

# PH PLUMBING INC.: A LONG-TERM CONSTRUCTION REVENUE RECOGNITION CASE STUDY

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## Abstract

Accounting for long-term construction projects is complex in large part because of its many industry-specific nuances. The availability of different approaches to recognizing long-term construction revenue coupled with the need to formulate a high number of managerial assumptions further complicates this topic. Additionally, the available literature on long-term construction accounting is limited. However, given the pervasiveness of the construction industry and the commonplace nature of long-term contracts, it is critical for accounting majors to gain an understanding of this subject matter.

This case study focuses on Step 5 of the revenue recognition process of the recently implemented Accounting Standards Codification *Revenue from Contracts with Customers (Topic 606)*, more commonly known as ASC 606. Step 5 states that revenue should be recognized when (or as) the entity satisfies a performance obligation. The student will be asked a series of comprehensive questions relating to the revenue recognition requirements of long-term construction projects. This case will focus predominately on long-term performance contracts requiring the recognition of revenue over a period of time and its associated input and output methods. It will also address the single point in the time revenue recognition scenario. The student will be required to think critically and research authoritative accounting literature to satisfactorily complete the required assignment. This case has a wide range of applicability and is designed for use in any graduate and undergraduate course that covers revenue recognition.

**Keywords:** revenue recognition, construction accounting, long-term construction contracts, percentage of completion, completed contract, cost-to-cost method, output methods

## Introduction

Financial Accounting Standards Board (FASB) ASC 606, which became effective for public entities for periods beginning after December 15, 2017, resulted from a joint project by the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB). The major goal of this comprehensive collaboration was to standardize revenue recognition reporting, thereby replacing the many available industry criteria options of accounting for revenue which was inherent in the predecessor revenue recognition standard ASC: *Revenue Recognition (Topic 605)*.

Other reasons cited for this collaborative effort included the following: (a) to remove the inconsistencies and weaknesses in the revenue recognition requirements, (b) to provide a robust framework for addressing revenue issues, (c) to provide useful information to financial statement users through improved disclosure requirements, and (d) to simplify the preparation of financial statements by reducing the number of requirements.

The FASB-IASB joint convergence project created a single-revenue recognition model for all contracts with customers, thereby improving comparability within and across industries and across global financial markets. This newly adopted comprehensive single-revenue recognition model resulted in the issuance of International Financial

Reporting Standard 15 (IFRS 15) and ASC 606. This convergence effort was a massive success; IFRS 15 and ASC 606 are almost identical and will heavily influence financial reporting for a multiple of global entities, including a great number of industries such as construction.

The core principle of ASC 606 is that an entity should recognize revenue to depict the transfer of control of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled for those goods or services. ASC 606 requires the application of the following five steps in accounting for revenue recognition:

Step 1. Identify the contract with the customer.

Step 2. Identify performance obligations in the contract.

Step 3. Determine the transaction price.

Step 4. Allocate the transaction price to each performance obligation.

Step 5. Recognize revenue when (or as) the entity satisfies a performance obligation.

Step 5 of the revenue recognition process, which is the focus of this case study, may be confusing because of differences in terminology inherent in this standard and in the construction industry. To help ease this matter, the following should be noted:

- Contract(s) and project(s) are synonymous terms and used interchangeably.
- Recognizing revenue when the entity satisfies a performance obligation is the equivalent of recognizing revenue at a single point in time.
- Recognizing revenue as the entity satisfies a performance obligation is the equivalent of recognizing revenue over a period of time.
- Revenue recognized is generally termed as contract revenues earned in the construction industry lexicon.
- Revenue recognition on a contract/project is the sum of its cost of revenues earned plus its associated realized gross margin (profit).
- Cost of revenues earned represents the production costs necessary for a construction project. This includes direct material, direct labor, and overhead costs, whereas general and administrative expenses include all other operating costs. Advertising and accounting costs are examples of general and administrative expenses.
- Gross margin and gross profit are synonymous terms and used interchangeably.
- Gross margin (profit) equals contract revenues earned less cost of revenues earned.
- Revenue recognition is based on two distinct performance measures: the input and output basis.
- Output methods measure performance on the basis of output results, such as units produced, whereas input methods measure performance on the basis of inputs used in a project, such as costs incurred.

### **Company Information and Case Overview**

PH Plumbing Inc. is a family-owned licensed plumbing construction company organized in the state of Florida on September 14, 2005. The company constructs multiple bathroom unit projects in developmental sites for the private and public sectors. The bathroom units are homogenous in nature and the construction contracts are always long-term in duration. All projects are located in Florida and completed between a 12- and 24-month time frame. While some projects have bonus and late completion penalty provisions, all are on a fixed-price basis.

The company recently adopted ASC 606 and recognizes revenue over a period of time by the use of the "cost-to-cost" method. Previously known as the percentage-of-completion method, cost-to-cost is an input method whereby progress towards completion is recognized according to the ratio of costs incurred to estimated total costs for each project. This method was chosen because management considers the cost-to-cost method to be the best available measure of performance and thus the most appropriate for the recognition of revenue. Contract costs include all direct material, labor, and subcontract costs, as well as indirect costs related to contract performance, such as indirect salaries and wages, equipment repairs and depreciation, insurance, and payroll taxes.

Jill Price, the controller, has several issues with the use of the cost-to-cost-method which has worked quite well in the past because the company has a successful history with accurately estimating project costs. Recently however, the accuracy of estimating total project costs has become more difficult due to increasingly volatile material costs, government labor regulations, and insurance costs. These issues have raised the possibility of changing to an output method to report revenue. Price wants a better understanding of the revenue reporting effects of an output method, how it compares to the cost-to-cost input method, and its prospect as an appropriate US generally accepted accounting principles (US GAAP) method for the revenue recognition reporting process. Price is also interested in understanding the feasibility of recognizing revenue at a single point in time (formerly termed the completed-contract method) for US GAAP financial reporting because this is the method chosen for federal income tax purposes. PH Plumbing Inc. has hired you, MF CPAs, to address the controller's concerns.

This case study addresses Step 5 of ASC 606 with respect to long-term construction contracts and requires the student to answer a series of questions regarding the controller's concerns. The first set of questions addresses the FASB requirements of recognizing revenue over a period of time as well as to a single point in time and the applicability and challenges of each approach, while requiring the preparation of a statement of income under a single point in the time scenario. Next, the student is asked to explain and provide examples of the input and output methods over a period of time revenue recognition scenario, assess the feasibility and challenges of each approach, and recommend the acceptable reporting method under US GAAP based on the case facts and circumstances. The student then computes the annual revenue recognition amount and prepares a statement of income over multiple periods under both an input and an output method. Finally, the student communicates their findings and recommendations to the controller in the form of a written report.

### Case Facts

On January 3, 20X0, PH Plumbing Inc. signed a contract to construct 100 bathrooms at a newly developed condominium for its owner, Supplier Contracting Inc., for a fixed price of \$4,000,000 (\$40,000 per bathroom). Each bathroom constructed will be identical in terms of specifications and materials. Each bathroom will be 200 square feet and is expected to be completed in one week (5 business days), and the entire project is estimated to be finalized in December 20X1. PH Plumbing Inc. has previously performed several projects for Supplier Contracting Inc. This project is representative of a typical contract for PH Plumbing Inc. because the company has successfully completed dozens of similar long-term construction projects. At the inception of the contract, PH Plumbing Inc. has estimated the total construction cost of the project as \$3,400,000, resulting in an estimated gross margin amount of \$600,000 (15%). This is consistent with the company's historical average gross margin of 15.28%. This estimate did not change on December 31, 20X0.

### Additional Facts:

- PH Plumbing Inc. began the construction of the bathroom units on January 15, 20X0, and satisfactorily completed the project (100 units) on December 14, 20X1.
- Material costs increased unexpectedly by 2% during 20X0, while insurance and employee benefit costs increased unexpectedly by 3%. This resulted in a final project construction cost of \$3,435,000, or \$35,000 over the estimated original cost.
- Exhibit 1 provides the relevant costs and bathrooms completed project data for the 20X0 and 20X1 calendar periods.
- Exhibit 2 provides a partially completed, condensed statement of income for the calendar years ending December 31, 20X0 and 20X1.
- General and administrative expenses were \$164,380 for the 20X0 calendar year and \$169,580 for the 20X1 calendar year.
- For simplicity, assume this is the company's only job in progress in 20X0 and in 20X1, and the company had no jobs in progress as of the beginning of the period, January 1, 20X0.

- In total, 49 bathrooms were completed in 20X0.
- The federal income tax rate is 21%. The state of Florida does not impose an income tax assessment on corporate entities.

### Required Questions

- The controller is interested in reporting long-term construction revenue at a single point in time rather than over a period of time and wants to know if this is an acceptable approach for financial statement reporting purposes.
  - Discuss the three situations when revenue will be recognized over a period of time on long-term construction contracts. In your answer, include why revenue from long-term construction contracts is usually recognized over a period of time.
  - Identify one of the three conditions requiring the recognition of revenue on a long-term construction project at a single point in time.
  - Provide two theoretical accounting positions to support revenue recognition on long-term construction contracts over a period of time.
  - Provide one theoretical accounting position to support and one to critique revenue recognition on long-term construction contracts at a single point in time.
- Prepare a statement of income in the partially filled Exhibit 2 for calendar years 20X0 and 20X1, assuming revenue is earned at a single point in time.
- The controller would like to obtain a greater understanding of the input and output methods of reporting revenue over a period of time and is interested in evaluating the feasibility of adopting an output method for financial statement purposes.
  - Explain the output and input methods, provide one example of each approach, and discuss the applicability and limitations of each method in its use in the recognition of revenue on long-term construction projects.
  - Based on the facts of the case, recommend which method (if any) is most acceptable for PH Plumbing Inc. in the measurement of performance/revenue.
- The controller is also interested in understanding the income statement effects of an output method and how it compares with the cost-to-cost input method. Assuming the following, calculate the revenue recognized and gross margin for calendar years 20X0 and 20X1:
  - The cost-to-cost input method.
  - The straight-line units of completion output method.
  - Based on your findings in part A, prepare a statement of income in the partially filled Exhibit 2 attachment for calendar years 20X0 and 20X1 assuming revenue is earned on the cost-to-cost input method.
  - Based on your findings in part B, prepare a statement of income in the partially filled Exhibit 2 attachment for calendar years 20X0 and 20X1 assuming revenue is earned on the straight-line units of completion output method.
- Prepare a written report for PH Plumbing Inc. controller Jill Price to address her concerns regarding revenue recognition. Include your findings and recommended courses of action in your report.

#### Exhibit 1:

**PH Plumbing Inc.**  
Cost-Input and Production Output Data  
(In US \$)

20X0                      20X1                      Total

Construction costs incurred during the year	1,700,000	1,735,000	3,435,000
Estimated costs to complete the project	1,700,000	0	
Total estimated cost of the project: end of year	3,400,000	N/A	
Bathrooms completed during the year	49	51	100

**Exhibit 2:** **PH Plumbing Inc.**  
Statement of Income  
For the Years Ending December 31, 20X0 20X1

Contract revenues earned	\$ ?	\$ ?
Cost of revenues earned	<u>1,700,000</u>	<u>1,735,000</u>
Gross margin		
General and administrative expenses	<u>164,380</u>	<u>169,580</u>
Income (loss) before income tax	?	?
Provision for income taxes (21%)	<u>?</u>	<u>?</u>
Net income (loss)	<u>\$ ?</u>	<u>\$ ?</u>

### TEACHING NOTES

#### Learning Objectives

Upon completion of the case study, the student should be able to do the following:

1. Understand the accounting requirements for revenue recognition on all types of long-term contracts.
2. Understand the US GAAP requirements of recognizing revenue over a period of time.
3. Understand the US GAAP requirements of recognizing revenue at a single point in time.
4. Compute revenue recognition and gross margin amounts on long-term construction contracts for multiple periods under a single point in time scenario.
5. Understand the theoretical accounting principles supporting the use of recognizing revenue over a period time.
6. Compute revenue recognition and gross margin amounts over multiple periods by the use of the cost-to-cost input method.
7. Compute revenue recognition and gross margin amounts over multiple periods by the use of an output method.
8. Based on a factual situation, recommend which approach (input vs. output) is most acceptable for reporting long-term construction revenue over a period time.
9. Prepare an income statement based on the following scenarios: (a) a single point in time, (b) an input method over a period of time, and (c) an output method over a period of time.
10. Communicate research results effectively and recommend courses of action.
11. Apply critical thinking and professional judgment skills in approaching accounting issues.
12. Research issues relating to construction accounting.

#### Need for a Case Study and Literature Review

Construction is one of the most prevalent US industries, accounting for close to 7% of the nation's gross domestic product and holding significant worldwide importance. The US is in the process of rehabilitating its long-neglected infrastructure and many Third-World countries are in the early stages of major long-term

construction projects. This undertaking will require a vast amount of public and private capital investment. The construction projects are both short-term (less than one year in duration) and long-term (longer than one year). Long-term projects may include the construction of highways, roads, skyscrapers, and transit systems; a residential painting project and installation of a new kitchen are examples of short-term projects. Despite the prevalence of construction projects and the complexity of accounting for long-term contracts, construction accounting is surprisingly neglected in higher education, typically covered only tangentially or in an appendix portion of an intermediate accounting textbook. The available literature on revenue recognition of long-term construction case studies is also quite limited.

There are only two case studies on long-term construction contracts specifically related to ASC 606; however, many of the five required steps are not covered in either case study. **“St. Hubertus Crossing: Revenue recognition under ASC 606 guidance,”** L. Davis, D. Matson, appeared in the June 2021 volume of *Journal of Accounting Education*. This case relates to an actual nonprofit organization that entered into a contract for the construction of a bridge over a river, highway bypasses, and a walking and bike path, as well as environmental rehabilitation of the riverbanks. The case study focuses on steps 2 and 4 of the revenue recognition process and includes determining whether the contract meets the requirements of a contract as specified in ASC 606 guidance, identifying the performance obligations embedded in the contract, and determining how revenue might be allocated to the performance obligations.

**“Blue Gilia Construction, Inc.: A Revenue Recognition Case Study,”** R. Albritton, A. Foshee, appeared in the 2020 volume of *The Accounting Educators’ Journal*. The case study focuses on step 2 of the revenue recognition process. The student is first required to analyze whether a change order constitutes a separate performance obligation or a modification of the original performance obligation. The next series of questions focus on an error made by management in the revenue recognition process and requires the student to calculate the effects of this error on income. This is followed by the application of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) and requires the student to identify the internal control weaknesses that may have contributed or caused the revenue recognition reporting error.

Both of these case studies concentrate exclusively on identifying the performance obligations in the contract (step 2 of ASC 606), with peripheral coverage of the allocation of the transaction price to each performance obligation (step 4), and the application of COSO to ensure proper internal controls over the revenue recognition process. This PH Plumbing Inc. case adds significantly to the literature by addressing multiple issues relating to step 5 of the revenue recognition process. Specifically, the following unique features are included in this case study:

- The student is required to compute performance (revenue recognition) over a period of time by the use of an output method that is rarely covered in the literature and an input method that is not addressed in the other case studies.
- The student is required to compute performance (revenue recognition) at a single point in time; this topic is not addressed in any of the other case studies.
- Based on the findings above, the student is required to prepare multiple period income statements. Most of the literature is limited to a single reporting period; however, the information from multiple period financial statements greatly expands the potential use of this case to other disciplines. As an example, comparative financial statements will allow for coverage of ratio analysis, which will make this case study suitable for a financial statement analysis course.
- Multiple acceptable solutions exist to many of this case study’s required questions, which reflect actual scenarios the student will encounter in the accounting profession. This is rarely seen in the literature or experienced in a university curriculum setting, where a question pattern is usually unambiguous, which results in only a single acceptable solution.

In closing, ASC 606 step 5 is arguably the most relevant and critical step in the five-step revenue recognition process. In many construction projects, steps 1, 2, 3, and 4 are either singular, straightforward, and/or non-applicable matters. It should also be noted that long-term contracts are not exclusive to construction projects and may be prevalent in the telecommunications, defense, computer software, and airplane manufacturing industries. Some

companies that perform long-term contracts include Lockheed Martin, Oracle, Verizon, and Honeywell. This information will help students realize the benefits of this case study and the importance of obtaining a thorough understanding of the subject matter.

### Intended Audience

This case study is suitable for a graduate intermediate financial accounting class, an undergraduate intermediate accounting I class, an accounting theory class, an accounting capstone class, and with some minor changes, an international accounting and financial statement analysis course. Before starting this comprehensive assignment, the student must have a good understanding of the revenue recognition guidance per ASC 606, in particular step 5.

### Limitations of Case Study

This case study is extremely comprehensive, which may result in too many required questions. As such, the author recommends some adjustments to the case to make its teaching more conducive to relevant classes:

**1. Graduate intermediate financial accounting course.** Keep the case study as well as the five recommended comprehensive questions.

**2. Undergraduate intermediate accounting 1 course.** Tailor the case to focus solely on the coverage of the more apt and relevant over a period of time revenue recognition scenario. This would include questions 1A, 1C, 3, and 4.

**3. Graduate and undergraduate accounting theory course.** Remove the computations parts of the case and focus solely on the theoretical questions, which would include questions 1, 3, and 5.

**4. Graduate and undergraduate capstone course.** Focus on the theoretical questions, which include questions 1 and 3, and add a question regarding the accounting effects of a change in accounting estimate and how this differs from a change in accounting principle.

**5. Graduate and undergraduate financial statement analysis course.** Add a comprehensive question on financial ratios and require the students to comment on their findings under the different reporting scenarios computed in questions 2 and 4.

**6. Graduate and undergraduate international accounting course.** Add a question requiring the student to identify a few differences in an otherwise almost-identical standard between the two accounting setters, FASB and IASB. This would be in addition to questions 1 and 3.

**7. Also note.** Questions 1B, 1D, and 2 focus solely on revenue recognition at a single point in time, whereas questions 1A, 1C, 3, and 4 cover revenue recognition over of period of time.

In closing, the comprehensiveness of this case study provides the instructor with the opportunity to alter parts of the assignment to target different courses.

### Implementation

The case study should be implemented in an intermediate accounting course any time after coverage of revenue recognition. An intermediate accounting textbook will normally follow this sequence:

Chapter 1: Introduction to Accounting

Chapter 2: The Accounting Cycle

Chapter 3: The Income Statement

Chapter 4: The Balance Sheet and Cash Flow Statement

Chapter 5: Time Value of Money

Chapter 6: Revenue Recognition

For an intermediate accounting class, this assignment may be provided to the students after coverage of Chapter 6. Because of the unique aspects of long-term construction contracts, it is recommended that the instructor devote some classroom time to outline several of its concepts, including specific terminology. The instructor may also address several construction-related issues when covering the inventory chapter (usually Chapter 8) by illustrating that a

long-term construction project is the equivalent of inventory for a construction company and is sold on a piecemeal basis over a period of time, whereas cost of revenues earned is equivalent to cost of goods sold. The instructor may include a review of gross profit and the gross profit ratio in this discussion.

For the non-intermediate accounting courses, it is recommended this case study be initiated in the first half of the semester after coverage of revenue recognition, which would allow the student sufficient time to complete the required assignment.

It is recommended that the case study be prepared in a group of four students and separated into three working parts as follows: (a) address the requirements for revenue recognition over a period of time as well as to a single point in time, (b) address the long-term construction input and output methods, in particular the cost-to cost and straight-line units of production methods, and (c) adequately complete the partially filled statement of income for the aforementioned three revenue recognition scenarios.

The student should clearly understand that there may be multiple acceptable solutions because of the ambiguity of this case study and the judgment element inherent in ASC 606. Additionally, the student should understand the need to research a number of accounting issues to answer the required questions satisfactorily.

Arguably, revenue recognition is the most important topic in financial accounting for specific reasons:

- It is almost the largest item on the financial statements.
- It demonstrates interrelationship with so many other financial statement accounts.
- It historically has been the major culprit of financial statement fraud.
- It is the metric used on Wall Street to identify a company's growth rate.

As such, it is recommended this case study account for 20–25% of the course grade. Depending on class time availability, the instructor may decide whether a group class presentation is feasible in addition to the mandatory written requirement. Written and oral communication skills are critical for the newly minted accountant, and as such, it is recommended this element comprise at least 10% of the final case study grade.

### **Student Feedback and Classroom Validation**

This case study was used twice in both a graduate and an undergraduate intermediate accounting course. The first time the case was presented, the student feedback elicited significant constructive criticism that resulted in a major overhaul of the case study. Specifically, students in the first two classes noted the original case study was too industry-specific and included too many questions. Much of the criticism centered around the variable consideration and the balance sheet assignment portions, which were subsequently removed.

These changes resulted in the final version of the case study with a focus on the income statement and part 5 of the revenue recognition process. This resulted in positive student feedback of the case study, with more than 95% of students finding the assignment beneficial.

The instructor added a number of features to the classes to make the case study more student- friendly. First, the instructor used a free one-hour school session that featured industry speakers to provide an overview presentation of construction accounting and related terminology concepts. Next, the instructor added an office hour every week to address student questions and concerns. Finally, the instructor made available several reference materials, such as the American Institute of Certified Public Accountants' *Construction Contractors: Audit and Accounting Guide*, relevant issues of professional journals, and selected manuscripts on long-term construction contracts.

Additionally, the instructor has over three decades of personal experience with construction companies and possesses a number of construction industry professional designations, such as Certified Construction Investment Financial Professional and Construction Risk and Insurance Specialist.

The case study was used over a four-semester period from January 2019 until December 2020, and the classroom validation included here was measured by the last time the students completed the case. Specifically, an undergraduate class of 23 accounting majors in their junior year completed the case study in an intermediate accounting 1 class in the spring 2020 semester. The assignment was completed on a group basis consisting of four students per group (one group had three students). Using the rubric in the Appendix, the cases completed were assessed as satisfactory at 50%, outstanding at 33%, rudimentary at 17%, and unacceptable at 0%. At the graduate level, 28 students completed the case study in the fall 2020 semester; the students comprised both accounting and finance majors in an intermediate financial accounting class. Each group consisted of four students. Using the rubric in the Appendix, the cases completed were assessed as satisfactory at 43%, outstanding at 43%, rudimentary at 14%, and unacceptable at 0%. The rudimentary responses were mostly due to insufficient research and preparation, which resulted in a number of incomplete responses. Graduate students also performed better, which may lead to several revisions to the undergraduate intermediate accounting 1 class going forward. Specifically, this revision would remove the single point in time revenue recognition scenario because of its low industry-wide applicability (questions 1B, 1D, and 2).

**Students in one graduate intermediate financial accounting class and one undergraduate intermediate accounting 1 class completed the case study and following survey. The results appear below.**

**A. Graduate Student Experience Questionnaire: PH Plumbing Inc. Case.**

Please rate how you agree with the following statements based on a 1-to-5-point scale with 1 being Strongly Disagree with the statement and 5 being Strongly Agree with the statement.

<u>Survey Questions</u>	<u>Weighted Mean</u>
This case study greatly increased my knowledge of revenue recognition of:	
Revenue recognition at a single point in time	4.63
Revenue recognition over a period of time	4.74
Cost-to-cost input method	4.76
Straight-line units of production output method	4.37
Understanding the positives and limitations of each revenue recognition approach	4.41
I found the case interesting	4.23
The case was a positive learning experience	4.36
The level of difficulty present in this case was appropriate for the course	4.06
Overall, I felt the case was helpful.	4.59
Overall, I have a good working knowledge of revenue recognition	4.38

What was the benefit of this case study?

Yes, I found the case study very useful and will serve as a basis for the more advanced classes.

I was able to learn a lot about revenue recognition and accounting theory and obtain an understanding as to how financial data is prepared and presented.

This case study was challenging but very useful.

Very interesting in that the FASB and IASB have agreed on revenue recognition reporting.

**B. Undergraduate Student Experience Questionnaire: PH Plumbing Inc. Case.**

Please rate how you agree with the following statements based on a 1-to-5-point scale with 1 being Strongly Disagree with the statement and 5 being Strongly Agree with the statement.

<u>Survey Questions</u>	<u>Weighted Mean</u>
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This case study greatly increased my knowledge of revenue recognition of:	
Revenue recognition at a single point in time	4.65
Revenue recognition over a period of time	4.61
Cost-to-cost input method	4.32
Straight-line units of production output method	4.27
Understanding the positives and limitations of each revenue recognition approach	4.16
I found the case interesting	4.28
The case was a positive learning experience	4.42
The level of difficulty present in this case was appropriate for the course	4.03
Overall, I felt the case was helpful.	4.36
Overall, I have a good working knowledge of revenue recognition	4.54

What was the benefit of this case study?

Difficult but worthwhile given the importance of revenue recognition.

The case study enabled me to obtain a solid understanding of revenue recognition.

I found it interesting to see the different ways of reporting revenue. This makes me think and better understand the difficult issues in accounting.

### **Additional Learning Objectives and the Case Requirements**

Because of the comprehensiveness of this case study, there is an opportunity to add four areas of coverage and related learning objectives that include subject matters referenced throughout the case study:

1. The use of estimates in the application of the cost-to-cost method.
2. The controller's interest in exploring the possibility of an accounting change in recognizing revenue (from the cost-to-cost method to the straight-line units of production method).
3. The almost-identical application of the single revenue recognition model between US GAAP and IFRS.
4. The use of the completed contract method for income tax purposes and the cost-to-cost method for financial statement reporting purposes.

#### ***Additional Learning Objectives***

Upon completion of the case study, the student should be able to do the following:

1. Understand several managerial assumptions needed in the application of the cost-to-cost method.
2. Understand the income statement effect of a change from an input method to an output method.
3. Understand some of the differences between ASC 606 and IFRS 15.
4. Understand the deferred income tax effect of long-term contracts.

#### ***Additional Case Requirements***

1. Explain two managerial estimates needed for the application of the cost-to-cost method.
2. Explain the income statement effect of a change from the cost-to-cost input method to the straight-line units of production output method.
3. State two differences between US GAAP and IFRS regarding the accounting for revenue recognition.
4. Compute the deferred income tax payable (tax asset) amount for PH Plumbing Inc. as of December 31, 20X0.

### **Expansion of the Case**

The expansion opportunities for this case study in terms of topical coverage and/or learning objectives are numerous and include the following:

1. The addition of ratio analysis coverage. As an example, this expansion may include the computation, comparison, and analysis of several financial ratios under the different reporting scenarios. The selected ratios may include gross profit, operating, and net income.

2. Analysis of which costs should be included and excluded in calculating performance measures under the cost-to-cost method. As an example, ASC 606 clearly states that costs that do not contribute to contract performance should be excluded in the measurement of revenue recognition.
  3. Analysis of the reasonableness of the indirect factory overhead cost allocation rate(s).
  4. Coverage of the accounting differences between a change in accounting estimate and a change in accounting principle.
  5. Coverage of a long-term construction contract scenario whereby an estimated project loss is expected.
  6. Coverage of several balance sheet items.
  7. Coverage of the voluminous disclosure requirements under ASC 606 and IFRS 15.
  8. Tax method requirements under the Internal Revenue Code regarding long-term construction contracts.
- Note:** The addition of items 2 and 3 may make this case suitable for a cost/managerial accounting course

### Conclusion

The passage of ASC 606 resulted in a global single-revenue recognition reporting model and will significantly change the accounting reporting requirements for a multitude of entities and industries, such as construction. This case study comprehensively addressed step 5 of the ASC 606 revenue recognition process: recognize revenue when (or as) the entity satisfies a performance obligation. Students were required to answer a series of comprehensive questions on long-term construction contracts, which should have resulted in an excellent working knowledge of this complex subject matter. The case study also required the application of critical thinking because many of the questions had multiple acceptable solutions. This is much different than the standard straightforward, myopic question-and-answer approach inherent in higher education. In closing, given the severe lack of long-term construction accounting information in the academic literature, many research opportunities exist for future case studies on this subject matter.

### References

Accounting Standards Update No. 2014-09 Revenue Recognition for Contracts with Customers (Topic 606)

### Recommended Solutions

This answer key represents a noncomprehensive guideline of recommended solutions. As with all case studies, differing solutions may earn partial to full credit based on varying acceptable assumptions and interpretations.

### Required Questions

- 1. The controller is interested in reporting long-term construction revenue at a single point in time rather than over a period of time and wants to know if this is an acceptable approach for financial statement reporting purposes.**
- A) Discuss the three situations when revenue will be recognized over a period of time on long-term construction contracts. In your answer, include why revenue from long-term construction contracts is usually recognized over a period of time.**

Revenue is recognized over a point of time (formerly called the percentage of completion method) if one or more of the following conditions are met:

- The seller creates or enhances an asset that the customer controls as it is being created or enhanced. This is normally the condition met for the revenue recognition of long-term construction contracts over a period of time because the customer of the product/service is typically the owner of the subject property, thus satisfying the control test.
- The entity's performance does not create an asset with alternative use, and the entity has a right to payment for work performed to date.

- Buyer derives benefit of seller's work as work is performed.

**B) Identify one of the three conditions requiring the recognition of revenue on a long-term construction project at a single point in time.**

There are three situations whereby revenue from a long-term construction project is recognized at a single point in time (formerly called completed contracts method), as follows:

- An entity cannot reasonably estimate the project's total cost.
- A loss is estimated on the project; this is consistent with the conservatism principle of recognizing losses in the period when a loss first becomes evident.
- None of the three conditions requiring recognition of revenue over a period of time (as outlined in part A) are met.

**Teaching Notes**

The last bullet point of part B will apply in the following example:

- The customer does not receive or consume benefits from the work until the very end.
- The contractor creates or enhances an asset that is under their own control.
- If the contract were to terminate, then the contractor would still be able to create another use of the asset and would not have the enforceable right to payment.

**C) Provide two theoretical accounting positions to support revenue recognition on long-term construction contracts over a period of time.**

- This satisfies the accrual basis of recognizing revenue in the period when earned.
- This satisfies the matching principle, which requires that revenues and any related expenses be recognized together in the same reporting period.
- This satisfies the consistency and comparability principles whereby a company is required to follow the same accounting procedures, methods, and principles from one accounting period to the next (consistency). This allows the readers of the financial statements to make meaningful comparisons between periods (comparability).
- This minimizes the variability/volatility of earnings reporting from period to period.

**D) Provide one theoretical accounting position to support and one to critique revenue recognition on long-term construction contracts at a single point in time.**

**Supporting Positions**

- For the total project loss situation, the theory of conservatism is satisfied because the loss is recognized in the period when it is first estimated rather than over a period of time.
- There is no need to estimate the total cost of a project.
- The project's ultimate reported revenue, construction cost, and gross margin totals are accurate.

**Critiques/Limitations**

- Management of earnings potential exists. Management may decide to postpone the completion of a profitable project to a time when there is a need for added revenue and net income reporting.
- There is potential net income (loss) volatility from one period to the next.
- Comparing financial results over different reporting periods is difficult because the revenue and net income reported amounts are not consistently applied.

**Teaching Notes**

- Revenue over a period of time is the normal basis for revenue recognition on long-term construction projects. The aforementioned exceptions of recognizing revenue at a single point in time occur

infrequently. However, short-term contract (projects of one year or less in duration) will be required to recognize revenue at a single point in time.

- Many construction companies perform projects that are short-term, and many also will perform annual-type management and maintenance service contacts as part of their business portfolio. This is in addition to the performance of long-term construction contracts. In this situation, the company must employ both revenue recognition timing methods.

**2. Prepare a statement of income in the partially filled Exhibit 2 for calendar years 20X0 and 20X1, assuming revenue is earned at a single point in time.**

<b>Exhibit 2:</b>	<b>PH Plumbing Inc.</b>	
	Statement of Income	
	For the Years Ending December 31, 20X0	20X1
Contract revenues earned	\$ 0	\$ 4,000,000
Cost of revenues earned	0	3,435,000
Gross margin	0	565,000
General and administrative expenses	164,380	169,580
Income (loss) before income tax	(164,380)	395,420
(Provision) benefit for income taxes (21%)	34,520	(83,038)
Net income (loss)	\$ (129,860)	\$ 312,382

**3. The controller would like to obtain a greater understanding of the input and output methods of reporting revenue over a period of time and is interested in evaluating the feasibility of adopting an output method for financial statement purposes.**

- A) Explain the output and input methods, provide one example of each approach, and discuss the applicability and limitations of each method in its use in the recognition of revenue on long-term construction projects.**

FASB 606-10-25-32 requires that for each performance obligation, the entity shall apply a single method of measuring progress with the goal of faithfully depicting an entity's performance of transferring control of goods or services promised to a customer. Per ASC 606-10-25-33, there are two methods of measuring progress which are categorized as output and input methods.

Per ASC 606-10-15-17, the first method is the output method. The output method measures performance on the basis of output results, such as surveys of performance completed to date, appraisals of results achieved, milestones reached, units delivered, and units produced. ASC 606-10 explicitly states that the major challenge with the output method is that there are few instances whereby a straight-line method properly measures performance. As such, an output method has highly limited applicability when reporting revenue. However, this issue in itself would not disqualify an output-based method from faithfully depicting an entity's performance obligations. ASC 606-10-55-20 states that a straight-line method may indeed be appropriate, but only if the entity's efforts or inputs are spread evenly throughout the performance period.

The second method per ASC 606-10-55-20 is the input method, which measures performance on the basis of inputs generated during a project. The most common inputs include costs incurred, time elapsed, resources consumed, labor hours tallied, and machine hours expended. This methodology clearly provides a faithful depiction of performance because direct materials, direct labor, and factory overhead are clear drivers for the construction of a long-term project. The cost-to-cost input approach is the most utilized method in the construction industry for the recognition of revenue on long-term construction contracts for financial statement and income tax purposes. Performance-to-date is based on an estimate of cost-to-date divided by the project's estimated total cost. Because

performance is based on an estimated amount, this method faces a potential limitation: unreasonable estimates will yield faulty revenue recognition totals. This issue may lead to earnings management techniques, thereby potentially distorting the performance level of a long-term construction project.

**B) Based on the facts of the case, recommend which method (if any) is most acceptable for PH Plumbing Inc. in the measurement of performance/revenue.**

Based on the facts of the case study, both methods meet the goal of faithfully depicting an entity's performance of transferring control of goods or services to a customer.

First, an output method, in this case the straight-line units of production method, satisfies the strict requirements of ASC 606-10-55-20, which states that a straight-line method may indeed be appropriate, but only if the entity's efforts are spread evenly throughout the performance period. The facts of the case tell us that each bathroom has identical specifications in its production process. Specifically, each of the 100 bathrooms is 200 square feet and will require identical materials. These specifications translate into the performance of a perfect, one-hundred homogeneous product.

Based on the facts presented, a major potential wrinkle in this method's application is the company worked as many days in 20X0 as 20X1, meaning that in an absolute ideal straight-line output method, the bathrooms completed should be equal at 50 per year. However, 49 bathrooms were completed in 20X0, whereas 51 were completed in 20X1; this discrepancy raises the potential issue of an inherent slight learning curve of one bathroom, or 2%. This may have resulted from a bit more time and effort due to employee familiarization with the worksite and/or added administrative efforts on management's part in initiating this project. Alternatively, this difference may be due to other factors, such as extra holidays, employee vacation, and/or sick days used in 20X0. Despite the potential validity of each aforementioned possibility, this difference is immaterial, thus justifying the use of the straight-line units of production output method.

Second, an input method, in this case the cost-to-cost method, clearly satisfies the goal of faithfully depicting an entity's performance of transferring control of goods or services to a customer because direct materials, direct labor, and factory overhead are evident drivers for the construction of a long-term project. However, as outlined in A, there is a potential major limitation in the use of the cost-to-cost method: unreasonable estimates may yield faulty performance measures. Estimates will never be exact, and minor differences will still yield materially correct revenue recognition totals. Nonetheless, it remains critical for the company to obtain solid cost estimates when applying the cost-to-cost input method.

The company has been highly successful with accurately estimating job costs. However, because of the recent increasing volatility in a number of production costs, the controller is concerned about this continued success going forward. Because the company's long-term projects are typically completed within two accounting periods, it is necessary to properly update estimated total project costs at the end of the first reporting period. This updated estimate will be based on the most current available cost data, which should result in highly accurate projections. Consequently, obtaining reasonably accurate cost estimates should not be too challenging despite the controller's concerns. Further, an examination of the current job adds credence to the company's efficacy in obtaining accurate cost estimates. Per the facts, the estimated project cost for this contract at inception (in 20X0) was \$3,400,000. As measured at the completion of the project one year later in 20X1, the actual cost was \$3,435,000. This difference resulted in an additional project cost of \$35,000 above the original estimate, equating to a 1% differential. This difference is minor and immaterially impacts reported revenue totals in 20X0 and 20X1. As such, the cost-to-cost input method is also a fully justifiable measure of performance.

**4. The controller is also interested in understanding the income statement effects of an output method and how it compares with the cost-to-cost input method. Assuming the following, calculate the revenue recognized and gross margin (profit) for calendar years 20X0 and 20X1:**

**A) The cost-to cost input method.**

Revenue for a given period/year=Revenue to date less revenue in prior periods  
 = (costs to date/total estimated project costs X transaction price)–revenue in prior periods

Revenue 20X0 (initial period): cost-to-cost input method= costs to date/total estimated project costs X transaction price=\$1,700,000/3,400,000=.50 X \$4,000,000=\$2,000,000

Contract revenues earned	\$ 2,000,000
Cost of revenues earned	<u>1,700,000</u>
Gross margin (profit)	\$ 300,000 =50% of total estimated gross margin of \$600,000

For 20X1, revenue earned equals: revenue to date=\$4,000,000 (because the project is complete) less revenue earned in prior period(s) (20X0) of \$2,000,000 =\$2,000,000. Note that the gross profit is lower by \$35,000 because the actual costs exceeded the estimated total project costs by \$35,000. The resulting gross margin on the project is \$565,000.

Contract revenues earned	\$ 2,000,000
Cost of revenues earned	<u>1,735,000</u>
Gross margin (profit)	\$ 265,000

**B) The straight-line units of completion output method.**

Revenue earned in 20X0 = units completed in 20X0/total contracted units to complete X transaction price.

49 bathrooms completed in 2020.  
 49/100=.49 X \$4,000,000= \$1,960,000 (49% completed)

Contract revenues earned	\$ 1,960,000
Cost of revenues earned	<u>1,700,000</u>
Gross margin (profit)	\$ 260,000

Revenue earned in 20X1=units completed in 20X1/total contracted units to complete X transaction price

51 bathrooms completed in 20X1.  
 51/100=.51 X \$4,000,000= \$2,040,000 (51% completed)

Contract revenues earned	\$ 2,040,000
Cost of revenues earned	<u>1,735,000</u>
Gross margin (profit)	\$ 305,000

Alternatively, the project was completed in 20X1 which results in 20X1 revenue of:  
 total revenue earned of \$4,000,000 less revenue earned in prior period(s) (20X0) of \$1,960,000=\$2,040,000.

**Teaching Notes**

- Although the solutions in A and B differ in the yearly reported amounts, the totals over the construction period are identical. The total project revenues is \$4,000,000, and the total cost of revenues earned is \$3,435,000, resulting in a project gross margin total of \$565,000. Despite different solutions, each approach will result in an acceptable response if the approach is applied correctly.
- Now may be a good time to share with students that this flexibility is due to the nature of accounting and financial information, where a single correct answer in an income statement account is not only rare, but also typically nonexistent. This is arguably the major reason for the many different types of generally accepted accounting approaches (i.e., average cost; first-in, first-out; last-in, last-out; and specific identification are all acceptable methods for inventory reporting).

- C) **Based on your findings in part A, prepare a statement of income in the partially filled Exhibit 2 attachment for calendar years 20X0 and 20X1 assuming revenue is earned on the cost-to cost input method.**

**Exhibit 2:****PH Plumbing Inc.**

## Statement of Income

	For the Years Ending December 31, 20X0	20X1
Contract revenues earned	\$ 2,000,000	\$ 2,000,000
Cost of revenues earned	<u>1,700,000</u>	<u>1,735,000</u>
Gross margin	300,000	265,000
General and administrative expenses	<u>164,380</u>	<u>169,580</u>
Income (loss) before income tax	135,620	95,420
Provision for income taxes (21%)	<u>28,480</u>	<u>20,038</u>
Net income	\$ 107,140	\$ 75,382

- D) **Based on your findings in part B, prepare a statement of income in the partially filled Exhibit 2 attachment for calendar years 20X0 and 20X1, assuming revenue is earned on the straight-line units of completion output method.**

**Exhibit 2:****PH Plumbing Inc.**

## Statement of Income

	For the Years Ending December 31, 20X0	20X1
Contract revenues earned	\$ 1,960,000	\$ 2,040,000
Cost of revenues earned	<u>1,700,000</u>	<u>1,735,000</u>
Gross margin	260,000	305,000
General and administrative expenses	<u>164,380</u>	<u>169,580</u>
Income (loss) before income tax	95,620	135,420
Provision for income taxes (21%)	<u>20,080</u>	<u>28,438</u>
Net income	\$ 75,540	\$ 106,982

- 5- **Prepare a written report for PH Plumbing Inc. controller Jill Price to address her concerns regarding revenue recognition. Include your findings and recommended courses of action in your report.**

To Controller Jill Price:

The purpose of this written communication is to provide you with a complete, detailed explanation in response to your questions and concerns regarding the accounting for revenue recognition issues affecting PH Plumbing Inc.

Your concerns are twofold and include questions as to whether PH Plumbing Inc. may adopt a revenue recognition method to recognize revenue at a single point in time (formerly termed the completed contract method) and whether an output method is a feasible, acceptable approach of reporting revenue under US GAAP.

In terms of your first question, US GAAP requires revenue recognition over a period of time for long-term construction contracts (formerly termed the percentage of completion method) if one or more of the following conditions are met:

- Buyer derives benefit of seller's work as work is performed.
- The entity's performance does not create an asset with alternative use, and the entity has a right to payment for work performed to date.
- The seller creates or enhances an asset that the customer controls as it is being created or enhanced.

This last condition is ordinarily met because your customer is typically the owner of the subject project property, thus satisfying the control test. As a result, PH Plumbing Inc. is required to recognize revenue over a period of time.

In terms of your second concern, the accounting standards require that for each performance obligation, the entity shall provide a single method of measuring performance with the goal of faithfully depicting an entity's

performance of transferring control of goods or services to a customer. There are two methods of measuring progress: output methods and input methods.

An output method measures performance on the basis of output results, and includes the straight-line units of production method that you have an interest in adopting. An output method is explicitly allowed in few cases and is appropriate only in situations where an entity's efforts or inputs are spread evenly throughout the performance period. The fact that each of PH Plumbing Inc.'s projects requires the construction of multiple bathroom units that are homogeneous in nature makes it clear that efforts and inputs are spread evenly throughout the performance period. As such, the use of the straight-line units of production method is an acceptable revenue recognition method.

The input method, which includes the cost-to-cost method that you currently use, clearly satisfies the goal of faithfully depicting an entity's performance of transferring control of goods or services to a customer because direct materials, direct labor, and factory overhead are evident drivers in the construction of a long-term project. However, this method is predicated on the reasonableness of estimates because the revenue earned is based on the total cost incurred divided by the project's total estimated cost. Unreasonable estimates will yield faulty revenue totals, in which case this method will be infeasible. PH Plumbing Inc. has been highly successful with accurate job costing estimations and because of the nature of its construction contracts, this success should continue. Specifically, PH Plumbing Inc.'s long-term construction projects are typically completed within two accounting periods. This will result in the necessity of properly updating each of the company's estimated total project cost schedule's only at the end of the first reporting period based on the most current available economic and cost data, which should result in fairly accurate estimated amounts. Consequently, obtaining reasonably accurate estimates should not be overly challenging despite your concerns about the increasing volatility of a number of production costs. As such, the cost-to-cost input method is also an acceptable revenue recognition method.

In summary, PH Industries Inc. is required to continue with the use of reporting revenue over a period of time with the application of either the cost-to-cost input method or straight-line units of production output method to measure the annual revenue amount.

In closing, please feel free call or email us with any questions.

MF CPAs

### APPENDIX

<b>Recommended Grading Rubric for Case Study (for Instructors)</b>			
<b>Requirement (1–4)</b>			
<b>Quality: (Unacceptable, Rudimentary, Satisfactory, or Outstanding)</b>			
<b>Unacceptable</b>	<b>Rudimentary</b>	<b>Satisfactory</b>	<b>Outstanding</b>
<b>1. Revenue Recognition</b>			
Unable to identify three requirements for the proper timing of revenue recognition and/or unable to adequately articulate theoretical support for revenue recognition over a period of time	Able to identify three requirements for the proper timing of revenue recognition and adequately articulate theoretical support for revenue recognition over a period of time	Able to identify four requirements for the proper timing of revenue recognition and adequately articulate theoretical support for revenue recognition over a period of time and at a single point in time	Able to identify four requirements for the proper timing of revenue recognition and adequately articulate theoretical support for revenue recognition over a period of time and at a single point in time <b>AND</b> identify one theoretical limitation of a single point in time revenue recognition scenario
Note: The timing of revenue recognition includes (a) at a single point in time and (b) over a period of time.			
<b>2. Input (Cost-to-Cost) and Output (Straight-Line Units of Production) Methods</b>			

Unable to correctly define and understand the applicability and limitations of the cost-to-cost and straight-line methods	Able to correctly define and understand the applicability and limitations of the cost-to-cost and the straight-line methods but unable to adequately recommend the acceptable method based on the case facts and circumstances	Able to correctly define and understand the applicability and limitations of the cost-to-cost and the straight-line methods <b>AND</b> adequately recommend the acceptable method based on the case facts and circumstances	Able to correctly define and understand the applicability and limitations of the cost-to-cost and the straight-line methods <b>AND</b> adequately recommend the acceptable method based on the case facts and circumstances <b>AND</b> specify that both methods are acceptable
<b>3. Revenue Recognition Computation</b>			
Unable to correctly compute revenue recognition and gross margin totals under the cost-to-cost and straight-line methods for 20X0 and 20X1	Able to correctly compute revenue recognition and gross margin totals under the cost-to-cost and straight-line methods for 20X0 and 20X1	Able to correctly compute revenue recognition and gross margin totals under the cost-to-cost and straight-line methods for 20X0 and 20X1 <b>AND</b> prepare a correct income statement for 20X0 and 20X1 for <b>TWO</b> of the following: 1. Cost-to-cost method 2. Straight-line units of production method 3. Revenue earned at a single period of time	Able to correctly compute revenue recognition and gross margin totals under the cost-to-cost and straight-line methods for 20X0 and 20X1 <b>AND</b> prepare a correct income statement for 20X0 and 20X1 for <b>ALL</b> of the following: 1. Cost-to-cost method 2. Straight-line units of production method 3. Revenue earned at a single period of time
<b>4. Written Communication</b>			
Not all main points are presented and/or not adequately supported	All main points are presented, adequately supported but not communicated reasonably well	All main points are presented, adequately supported, and communicated reasonably well	All main points are presented, adequately supported <b>AND</b> communicated clearly, effectively, comprehensively, unambiguously, and professionally