S., since, in just a few years, agencies have identified several of its advantages in the most important considerations in construction: cost, time, and quality. Based on four years of research into this new method, this paper presents evidence for these benefits and a case study to demonstrate them. Indeed, the ability of PB to significantly speed up project design and construction processes actually saved an agency in distress. Less dramatically, but still importantly, PB has also provided critical help to agencies in other areas: preventive maintenance activities bundled by work type and location; the establishment of privately funded bridge programs; state and municipal projects integrated into single bundles; quick compliance with sudden governmental mandates; and vertical and horizontal construction combined into single contracts. PB offers so many advantages that it is hard to imagine the practice not expanding quickly around the world.

References