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INTELLIGENCE THAT WORKS

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Letter from the Editor

Welcome to Volume 8 of the *BRG Review*, an official publication of Berkeley Research Group, LLC. This publication reviews topics based on independent analysis by our authors. The breadth of material covered provides insight into varied and interesting ongoing research performed around the world by experts and staff throughout BRG. Our experts comprise academics and private-sector professionals in fields including economics, finance, healthcare, and data analytics. BRG has over 1,200 professionals in more than forty offices worldwide who apply innovative methodologies and analyses to complex problems in the business and legal arenas.

One advantage of having a publication that is fully digital is that we publish papers as they are ready to appear and then can combine them into an issue, which we have done here. In our first paper, published in June 2019, Jason Moretz and Nicholas Chmielewski break down methods for boarding admitted patients in emergency departments. The authors provide a detailed review of four methods for measuring boarding on emergency department productivity, with recommendations for best practices to target a productive level of staffing.

In our second paper, published in October 2019, Elizabeth Arnold and Chester Hanvey review rule changes impacting the overtime eligibility for more than a million workers. They describe methodologies using data to describe an employee's job duties to determine whether an employee is eligible for overtime.

In our third paper, published in August 2020, Stuart Miller, PhD investigates Federal Circuit decisions regarding reasonable royalties for patent infringement in relation to an infringer's profits. In a hypothetical negotiation, overlap in the willingness to pay by an infringer and the willingness to accept by a patent holder might not occur. Moreover, actual profits are not the same as expected profits. In scenarios such as these, the Federal Circuit has held consistently that an infringer's profits are not a cap on a reasonable royalty.

In our final paper, also published in August 2020, Chris Cable writes that the traditional productivity model used in hospitals depends on a metric of worked hours per unit of service. He describes an alternative model that explicitly considers staff that are fixed, leading to more accurate predictions for hospital staffing.

Finally, a special thank you to the reviewers and editors who work hard to ensure that the papers published within the *BRG Review* reflect nothing short of excellence. To our readers, we hope these papers stimulate discussion and discourse and deepen our relationships with fellow professionals, academics, clients, government representatives, attorneys, and other interested individuals across the world.

Regards,

Cleve B. Tyler, PhD
Editor-in-Chief

INTELLIGENCE THAT WORKS

Emergency Department Boarding: Methods Accounting for Lost Productivity

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Nick Chmielewski has over fifteen years of emergency nursing practice, including leadership experience in emergency department manager, director, and associate CNO-level leadership roles. His career has spanned experiences at forty-two EDs in fourteen states, spending the last five years in consulting roles. He is a published author in multiple journals, current chairperson of ENA's Advocacy Advisory Council, and an elected member-at-large on the Academy of Emergency Nursing's board.

Introduction

Boarding admitted patients in an emergency department (ED) represents one of the greatest challenges to emergency care in the United States. The Institute of Medicine in 2006 recommended an end to boarding admitted patients within EDs.[1] Subsequent research has established adverse implications of ED boarding on patient quality outcomes.[2] However, since 2010, the average ED length of stay for an admitted patient, including boarding time, has increased from 281 minutes to 304 minutes.[3]

Effective hospital leadership monitors a variety of metrics regarding ED quality, throughput, and staffing efficiencies. While alternative productivity calculations exist, such as the use of Ambulatory Payment Classifications, most US EDs calculate productivity by using a unit of service called worked hours per patient visit (wHPPV), where total productive staff hours are divided by the number of patient visits. Boarding patients present a challenge when interpreting wHPPV. These patients require additional staff resources than the typical ED patient due to their prolonged time in the ED and acuity. For this reason, it's prudent to have a method to account for boarding patients. Without this, EDs may appear less productive, resulting in less human capital than necessary to provide care.

Little to no research has evaluated standardized methodologies to account for the productivity impact of admitted patient boarding.[4] The challenge with using the wHPPV model in relation to boarding is the lack of consideration for a patient's acuity and length of stay, as each patient, regardless of those factors, counts as one visit.[5] This paper provides insight into the challenges associated with properly measuring for boarding patients' impact on ED productivity; it also discusses the impact of four methods on accounting for such loss.Standards for Boarding in the Emergency Department

1 Institute of Medicine, *The Future of Emergency Care in the United States Health System* (2006), available at: http://www.nationalacademies.org/hmd/Activities/Quality/emergencycare.aspx.

2 A.J. Singer, H.C. Thode Jr, P. Viccellio et al., "The association between length of emergency department boarding and mortality," Acad. Emerg. Med. 18 (2011): 1324–1329; P.C. Sprivulis, J.A. Da Silva, I.G. Jacobs et al., "The association between hospital overcrowding and mortality among patients admitted via Western Australian emergency departments," *Med. J. Aust.* 184 (2006): 208–212; D.B. Chalfin, S. Trzeciak, A. Likourezos et al "DELAY-ED Study Group. Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit," *Crit. Care Med.* 35 (2007): 1477–1483; D.B. Diercks, M.T. Roe, A.Y. Chen et al., "Prolonged emergency department stays of non-ST-segment elevation myocardial infarction patients are associated with worse adherence to the American College of Cardiology/American Heart Association guidelines for management and increased adverse events," *Ann. Emerg. Med.* 50 (2007):489–496.

3 Emergency Department Benchmarking Alliance, 2016 Cohort Tables Final (2017).

4 C. Morley, M. Unwin, G.M. Peterson, J. Stankovich, & L. Kinsman, "Emergency department crowding: A systemic review of causes, consequences and solutions," *PLoS ONE* 13(8) (2018), available at: https://doi.org/10.1371/journal.pone.0203316

5 Emergency Nurses Association, *Position Statement: Staffing and Productivity in the Emergency Department,* (2018), available at: https://www.ena.org/docs/default-source/resource-library/practice-resources/position-statements/staffingandproductivityemergencydepartment.pdf?sfvrsn=c57dcf13_6.

Standards for Boarding in the Emergency Department

The Emergency Department Performance Measures and Benchmarking Summit group in 2006 defined a boarded patient as "an admitted patient for whom the time interval between decision-to-admit and physical departure of the patient from the ED treatment area exceeds 120 minutes."[6]

The National Quality Forum (NQF) in 2008 defined ED boarding as the time from a physician's decision-to-admit to the patient's departure from the department.[7] The American College of Emergency Physicians (ACEP)[8] and Emergency Department Benchmarking Alliance (EDBA) have since supported this time metric.[9]

In 2013, the Joint Commission, a hospital accreditation organization, described boarding in a then-upcoming patient-flow standard and recommendation (Standard LD04.03.11):[10]

> Boarding is the practice of holding patients in the Emergency Department or another temporary location after the decision-to-admit or transfer has been made. The hospital should set its goals with attention to patient acuity and best practice; it is recommended that boarding time frames not exceed 4 hours in the interest of patient safety and quality of care.

Though the Joint Commission's note makes a distinction that patient boarding begins after decision-to-admit and that this time frame should not exceed four hours, we have observed that some hospitals define boarding as beginning only after the four-hour mark has passed. Other hospital systems use variations of the boarding term in their calculation methodologies.

While there is agreement on the general definition of boarding, discussion remains on when boarding actually begins. Boarding for any length of time creates additional workforce needs within the ED, and how hospital leadership accounts for the associated labor cost varies greatly across the country.

Limitations of Current Boarding Definition

Although the NQF defined boarding and ACEP and EDBA endorsed the definition of the term, the operational definition of "decision-to-admit" lacks consensus. Many believe that decision-to-admit is the actual moment a physician/provider determines hospitalization is warranted. An example of this would be an emergency physician's evaluation for a 63-year-old male presenting with chest pain who has a history of myocardial infarction, stent placement, and multiple comorbidities. The physician may know when she initially evaluates the patient that hospitalization in an observation status is required, at a minimum.

Others believe the decision-to-admit is the moment when all of the following conditions have occurred: (1) sufficient diagnostic information has been resulted and reviewed, (2) appropriate stabilization care has been provided, and (3) the ED physician/provider has contacted the admitting provider and transferred physician/provider responsibility of care.

The Emergency Medical Treatment and Active Labor Act (EMTALA) requires hospital EDs to medically screen every patient

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6 S. Welch, J. Augustine, C. Camargo, and C. Reese, "Emergency Department performance measures and benchmarking summit," *Academic Emergency Medicine* 13(10) (2006, October): 1074–1080, available at: https://www.ncbi.nlm.nih.gov/pubmed/16946283.

7 National Quality Forum, *National Voluntary Consensus Standards for Emergency Care: A Consensus Report* (2009), available at: http://www.qualityforum.org/publications/2009/09/national_voluntary_consensus_standards_for_emergency_care.aspx.

8 ACEP, "Definition of a boarded patient," Policy Statements (2018, September), available at: https://www.acep.org/patient-care/policy-statements/definition-of-boarded-patient/#sm.00006mqo0s1ctsf8qtes3g1xi33z2.

9 J. Wilner, S. Welch, J. Pines, J. Schuur, N. Jouriles, & S. Stone-Griffith, "Emergency department performance measures updates: proceedings of the 2014 emergency department benchmarking alliance consensus summit," *Academic Emergency Medicine* 22(5) (2015, May): 542–553.

10 The Joint Commission, "The 'Patient Flow Standard' and the 4-hour Recommendation," *Joint Commission Perspectives* 33(6) (2013, June), available at: https://www.jointcommission.org/assets/1/18/S1-JCP-06-13.pdf.

who requests emergency care and stabilize or transfer those with medical emergencies.[11] Given this requirement, we believe the latter definition of decision-to-admit to be more appropriate. That is, we recommend the decision-to-admit timestamp be defined as occurring only after stabilization care is provided and transfer of physician/provider responsibility of care has occurred.

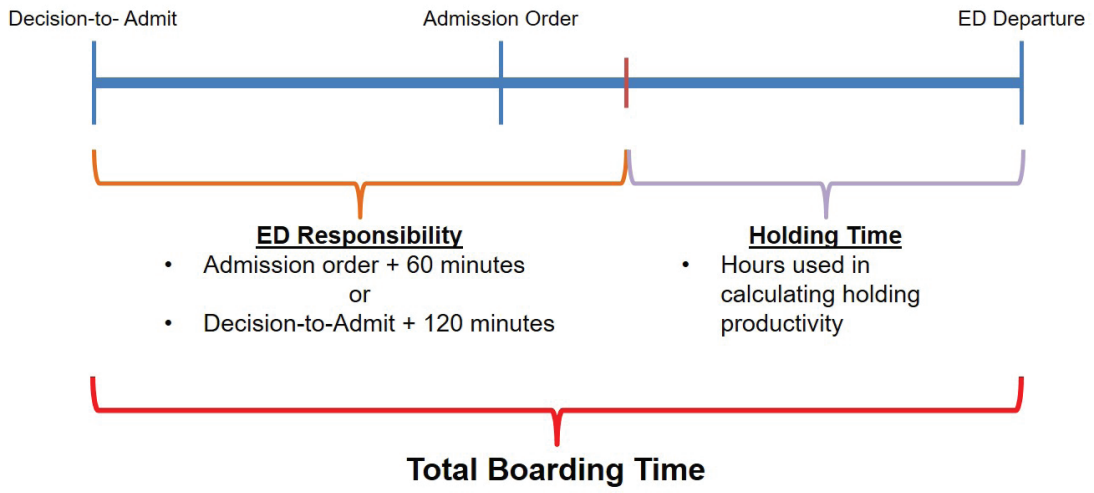
Defining Boarding for Calculating Productivity

Boarding is defined by the NQF and ACEP as the time between the decision-to-admit through departure from the ED.[12] In many facilities, ED patients are not transported to an inpatient setting without an admission order. Logically, even when a decision-to-admit or admission order is received, the patient isn't immediately transported to the inpatient unit. The patient must be readied for admission, and a nursing hand-off of patient care from the ED to the inpatient unit must take place. Thus, even when the ED provider has transferred care to an inpatient provider, the ED staff are still responsible for processes to admit the patient. We find that these processes typically take approximately 60 minutes.

We recommend applying the following standards and terminology in calculating boarding time of admitted patients in the ED. Figure 1 displays these standards.

- ED is responsible for productivity of patient from admission order plus 60 minutes.
- In absence of an admission order timestamp in the data extract, decision-to-admit plus 120 minutes will be used. This provides an additional 60 minutes to secure admission orders.
- Time in excess of this window will be referred to as "Holding Time."

FIGURE 1 **ED boarding and holding time calculations**



ED Productivity and Units of Service

11 ACEP, EMTALA *(Emergency Medical Treatment And Labor Act)* (2015), available at: https://www.acep.org/life-as-a-physician/ethics--legal/emtala/emtala-fact-sheet/

12 ACEP, "Definition of a boarded patient," Policy Statements (2018, September), available at: https://www.acep.org/patient□care/policy□statements/definition□ofboarded□patient/#sm.00006mqo0s1ctsf8qtes3g1xi33z2; NQF, *National Voluntary Consensus Standards for Emergency Care: A Consensus Report (2009)*, available at: http://www.qualityforum.org/publications/2009/09/national_voluntary_consensus_standards_for_emergency_care.aspx

While different methods are used to calculate productivity for a hospital staff's ED, the most widely implemented metric in US hospitals is wHPPV. This metric is calculated over a specified time period as:

wHPPV = (total worked hours in the ED cost center / total number of ED visits)

Methods of Accounting for Holding in Productivity

In our observations and experience, four primary methods are used in accounting for excess staffing requirements related to admitted patient holding:

- ED only (no adjustments for holding productivity)
- ED only with calculated "buffer"
- Use of virtual cost center
- Calculated modified visits

Below, we discuss each method of accounting for holding in productivity.

ED Only (no adjustments for holding productivity)

Definition: All worked hours are maintained within the ED cost center. This includes worked hours caring for patients in the ED and in holding, as well as hours worked by non-ED staff (inpatient nurses) that may be floated to the ED during times when an unusually high number of patients (both ED patients and holding patients) are within the ED.

EXAMPLE: In a pay period (14 days), an ED had budgeted a wHPPV of 2.86 and realized a wHPPV of 3.04. The pay period consisted of 1,373 visits associated with 4,174 worked hours, of which 1,284 were holding hours. The ED's wHPPV in this method does not differentiate holding hours from total worked hours in any productive standard.

Pros: This method is the most straightforward and provides for clear management by ED leadership.

Cons: For holding patients, no additional productive factor is provided for patient care. If holding is significant, the department's productivity measurement may not be sufficient to provide adequate resources to properly care for patients and could lead to staff shortages or insufficient care for holding patients.

ED Only with Calculated "Buffer"

Definition: Worked hours are kept within the ED cost center. However, a mathematical calculation is used to determine the productivity impact associated with the holding of admitted patients in the ED.

EXAMPLE: As above, in a pay period (14 days), an ED had 1,284 holding hours, a volume of 1,373 visits, a budgeted wHPPV of 2.86, and an actual wHPPV of 3.04 (4,174 worked hours).

wHPPV Buffer Calculation

$$(1{,}284\ Hold\ Hours) * (0.25\ Nurse\ to\ Patient\ Ratio) = 321\ Required\ Care\ Hours$$

$$\frac{(321\ Required\ Care\ Hours)}{(1{,}373\ Pay\ Period\ Volume)} = 0.23\ wHPPV\ for\ Holding$$

Initially, 1,284 hold hours are divided by an industry-accepted standard of one nurse to four patients, thus multiplying by 0.25, which results in 321 required care hours, or hours that require nurse staffing. In the same manner of calculating wHPPV, the required care hours are divided by the volume to reflect the wHPPV required for the holding patients.

A wHPPV of 0.23 would constitute a "buffer" that is added to the budgeted wHPPV of 2.86, such that the department's productivity target would be between 2.86 and 3.09. The department's actual wHPPV for the pay period was 3.04; therefore, it was within its productive target for the pay period. Further, by subtracting the buffer from the actual wHPPV (3.04–0.23), the department's wHPPV without holding is 2.81, which is less than the 2.86 budgeted target.

Pros: In this method, all worked hours remain in the ED cost center, which is straightforward from an accounting perspective. There is also financial oversight of productivity by ED and financial leadership. This method also provides a calculation for the additional worked hours to care for hold patients. The method allows for the ED to anticipate the need for resources over and above its budgeted staffing plan to care for long-term holding patients. Credit is given based on the number of holding hours and converting those hours into a wHPPV "buffer."

Cons: This method still reflects that the ED is above its productivity target on most financial statements. The holding of admitted patients in the ED is a hospital throughput problem, not an ED problem. While these calculations would be conducted and provided as rational for being over an ED's productivity, hospital leadership needs a culture and understanding of the buffer methodology. This approach would not be successful in an organizational culture that has absolute departmental consequences for not meeting productivity targets.

Use of Virtual Cost Center

Definition: ED labor is divided between two cost centers: one aimed at "regular" ED care and a second "virtual" cost center dedicated for staff hours related to holding. Holding hours are converted to required care hours; then ED nursing worked hours are transferred or moved from the ED cost center to the virtual cost center. This practice in essence artificially lowers the ED overall worked hours, decreasing the wHPPV calculated. The virtual cost center, and associated labor attributed to it, then clearly defines the labor necessary for providing care to holding patients and creates an accurate representation in the ED cost center of the labor that was utilized in caring for ED patients.

EXAMPLE: In a pay period (14 days), an ED had 1,284 holding hours, a volume of 1,373 visits, a budgeted wHPPV of 2.86, and an actual wHPPV of 3.04 (4,174 worked hours). In our example, 321 hours constitutes the required care hours for holding.

Required Care Hour Calculation

$$(1{,}284\ Hold\ Hours) * (0.25\ Nurse\ to\ Patient\ Ratio) = 321\ Required\ Care\ Hours$$

The virtual cost center identifies the number of hours and FTEs that were required to care for holding patients within the ED. A total of 3,853 worked hours (4,174 less 321) would be attributed to the regular ED cost center, and 321 worked hours would be transferred to the virtual cost center. The regular ED cost center would then have a calculated wHPPV of 2.81, less than the budgeted target of 2.86.

Pros: This method shows and represents a "clean" ED productivity of ED operations without holding.

Cons: Currently, this is a manual process requiring clerical and leadership staff time to quantify and transfer the number of hours to the virtual cost center. This process typically entails the ED leader reclassifying

employees' hours in the time clock system from the ED cost center to the virtual cost center. This process may lead to inaccurate productivity reports. In addition, this process would have to be completed in a timely manner and before the end of payroll. Further, the virtual cost center is a "black hole" of worked hours. Facilities do not attribute full-time equivalent (FTE) or hired staff into this cost center; the extra worked time is typically in the form of overtime or agency staffing. This also leads to poor management of this virtual cost center, as there isn't typically a hospital leader tasked with managing the labor of this cost center. Also, there isn't a financial metric (such as ED visits) to accompany the cost center, thus it is simply an accounting method to identify and track the labor utilization of ED staff caring for holding patients. Thus, this is an accounting exercise that artificially lowers the ED wHPPV by reducing the total number of hours in the ED cost center.

Calculated Modified Visits

Definition: Holding hours are converted into patient visits; then a "modified" ED volume is used to calculate productivity.

EXAMPLE: In a pay period (14 days), an ED had 1,284 holding hours, a volume of 1,373 visits, a budgeted wHPPV of 2.86, and an actual wHPPV of 3.04 (4,174 worked hours).

Modified Visit Calculation

$$(1{,}284\ Hold\ Hours) * (0.25\ Nurse\ to\ Patient\ Ratio) = 321\ Required\ Care\ Hours$$

$$\frac{(321\ Required\ Care\ Hours)}{(2.86\ Budgeted\ wHPPV\ Target)} = 112\ Modified\ Additional\ Visits$$

The new modified visits would be 1,485 (1,373+112), reducing actual wHPPV from 3.04 to 2.81 modified.

Pros: This method provides a reasonable accounting method for attributing productivity to holding.

Cons: Due to current financial accounting systems that do not have a methodology for calculating these values, this method requires manual calculation and labor to determine the number of modified visits. Another challenge is identifying how the modified visits number will be used and where will it be reported. This method would require a facility-specific method for gathering and reporting these numbers. Last, the facility will have two visit numbers, which could cause confusion to those uninformed of the process.

Recommendation for Accounting for Admitted Patient Holding in the Emergency Department

These calculations provide a fair and equal representation of the productivity required to care for holding patients. With the exception of the *ED Only* method, the alternatives provide end results that are essentially equal. Therefore, the final evaluation considers which method is most operationally effective, leaves the least room for error, and best drives a culture for reducing admitted patient holding hours.

In the absence of a preexisting method for calculating holding productivity, we recommend using the *ED Only with Calculated "Buffer"* method for adjusting productivity to reflect holding patients. This method is easy to calculate and does not require the creation and maintenance of other cost centers or monitoring tools. This method can also be calculated on daily, weekly, monthly, or yearly bases, providing additional flexibility in creating yearly budgets and monitoring techniques. Figure 2 displays a simulated client analytics platform based on this recommendation.

FIGURE 2

Simulated client analytics platform

Historical Daily Ed Detail
January 2019

	Visits	Admits	Percent Admits	AMA	Percent AMA	LWBS	Percent LWBS	Avg Time: Arrival to Room	Avg Time: Room to Provider	Avg Time: Arrival to Provider	Avg. Time: Provider to Dispo	Avg. Time: Dispo to Depart	Avg. Time: Dispo to Depart*	Avg Time: Arrival to Depart ALOS	Avg Time: Arrival to Depart-Admits	Admit Hold Time (hours)	Average Admit Hold Time (hours)	Admit Hold wHPPV
January 12, 2019	203	31	15.27%	1	0.49%	1	0.49%	8.0	11.5	16.0	148.9	54.9	36.2	215.3	366.9	62.8	2.03	0.08
January 11, 2019	229	33	14.41%	0	0.00%	0	0.00%	9.2	11.8	17.1	131.4	48.6	39.5	194.7	337.2	49.1	1.49	0.05
January 10, 2019	240	47	19.58%	3	1.25%	1	0.42%	10.2	10.9	19.0	146.5	68.0	33.4	231.8	417.5	124.1	2.64	0.13
January 9, 2019	243	58	23.87%	2	0.82%	1	0.41%	10.7	14.9	19.9	147.3	63.8	37.9	229.1	374.4	145.2	2.50	0.15
January 8, 2019	285	59	20.70%	3	1.05%	0	0.00%	11.9	20.2	29.7	147.8	78.1	30.4	254.3	492.3	243.8	4.13	0.21
January 7, 2019	290	53	18.28%	6	2.07%	1	0.34%	15.0	20.5	31.1	160.0	67.3	38.2	250.5	445.5	162.8	3.07	0.14
January 6, 2019	280	55	19.64%	2	0.71%	3	1.07%	11.8	20.2	28.8	161.1	54.2	41.9	236.3	375.1	102.1	1.86	0.09
Grand Total	1,770	336	18.98%	17	0.96%	7	0.40%	11.2	16.3	23.8	149.6	62.8	36.8	232.1	408.1	889.8	2.65	0.13

The blue shaded area indicates total hold time hours used to calculate the Admit Hold wHPPV using the "Buffer" method.

Inpatient holding within the ED continues to challenge hospitals across the country. Hospitals that have no current method of accounting for the additional labor requirements within the ED to care for holding patients are understaffing departments. By utilizing one of the outlined methods, hospitals will have a clearer picture of the labor needs of holding patients within the ED.

INTELLIGENCE THAT WORKS

Compliance with the DOL's New Overtime Rules: The Exemption Job Analysis

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Elizabeth Arnold, MS, is a director in the Labor and Employment practice at BRG and has been advising clients on issues related to employment practices and wage and hour compliance for nearly twenty years. She provides expert services to clients at leading law firms, companies, and employees nationwide on state and federal litigation and advisory projects. Her broad scope of experience ranges from the retail and transportation industries to food processing and healthcare.

Chester Hanvey, PhD, is an associate director in the Labor and Employment practice at BRG and provides consulting services in both litigation and non-litigation contexts. Dr. Hanvey has worked with more than 100 organizations across a range of industries including public and private sectors. He specializes in designing and conducting job analyses and conducting statistical analyses to evaluate wage and hour compliance, appropriateness of class certification, allegations of discrimination, and damages. He holds a PhD in industrial/organizational (I/O) psychology with a minor in quantitative methods (statistics).

Abstract

On September 24, 2019, the US Department of Labor (DOL) announced its final rule to revise regulations that define which employees are exempt from Fair Labor Standards Act (FLSA) protections such as overtime. The most notable revision is an increase to the minimum salary for exempt employees to $684 per week.[1] This rule will expand overtime protections to more than one million employees and will take effect on January 1, 2020. We expect that these revisions will motivate many employers to audit employee classifications to minimize the legal risks associated with misclassification. In this article, we discuss the revisions to the FLSA and describe methods to collect valid and reliable data regarding employees' job duties to help determine which employees should be classified as overtime eligible. The methodologies we describe are based on our extensive experience evaluating employee classifications in many organizations across a range of industries.

1 US Department of Labor (DOL), 29 CFR Part 541, *Defining and Delimiting the Exemptions for Executive, Administrative, Professional, Outside Sales and Computer Employees* (September 26, 2019), available at: https://www.dol.gov/whd/overtime2019/overtime_FR.pdf

Overview

On September 24, 2019, the US Department of Labor (DOL) announced a final rule to revise Fair Labor Standards Act (FLSA regulations (29 CFR 541 et seq.) to modify the criteria to be classified as exempt from the FLSA ("2019 Rules"). The most notable change in the 2019 Rules is an increase to the minimum salary an employee must be paid in order to be overtime exempt—increasing from $455 per week ($23,660 per year) to $684 per week ($35,568 per year). When the 2019 Rules are implemented in 2020, the DOL estimates more than one million US workers will no longer qualify for an exemption and will have become eligible for overtime pay and other FLSA protections.[2]

The second component of the 2019 Rules, the "Duties Test," remains unchanged from existing regulations. The duties an employee performs remain a critical component of the criteria for FLSA exemptions. The Duties Test dictates that to be exempt from overtime pay, employees must perform their jobs such that their "primary duty" is exempt. An employee's primary duty still must satisfy the criteria from an exemption to be classified as exempt from the FLSA.

The DOL previously attempted to modify these rules in 2016. The 2016 Rules proposed an increase in the minimum salary an employee must be paid in order to be overtime exempt to $913 per week ($47,476 per year),[3] substantially higher than the 2019 Rules. However, on August 31, 2017, a Texas federal judge invalidated the 2016 Rules as part of litigation brought by the Plano Chamber of Commerce and more than fifty-five business groups, including twenty states that had challenged the increase. The judge granted summary judgment in favor of the business groups, stating, in part, that the increase in the 2016 FLSA regulation was simply too high and would essentially invalidate the Duties Test. In other words, nearly all employees who met the proposed salary test would also satisfy the Duties Test.

The goal of this article is to describe several scientifically based methodologies that can be used to determine whether employees' "primary duties" qualify them to be overtime exempt. Each methodology is based on well-established job analysis techniques and is designed to collect detailed data on the work employees actually perform, the amount of time they spend performing that work, and the context in which that work is performed. We have developed and refined these job analysis methodologies over many years, specifically to address the key issues relevant to assessing an employee's exempt status, and have used them successfully with many clients in both a consulting role and in response to litigation.

The "White Collar" FLSA Exemptions

The FLSA, enacted in 1938, grants numerous wage and hour protections to US employees unless they meet the criteria for an exemption and have been classified by their employer as "exempt." The most notable FLSA protection entitles workers to overtime pay at 1.5 times their regular rate for all hours worked in excess of 40 in a week. Employees who qualify for an exemption may legally be classified as "exempt" and thus are not entitled to any FLSA protections, including overtime pay. Exempt employees are paid a fixed salary regardless of the number of hours they work (i.e., "salaried").

The DOL's Wage and Hour Division has established exemption rules for employees under the FLSA. The three most common exemptions (Executive, Administrative, and Professional), commonly known as the "White Collar" exemptions, are summarized in Table 1. The changes to the salary thresholds are noted.

2 US DOL, *Overtime Update* [Final Rule] (2019), available at: https://www.dol.gov/whd/overtime2019/

3 US DOL, *Defining and Delimiting the Exemptions for the Executive, Administrative, Professional, Outside Sales and Computer Employees* [Final Rule] (2016), available at: https://federalregister.gov/a/2016-11754

TABLE 1: SUMMARY OF NEW FLSA EXEMPTION CRITERIA FOR WHITE COLLAR EXEMPTIONS[4]

Executive Exemption

(1) Paid a salary of $684 (previously $455) or more per week; and

(2) Primary duty is management of the enterprise, department, or subdivision; and

(3) Manages two or more employees; and

(4) Has the authority to hire or fire others (or whose recommendations are given particular weight).

Administrative Exemption

(1) Paid a salary of $684 (previously $455) or more per week; and

(2) Primary duty is the performance of office or non-manual work directly related to the management or general business operations of the employer or the employer's customers; and

(3) Primary duty includes the exercise of discretion and independent judgment with respect to matters of significance.

Professional Exemption

(1) Paid a salary of $684 (previously $455) or more per week; and

(2) Primary duty is work requiring one of the following:

a. Advanced knowledge (i.e., "Learned Professional"); or

b. Invention, imagination, originality, or talent in an artistic or creative field (i.e., "Creative Professional").

Although the specific criteria for each exemption differ, all exemptions are based on two broad factors: the employee's salary (Salary Test) and the employee's job duties (Duties Test).

4 This list is a summary of the criteria contained in the Code of Federal Regulations. The actual regulations (see 29 CFR 541 et seq.) provide additional explanation and guidance. Available at https://www.federalregister.gov/documents/2019/09/27/2019-20353/defining-and-delimiting-the-exemptions-for-executive-administrative-professional-outside-sales-and

Salary Test

To satisfy the new Salary Test, the employee must be paid a minimum salary of $684 per week ($35,568 per year). An evaluation of whether employees meet the Salary Test involves analyzing payroll data to determine which employees reach the minimum salary threshold. The Salary Test may not require expertise in work measurement.

Duties Test

The Duties Test remains unchanged. Determining whether a job in an organization meets the Duties Test requires detailed measurement of work behaviors. To satisfy the current Duties Test, the employee's "primary duty" must be exempt work. An evaluation of "primary duties" requires an understanding of what work employees actually perform, the context in which work is performed, the nature of the work, and the time spent on that work. One method used to collect data relevant to this evaluation is a job analysis.[5]

The precise definition of primary duty can be unclear due to different interpretations across geographies, industries, and courts. In federal courts, "primary duty" has been interpreted qualitatively, meaning that there is no defined threshold for the percent of time that an employee needs to spend performing exempt duties. Other factors, such as importance of the work performed, may be considered in addition to percent of time spent when determining an employee's primary duty. Because of this qualitative focus, employees may be considered exempt even if they spend less than half of their time performing exempt work.

In contrast, California's state labor laws (for which exemption litigation is disproportionately high) are more restrictive, requiring that exempt employees spend more than 50 percent of their time performing exempt work. Employers operating in California must comply with the more restrictive state standard.

Through our extensive client work auditing employees' job duties using job analysis, we have developed several methodologies to measure the specific factors relevant to the different exemptions under both standards. These methodologies can be used to collect precise measurements of work behaviors, which is useful for addressing exempt status under both state and federal regulations. The three most commonly used exemption job analysis methodologies are described in the following section.

The Exemption Job Analysis

The specific method of data collection should be selected and customized based on the specifics of the job and the exemption(s) being evaluated. Having executed more than one hundred exemption studies for many different positions across a variety of industries, we offer a general framework for the evaluation process and examples to highlight some issues that may arise for employers.

The common theme across the following methods is primary data collection. Reviewing documents that provide high-level descriptions of the work that employees in certain positions are *supposed to do* (e.g., job descriptions) provides some value, but in isolation these documents are limited. In many situations, employers will benefit from a review of data that shows what employees *actually do* on the job.

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5 For additional information, see C.M. Hanvey, *Wage and Hour Law: Guide to Methods and Analysis*, New York, NY: Springer (2018); C.M. Hanvey & C.G. Banks, "Wage and Hour Litigation," in C.M. Hanvey and K. Sady (Eds.), *Practitioner's Guide to Legal Issues in Organizations, New York,* NY: Springer (2015); C.G. Banks & L.W. Aubry, "How to Conduct a Wage and Hour Audit for Exemptions to Overtime Laws," *Bender's Labor & Employment Bulletin* (2005): 292–302; C.G. Banks & L. Cohen, "Wage and Hour Litigation: I-O Psychology's New Frontier," in F.J. Landy, *Employment Discrimination Litigation*, Jossey-Bass/Pfeiffer (2005); H.Y. Ko & B.H. Kleiner, "Analyzing Jobs to Determine Exempt or Non-Exempt Status," *Equal Opportunities International* 24(5/6) (2005): 93–100; A.L. Honorée, D.C. Wyld, & R.L. Juban, "A Step-by-Step Model for Employers to Comply with the Fairpay Overtime Initiative under the Fair Labor Standards Act (FLSA)," *Equal Opportunities International 24(2) (2005): 54–66.*

The most appropriate job analysis methods for collecting valid and reliable data to evaluate exemption status are: 1) observing and documenting how employees perform their work, or 2) collecting verbal/written self-reports from employees about the work they perform. Each of these methods is based on scientifically sound job analysis techniques. The appropriate method for a given organization or job is dependent on several factors, such as: the type of work performed, the language ability of employees, the geographic disparity of employees, and even practical considerations such as cost and time. Most important, the method selected must be capable of generating valid and reliable data. A general overview of the underlying process for conducting a job analysis for auditing classification is provided in Graphic 1.

GRAPHIC 1: GENERAL FRAMEWORK OF AN EXEMPTION JOB ANALYSIS[6]

Time and Motion Observations

Time and motion observation studies result in a robust data set that many readers find particularly compelling. Observations involve a trained job analyst directly observing and documenting a continuous record of all tasks an employee performs throughout the day, along with the duration of each task performed. One advantage of this method is that data are collected from an objective professional who directly observes and documents the tasks performed in a given work environment. This ensures that data are free from biases or memory decay that may lead to inaccurate self-reports. An example of a partial observation record is included below.

6 For illustrative purposes only. The specifics for each study will vary.

TABLE 2: EXAMPLE OF PARTIAL OBSERVATION RECORD OF RETAIL SALES MANAGER

TASK START	TASK END	PERIOD TIME	TASK
12:53:30	12:54:30	0:01:00	Plug in and start laptop in back office.
12:55:30	12:56:20	0:00:50	Review company mail.
12:57:10	12:58:40	0:01:30	Retrieve and put on radio.
13:00:10	13:02:40	0:02:30	Receive update from employee about customer service issue.
13:05:10	13:05:30	0:00:20	Inform employee that they will go over training today.
13:05:50	13:06:50	0:01:00	Discuss lunch scheduling and whether it is completed yet with Assistant Manager.
13:07:50	13:09:00	0:01:10	Discuss results of Operations audit with Assistant Manager.
13:10:10	13:11:10	0:01:00	Ask employee status of her assigned tasks.
13:12:10	13:12:50	0:00:40	Review Assistant Manager's observation and evaluations of other employees.
13:13:30	13:13:50	0:00:20	Direct employee to transfer phone book for customer.
13:14:10	13:14:40	0:00:30	Monitor customer service at POS station.
13:15:10	13:16:30	0:01:20	Receive message from employee regarding survey of IT maintenance service.
13:17:50	13:19:20	0:01:30	Adjust merchandise on shelves.
13:20:50	13:21:30	0:00:40	Check in with other employees regarding task status and how things are going on the sales floor.
13:22:10	13:27:20	0:05:10	Review timesheets in system for exceptions or errors in coding, and approve.
13:32:30	13:33:50	0:01:20	Run and review report for missing time sheets.
13:35:10	13:38:30	0:03:20	Review requests for time off, and approve or reject.
13:41:50	13:44:10	0:02:20	Ask employee whether she completed training, and direct her to complete it.

Once collected, individually recorded tasks can be grouped into exempt and non-exempt categories[7] and analyzed to provide an overall percentage of time spent on different exempt activities. Other factors relevant to a classification evaluation, such as task importance, independent judgment and decision making, and role in hiring and firing, may be difficult to observe directly because they are mental processes that are not visible and may occur infrequently. Therefore, observation data can be supplemented with some self-report data collected from incumbents or managers to specifically address these areas.

Conducting observations of all employees in a population is typically cost prohibitive. Therefore, it is typically necessary to collect data from a sample of employees. The methods used to select the sample should be carefully considered to avoid bias.

An important consideration when conducting an observation study is the type of job being evaluated. Some tasks (e.g., mental tasks) do not lend themselves to an observation methodology. Jobs that are composed primarily of these types of tasks are more challenging to observe. Jobs that are composed primarily of visible tasks are more easily studied using observational techniques. The case study below describes an observation study we conducted of a cable installation manager at a company operating in California.

7 Specific legal expertise may be required for classification of tasks.

CASE STUDY 1: OBSERVATION STUDY OF CABLE INSTALLATION MANAGERS

A client was facing litigation in California claiming that its cable installation managers (managers) were misclassified as exempt. To collect job analysis data relevant to evaluating the job based on the executive exemption, we designed a study that included conducting thirty full-shift manager observations and ten structured interviews with managers.

We started the study by reviewing documents (e.g., job descriptions, training materials), interviewing manager supervisors, and visiting managers outside of California. These visits allowed us to observe work firsthand. Observing out-of-state managers gave us the opportunity to ask incumbent managers questions without tapping into the same group of managers in California that we would ultimately be studying.

We learned important details about the work environment from these interviews and visits. This information was used to develop a "Task List" of individual tasks that any manager could perform on the job. This list was used by observers as a guide to accurately record and categorize the tasks they observed. This list was grouped by topic into "Task Areas," which were then classified as "exempt" or "non-exempt" by counsel. This structure was used to analyze the data collected and to determine how these managers spent their time individually and as a group.

To standardize the observation data collection and ensure that observers were prepared to respond appropriately to potential customer interactions, we prepared a detailed Observation Protocol. The protocol provided guidance to observers on how to track unique tasks and scripted language to use in various scenarios.

Through our preliminary research, we learned that managers sometimes performed additional work from home before and after their formal "work day." To capture information about the entire range of tasks performed, we conducted additional structured interviews with a supplemental sample of managers. After the observations were completed, we followed up with this sample of managers by phone and asked them to self-report additional information on topics such as work performed from home and possible changes in their jobs over time.

The observation and interview data provided a comprehensive picture of the manager job and enabled us to provide to the client information relevant to evaluating its classification. The client used the results of the study in the litigation.

Self-Report

JOB ANALYSIS QUESTIONNAIRES

A second method for evaluating exemption classifications is a self-report job analysis questionnaire. This method involves collecting self-report responses from employees and/or their managers to a series of written questions. Based on current science and best practices in the field, the job analysis questionnaire is a carefully designed instrument specifically designed to accurately measure employee behaviors in the workplace.

One advantage of a self-report questionnaire is that it can be administered to a large number of employees relatively inexpensively. In addition, data can be collected regarding past experiences, and questions can be asked about issues that may be difficult to observe, such as decision-making authority or the reason tasks are performed. Self-report data collection can be used independently or in conjunction with other methods.

To address factors relevant to the exemptions, a job analysis questionnaire must be thorough, detailed, and comprehensive. For example, our job analysis questionnaires often include five or more sub-sections, each covering a different element of the job. Given the length of the questionnaire, participation can be time consuming for employees. However, this is necessary to collect sufficient data to draw meaningful conclusions.

Topics addressed in a self-report tool can include tasks performed, time spent, decision making, level of autonomy, task importance, role in different operational areas, and other special duties or responsibilities. Using this approach can also provide insight into the *reasons* behind employees performing various tasks. If, for example, a manager at a retail

store is spending the majority of his/her time ringing up customers on the register, a self-report tool can reveal that the reason for this behavior is to ensure that a recently repaired register is functioning properly. This type of information can be critical in determining whether noncompliant behavior is an individualized issue or a structural problem throughout the organization.

Different mediums can be used to administer a job analysis questionnaire. Two that we use for clients are hard-copy "paper and pencil" questionnaires and online, web-based questionnaires. One consideration when choosing a medium for administration is that the administration of a hard-copy questionnaire requires more time and effort to manage, including coordinating and overseeing proctored, in-person administration sessions. In contrast, an online questionnaire requires less time to administer, but it is only feasible when employees have reliable access to and general familiarity with computers and the internet. In addition, participants' ability to ask clarifying questions can be limited using an online format.

If a hard-copy questionnaire is used, the employees' responses must be subsequently entered into an electronic form before they can be analyzed. If an online questionnaire is used, no data entry is required, and the responses can be downloaded easily and analyzed to determine how employees responded. The case study below describes how we used an online questionnaire to conduct a study of a Store Manager position working at different client locations around the country.

CASE STUDY 2: ONLINE JOB ANALYSIS QUESTIONNAIRE FOR NATIONAL RETAILER

In-house counsel for a national retail company asked us to develop a program to proactively assess whether its Store Managers were performing their jobs in a way that met the criteria for the executive exemption. They also asked us to design a coaching program to modify the behavior of employees who were not performing the Store Manager job the way it was intended (i.e., majority of time spent on exempt tasks). To accomplish this, we developed an online job questionnaire with an accompanying feedback and coaching component.

To develop this customized questionnaire, we started by reviewing existing documents, including training and operations materials and job descriptions of various positions in the store. Next, we visited a variety of stores around the country to interview and observe Store Managers to learn firsthand about store operations and Store Manager job responsibilities. We also held multiple "subject-matter expert" focus group meetings with District Managers representing geographies around the country to gather information about the differences between stores and how these differences could impact the way a Store Manager spends his/her time.

Based on this background information, we developed a comprehensive list of tasks Store Managers may perform on the job. This task list was then reviewed by multiple groups of District Managers for accuracy, and modifications were made based on their input.

The task list was used as the basis of the questionnaire. Participants were asked to report the relative time spent on each task on the list. Next, tasks were grouped into Task Areas (i.e., groups of tasks that serve a common function), and participants reported the percentage of time they spent performing work in each Task Area. Task Areas were pre-classified as exempt or non-exempt by an external legal expert, allowing calculation of total time spent on exempt work. Finally, we asked Store Managers to report the reasons they performed non-exempt tasks. This was used to help customize the follow-up coaching process. The entire questionnaire was then reviewed by groups of District Managers for clarity, and revisions were incorporated based on District Manager feedback.

The online questionnaire was then pilot tested with a random sample of Store Mangers to ensure that the instructions were clear and that the content was appropriate and accurately reflected the scope of the Store Manager job. After making minor revisions based on this feedback, we administered the questionnaire to more than 1,200 Store Managers nationwide.

Analysis revealed that most of the Store Managers were spending the majority of their time on exempt work. The Store Managers who were spending a large percentage of their time on non-exempt activities were identified, and the reasons these Store Managers reported performing non-exempt activities were reviewed.

Based on the reasons reported for performing non-exempt work, a customized coaching program was developed for each of these Store Managers. District Managers were given coaching points that were customized for each Store Manager depending on his/her specific reasons for performing specific tasks. District Managers used the coaching guide as a basis to work with each Store Manager to identify goals and strategies for performing the job as expected and dedicating the appropriate level of time and importance to exempt work.

To communicate the results of the questionnaire out to field management, we created an automated report that generated a customized summary for each region and district. The report presented a high-level summary of the division, a comparison to other divisions, and details regarding how individual Store Managers were spending their time.

After the success of the first administration, the company asked us to revalidate (i.e., update) the questionnaire content periodically and to readminister the questionnaire every two years to ensure continued Store Manager compliance with company expectations.

STRUCTURED INTERVIEWS

Another self-report tool that can be used for evaluating exemption compliance is the structured interview. The same foundations of job analysis practice are used to form the basis of the structured interview. However, unlike the job analysis questionnaire, which typically contains mostly closed-ended (i.e., fixed-scale) questions, the structured interview contains mostly open-ended questions. Open-ended questions allow employees to elaborate and provide significant detail in their responses. These types of interviews can result in interesting and illustrative examples of different scenarios and circumstances. In addition, follow-up questions can be built into the tool to capture the drivers that lead to different employee behaviors. Some interviews may incorporate both open- and closed-ended questions, which can expedite the interview and provide numeric data to analyze. An example of responses to selected interview questions is provided below.

TABLE 3: EXAMPLES OF CALL CENTER EMPLOYEE STRUCTURED INTERVIEW QUESTIONS AND RESPONSES

QUESTION	RESPONSE
Auditing	
1. How do you review and evaluate your Customer Service Representatives' work? What steps do you take? What metrics or reports do you review? What do you look for in these metrics or reports?	I review key metrics to ensure that Customer Service Representatives are meeting the levels set for them. I also listen to and grade calls on a daily basis. Based on the results of the call, that is when we prepare our Disciplinary Action Reports as needed.
2. Do you audit other teams? Do you generate or review any metrics or reports for other teams? If so, what do you look for when reviewing these reports? What conclusions or information do you draw from these reports?	If I am assigned as a point of contact for all teams. I am also responsible for auditing other pods' adherence and compliance. I monitor their invalid escalations. I do this to ensure that CSRs are meeting their metrics on a daily basis. If they are not, then I decide how to handle it. One option is coaching, another is disciplinary. This is my decision, based on general guidelines which are provided to me regarding auditing and expectations.
3. How important is auditing to your job? What would be the consequences to the call center if you did not perform these audits?	I believe auditing is a very important part to my job. The consequences to the call center would be potentially devastating due to the fact that I always have to keep track of everyone's performance, quality, and coaching on a daily basis. I always have to be on top of our teams. The consequences of not auditing could lead to closure or even fines due to our federal contracts.
Autonomy	
1. How frequently do you interact with your Manager?	Daily.
2. How do you typically interact your Manager? In person, phone, email, text?	The main form of communication is email. Second is in person, then phone and text message.
3. For what purpose do you regularly interact with your Manager?	We conduct daily team meetings. Every day, within the first hour or two of our shift, our manager gets together with all the supervisors in their core, and we discuss metrics, daily game plan, and any hot-topic issues.

QUESTION	RESPONSE
4. What is the goal of these regular interactions? Are you receiving information or providing information?	It is usually both receiving and providing information. Again, if our manager has any new updates or information he needs to get out, we'll review it in our team meeting instead of communicating via email. Supervisors will also have the opportunity to provide critical updates to management in these meetings.
5. For what purposes do you interact with your Manager beyond your regular interactions? Under what circumstances would you communicate with your Manager more often or in addition to your regular interactions?	Normally the interactions with my manager are around individual agent issues (e.g., attendance, quality). For someone that is performing extremely well (e.g., one CSR had perfect attendance for a year), I may want to reward them. Any time I'm interacting with my manager in addition to our regular interactions, it is usually around specific agent issues.

The structured interview approach can be useful when studying complex and highly technical jobs that do not lend themselves to a pre-structured questionnaire with defined measurement scales. Given the large number and detailed nature of questions, structured interviews can take a significant amount of time to execute. Depending on the environment, this time requirement can limit the number of employees who can be interviewed and included in the study.

The employee responses to a structured interview can be lengthy, thus requiring a content-analysis approach to summarize. However, responses typically contain much more detail that other self-report instruments. Some find these detailed descriptions more informative and useful than numeric data. The case study below describes how we designed and implemented a structured interview tool to a group of employees involved in various stages of the design and creation of integrated circuit chips at a semiconductor company.

CASE STUDY 3: JOB ANALYSIS OF ENGINEERS AT A SEMICONDUCTOR COMPANY

A semiconductor manufacturing company was facing litigation in which plaintiffs alleged that their "engineers" were misclassified as exempt. We were asked to determine how employees in an engineering position were performing their jobs. The job class of engineer included the following six job categories: Chip Design/Hardware, Software, Chip Layout, Product Applications, Manufacturing/Operations, and Customer Relations.

As expected with six job categories, the employees included in our study held many different job titles. The organization considered them all exempt, but different employees were considered exempt under different exemptions, including the professional, administrative, computer professional, and executive exemptions. In addition, because the class of engineers had already been certified, our data collection was limited to those who "opted out" of the litigation. Given the diversity of the jobs included within this study and the technical nature of the positions, we determined that a structured interview method would be the best option to gather reliable data that addressed the key issues relevant to the various exemptions.

We started the job analysis by collecting background information about the parts of the business in which engineers worked. Through this effort, we learned that engineers worked in almost every phase of the product development cycle and that we needed to obtain significant background information about the different procedures and technologies involved in this process to adequately understand what employees in this group of jobs were actually doing. We relied on both internal and external resources, including interviews with external technology experts and industry readings.

Next, we conducted and recorded interviews with more than forty managers of the different engineering positions. Because of the technical language used during the interviews, the recordings enabled us to listen multiple times in order to accurately transcribe content.

Using the information gained from the background research and manager interviews, we developed a structured interview protocol, which asked questions about the nature of the engineer relationship with customers and other employees, the frequency and nature of supervision by their managers, the degree and nature of problem-solving required in performing tasks, the technical knowledge and expertise required to perform tasks, the degree and nature of physical and routine work performed, the extent to which engineers supervised others, and the types of decisions made and degree of autonomy in making those decisions, among other things.

The structured interview data we collected resulted in a database with extremely detailed information about the work that engineers in each of the six groups performed and specifically how it fit into the areas relevant to the exemption. We prepared a summary report detailing our findings and the significant range in job duties we found across the organization. The client relied on our report to address class certification and merits issues in the case.

Conclusion

Recent changes to the salary component of the FLSA regulations have emphasized the continued importance of the Duties Test in assessing which employees qualify for an exemption. Proactive employers may choose to evaluate how their employees' duties are aligned with the current exemptions, in addition to salary levels. In our experience, conducting a thorough job analysis is the most effective approach to evaluating the exemption status of employees. In this article, we have provided information regarding methods we have developed and applied over many years to study employees. All research methods have strengths and weakness, so the most appropriate method depends on the specifics of an organization and the position being studied.

Disclaimer: Each of the methods presented above describe data collection options which can be used to inform job classification decisions, however, we recommend seeking legal counsel before making any decisions related to classification.

INTELLIGENCE THAT WORKS

Reasonable Royalty and the Infringer's Profits

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Abstract

In patent infringement damages, one approach to the determination of a reasonable royalty is to apply the hypothetical negotiation framework. To determine a reasonable royalty under this framework, it can be instructive to compare the licensee's willingness to pay and the licensor's willingness to accept. Where there is an overlap in these two positions, it is possible to determine a reasonable royalty that is generally consistent with each party's position. In certain instances, there may be no such overlap. This dynamic can occur when the licensor's minimum willingness to accept exceeds the licensee's actual or anticipated profits associated with the sale of the accused product. This article explores Federal Circuit decisions addressing the circumstances under which a reasonable royalty may exceed the infringer's profits. The Federal Circuit has generally upheld royalty rates in district court rulings where the royalty rate exceeds the infringer's claimed profits, although in doing so the Federal Circuit has often drawn attention to the specific facts and circumstances of the licensee's position.

I. Introduction

In patent infringement litigation, one measure of damages is a reasonable royalty. While there is no required method for determining the reasonable royalty, a common approach is the hypothetical negotiation or "willing licensor-willing licensee" approach.[1] This approach "attempts to ascertain the royalty upon which the parties would have agreed had they successfully negotiated an agreement just before infringement began."[2]

The hypothetical license is distinguished from a real-world license in various respects. For example, (1) the asserted patents are assumed to be valid and infringed,[3] (2) the parties are willing negotiators,[4] (3) the parties are both assumed to be prudent negotiators,[5] (4) there are no information asymmetries,[6] (5) the parties may have knowledge of certain future information,[7] (6) the license scope is limited to a bare patent license, (7) the negotiations occur on the eve of infringement,[8] and (8) the resulting payment structure is typically a running royalty or lump sum payment.

One technique to determine the reasonable royalty under the hypothetical license is to compare the licensor's minimum willingness to accept and the licensee's maximum willingness to pay. In the bargaining literature, this is known as the Zone of Possible Agreement or the bargaining range.[9] The bargaining range is fertile ground for a negotiated royalty rate. In certain situations, the hypothetical licensing arrangement can generate the expectation of profits for both the licensee and licensor.[10] In other situations, a contemplated hypothetical license may not be mutually beneficial, the licensor may not wish to grant a license, and/or the licensee may be unwilling to accept a license at the offered terms. It is quite possible there will be no overlap in the parties' respective bargaining ranges. In a real-world negotiation, typically no bargaining range will exist if the licensor's minimum willingness to accept exceeds the licensee's expected incremental profits derived through its use of the patented invention. Nevertheless, the hypothetical negotiation construct requires that the hypothetical license be granted,[11] which guarantees the licensor "in no event less than a reasonable royalty,"[12] even if the parties may not reach an agreement in a real-world negotiation.

For example, consider a licensor whose patent-practicing products earn a profit of $2.00 per unit and an infringer whose profitability on its accused product is $1.00 per unit.[13] These products are substitutes for each other, and absent the

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1 Determination of the reasonable royalty under the "willing licensor-willing licensee" approach is often done through use of the *Georgia-Pacific* factors (see *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970)), although use of the *Georgia-Pacific* factors is not required. See, for example, *Whitserve, LLC v. Computer Packages, Inc*., 694 F. 3d 10, 31 (Fed. Cir. 2012); *Energy Transp. Group, Inc. v. William Demant Holdings A/S*, 697 F.3d 1342, 1357 (Fed. Cir. 2012).

2 *Lucent Technologies, Inc., v. Gateway, Inc*. 580 F. 3d 1301, 1324 (Fed. Cir. 2009).

3 *Id*. at 1325.

4 *Fromson v. Western Litho Plate and Supply Co.,* 853 F. 2d 1568, 1575 (Fed. Cir. 1988).

5 *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970).

6 *LaserDynamics, Inc. v. Quanta Computer, Inc*. 694 F. 3d 51, 76 (Fed. Cir. 2012).

7 *Fromson v. Western Litho Plate and Supply Co.,* 853 F. 2d 1568, 1575 (Fed. Cir. 1988).

8 *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F. 3d 860, 869 (Fed. Cir. 2003); *LaserDynamics, Inc. v. Quanta Computer, Inc*. 694 F. 3d 51, 76 (Fed. Cir. 2012).

9 See, for example, Harvard Law School, "zone of possible agreement" [webpage], available at: https://www.pon.harvard.edu/tag/zone-of-possible-agreement/

10 By way of example, the Federal Circuit held that "the basic premise of the hypothetical negotiation in this case would have been the opportunity for making substantial profits if the two sides were willing to join forces." See *Gaylord v. United States*, 777 F. 3d 1363, 1368 (Fed. Cir. 2015).

11 The Federal Circuit stated that the hypothetical negotiation "methodology encompasses fantasy … because it requires a court to imagine what warring parties would have agreed to as willing negotiators." See *Fromson v. Western Litho Plate and Supply Co.,* 853 F. 2d 1568, 1575 (Fed. Cir. 1988). But, as the 6th Circuit stated in *Panduit*, "[t]here is, of course, no actual willingness on either side." The Federal Circuit has also described the license resulting from the hypothetical negotiation as a "form of compulsory license, against the will and interest of the person wronged, in favor of the wrongdoer." See *Rite-Hite Corp. v. Kelley Co., Inc*., 56 F. 3d 1538, 1555 (Fed. Cir. 1995) citing *Del Mar,* 836 F.2d at 1328, 5 USPQ2d at 1261.

12 35 U.S.C. § 284

13 For this stylized example, assume that no apportionment is required or that the infringer's apportioned profitability is $1.00 per unit.

infringement, the patentee believes it would likely make the sale. If the patentee is unable to establish a lost profits claim,[14] the patentee may then seek a reasonable royalty.[15] When seeking a royalty, the licensor may still argue that, from a business perspective, a royalty rate of less than $2.00 per unit would leave it worse off than making the sales itself. Conversely, the licensee would typically argue that a royalty rate greater than $1.00 per unit offers no economic incentive to take a license.[16] In a real-world negotiation where there is no bargaining range, it is unlikely the parties would come to an agreement. Under the hypothetical negotiation construct, the parties must reach an agreement. How then should practitioners proceed when evaluating a reasonable royalty in such a scenario?

This article reviews guidance relevant to determining a reasonable royalty when there is no clear overlap in the parties' willingness to pay. It focuses on the role of the infringer's profit in determining the reasonable royalty and reviews the circumstances under which a royalty may exceed the infringer's profit.[17] Section II reviews the purpose of a reasonable royalty. Section III discusses issues pertinent to compensating the patentee fully in light of the licensee's profit. Section IV addresses the distinction between the infringer's anticipated and actual profits. Section V summarizes selected Federal Circuit decisions, and Section VI concludes.

II. Purpose of a Reasonable Royalty

In discussing the purpose of a reasonable royalty, it is useful to start with 35 U.S.C. § 284, which states:

> Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

The Federal Circuit has described the reasonable royalty damages remedy as "merely the floor below which damages shall not fall."[18] While the concept of a reasonable royalty providing a damages floor is understood,[19] the question remains as to the purpose of the reasonable royalty under § 284. As summarized by the Federal Circuit in *Mars v. Coin Acceptors (2008)*, the Supreme Court stated that "[i]n enacting § 284, Congress sought to ensure that the patent owner would in fact receive full compensation for any damages [the patentee] suffered as a result of the infringement,"[20] and "while the statutory text states tersely that the patentee receive adequate damages, the Supreme Court has interpreted this to mean that adequate damages should approximate those damages that will *fully compensate* the patentee for infringement."[21]

In *Astrazeneca v. Apotex* (2015), the Federal Circuit stated that "the reasonable royalty theory of damages … seeks to compensate the patentee not for lost sales caused by the infringement, but for its lost opportunity to obtain a reasonable royalty that the infringer would have been willing to pay if it had been barred from infringing."[22] In *Astrazeneca*, the Federal Circuit also held that in "determining what such a reasonable royalty would be, the district court was required to assess

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14 Lost profits is a separate patent damages remedy under which the patentee may recover its lost profits instead of a reasonable royalty if it can prove it lost sales it otherwise would have made due to the alleged infringement. Lost profit claims are often demonstrated through application of the factors set forth in *Panduit Corp. v. Stahlin Bros. Fibre Works*, 575 F. 2d 1152 (6th Cir. 1978).

15 Patentees may of course claim lost profits and a reasonable royalty on sales not subject to the lost profits claim.

16 There are exceptions, such as the infringing product being a loss leader for the defendant or the possibility of the defendant generating additional profits from service revenues or convoyed sales.

17 The focus in this paper is on reasonable royalties negotiated for patents that are not standard essential and are not subject to reasonable and nondiscriminatory terms (RAND)/fair, reasonable, and nondiscriminatory terms (FRAND) commitments.

18 *Bandag, Inc. v. Gerrard Tire Co., Inc.* 704 F.2d 1578, 1583, 217 USPQ 977, 981 (Fed. Cir. 1983).

19 See, for example, *State Industries, Inc. v. Mor-Flo Industries, Inc.*, 883 F. 2d 1573, 1577 (Fed. Cir. 1989).

20 *Mars, Inc. v. Coin Acceptors, Inc.*, 527 F. 3d 1359, 1366 (Fed. Cir. 2008) (internal quotation marks omitted) citing *Gen. Motors Corp. v. Devex Corp.*, 461 U.S. 648, 654-55, 103 S. Ct. 2058, 76 L.Ed.2d 211 (1983).

21 *Ibid.* (internal quotation marks omitted; italics in original) citing *Rite-Hite Corp. v. Kelley Co., Inc.* 56 F. 3d 1538, 1545 (Fed. Cir. 1995).

22 *Astrazeneca AB v. Apotex Corp.*, 782 F.3d 1324, 1334 (Fed. Cir. 2015) citing *Lucent v. Gateway* 580 F.3d 1301, 1325 (Fed. Cir. 2009).

Astra's injury … according to what Astra could have insisted on as compensation for licensing its patents to Apotex as of the beginning of Apotex's infringement."[23]

From the infringer's point of view, there is still the question of whether a reasonable royalty need leave it with a profit, and, if yes, a profit under which metric? Indeed, *Georgia-Pacific* factor 15 addresses the "amount that … a licensee … would have been willing to pay as a royalty and yet be able to make a reasonable profit."[24] In *Trans-World Mfg. v. Al Nyman & Sons* (Fed. Cir. 1984), the Federal Circuit stated that a "reasonable royalty is the amount that a person, desiring to manufacture [, use, or] sell a patented article, as a business proposition, would be willing to pay as a royalty and yet be able to make [, use, or] sell the patented article, in the market, at a reasonable profit."[25]

As discussed subsequently, although certain court decisions reference a reasonable royalty that leaves the defendant with a "reasonable profit" after taking a license, in practice the issue is more nuanced. As subsequent Federal Circuit decisions articulate, it is useful to consider the different types of profits and specific facts and circumstances in each matter.

III. Fully Compensating the Patentee and the Infringer's Profit

Starting from the premise that the reasonable royalty under § 284 is meant to "fully compensate" the patentee and provide the licensor what it "could have insisted on as compensation for licensing its patents," it is useful to consider how this guidance reconciles with the negotiation dynamics that may occur between licensor and licensee at the hypothetical negotiation. From an economic perspective, it is not difficult to envision a scenario in which the licensor may seek a reasonable royalty that exceeds the infringer's profits. The licensor need not necessarily be motivated by a desire to impose a high royalty for such a scenario to arise. All that is required is a dynamic in which the licensor's profits from its next best alternative to licensing exceed the infringer's profits.

In patent infringement litigation, the licensor's damages expert may face challenges if he or she advances a damages claim that seeks a royalty rate equal to the licensor's expected profits.[26] Even if the expert's basis for seeking such a royalty were economically rational, in a litigation setting the accused infringer would likely assert that such a proffered royalty was merely a means of claiming lost profits by avoiding application of *Panduit* and other means of establishing lost profits.

Indeed, as the Federal Circuit has held, "[t]o recover lost profits damages for patent infringement, the patent owner must show that it would have received the additional profits 'but for' the infringement," and the "patent owner bears the burden to present evidence sufficient to show a reasonable probability that it would have made the asserted profits absent infringement."[27] Therefore, if the evidence suggests the patent holder would have indeed made the sales instead of the defendant, the practitioner might consider estimating lost profits.

Setting lost profits to the side, the patent holder may still have an economic basis to seek a royalty exceeding the defendant's willingness to pay. The next section addresses how to best consider scenarios where the reasonable royalty may exceed the infringer's profits.

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23 *Astrazeneca AB v. Apotex Corp.*, 782 F.3d 1324, 1334 (Fed. Cir. 2015).

24 *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

25 *Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.* 750 F. 2d 1552, 1568 (Fed. Cir. 1984) citing *The Goodyear Tire & Rubber Co. v. Overman Cushion Tire Co.*, 95 F.2d 978, 984 37 USPQ 479, 484 (6th Cir. 1938) and *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.* 575 F.2d 1152, 197 USPQ 726 (6th Cir. 1978) (internal quotations omitted).

26 In *Mitutoyo* (Fed. Cir. 2007), no lost profits were awarded, and the Federal Circuit allowed the royalty rate of 29.2% to stand, which was the plaintiff's profit margin. The Federal Circuit stated that "it is unlikely that Mitutoyo would have been interested in less than a 29.2% rate," although in this case, the defendant's anticipated profit margin was 70%, and there was clearly a viable bargaining range. See *Mitutoyo Corp. v. Central Purchasing*, LLC, 499 F. 3d 1284 (Fed. Cir. 2007). In *Asetek* (Fed. Cir. 2017), the Federal Circuit held that "[n]egotiating for a per-unit payment equal to its per-unit profit can be a logical approach for a patent owner that is uncertain of how many sales might be lost by granting the license at issue or is just using its own experience to place a value on the right to use the technology at issue." See *Asetek Danmark A/s v. CMI USA INC.*, 852 F. 3d 1352, 1363 (Fed. Cir. 2017).

27 *King Instruments Corp. v. Perego*, 65 F.3d 941, 952 (Fed. Cir. 1995).

IV. The Infringer's Profits

As practitioners are aware, the infringer's profits may be measured under different metrics (e.g., gross profits, net profits, incremental profits). With respect to analyzing the infringer's profits, the Federal Circuit has held that the metric used to measure the infringer's profitability is a matter specific to facts and circumstances of each case. The Federal Circuit stated that "[w]e have never held that any one profit accounting methodology is appropriate in all industries, for all companies, in all cases. The selection of the appropriate method of profit accounting in the circumstances is properly left to the broad discretion of the district court."[28] Accordingly, the term *profit* is used in a general sense unless otherwise specified. Although the measurement of profit may vary by case, the Federal Circuit has commented on the infringer's anticipated (or expected) profits and actual profits, as described in Section V.

The Federal Judicial Center's Pocket Guide on Compensatory Damages Issues in Patent Litigation states that "[a] fundamental premise of the hypothetical negotiation form of reasonable royalty analysis is that the suppositious licensee would be left with *some* anticipated profit after paying the royalty."[29] With respect to the term "anticipated profit," the *Pocket Guide* notes that "[a]s evidence of the profits the accused infringer at the hypothetical negotiation table would have expected to make from using the invention, actual profits are like evidence of postnegotiation license agreements, in that the relevance of the infringer's actual profits depends on whether the circumstances under which those profits were made were comparable to what the negotiation party would have anticipated or expected."[30] Further, "[t]hat an infringer actually made unexpectedly low profits, or even lost money, from its infringing use may have little or no relevance, and a reasonable royalty may exceed the infringer's actual profit."[31] The Federal Circuit has held that "[e]vidence of the infringer's actual profits generally is admissible as probative of his anticipated profits."[32]

Finally, the infringer's profit may not always be purely a function of the infringer's cost structure. For example, consider a scenario in which the infringer's accused product is deliberately priced lower than competing products in order to gain market share or achieve some other business objective. From an economic perspective, it is not always apparent that the infringer's profit in such a scenario should act as a constraint on the royalty.

V. Overview of Selected Federal Circuit Decisions

The Federal Circuit has addressed the nexus between the infringer's profit and the royalty rate in a number of cases.[33] Typically, the accused infringer appealed the royalty rate awarded by the district court on the grounds that the royalty rate would leave it with no or limited profits. The following cases are discussed in chronological order.

In *Hanson v. Alpine Valley* (Fed. Cir. 1983), the patent-in-suit covered "a method and apparatus for making snow used in winter sports."[34] The magistrate determined that the patent generated a savings of $75 per unit and concluded that a

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28 *Mars, Inc. v. Coin Acceptors, Inc.*, 527 F. 3d 1359, 1375 (Fed. Cir. 2008).

29 Federal Judicial Center's *Pocket Guide on Compensatory Damages Issues in Patent Litigation* (Second Edition), p. 23 (italics in original; underline added). The *Pocket Guide* also comments that "[a]lthough, economically speaking, exceptional circumstances exist where the infringer's anticipated profit flowing directly from infringing sales may not represent a reasonable cap, such as a loss leader, those circumstances should be considered from the broad perspective of benefit to the infringer, not just benefit from the infringing sales, if those benefits can be quantified." See *Id.* at footnote 105.

30 *Id.*, p. 24.

31 *Ibid.*

32 *Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.* 750 F. 2d 1552, 1568 (Fed. Cir. 1984) citing *Locklin v. Switzer Brothers, Inc.* 235 F. Supp. 904, 906, 143 USPQ 233, 238 (N.D. Cal. 1964) and 5 Chisum, *Patents* § 20.03[3][b][iv].

33 The Federal Circuit cases discussed in this section were identified by reviewing *Aqua Shield* (Fed. Cir. 2015) and predecessor cases cited. The cases discussed here may not be an exhaustive listing.

34 *Hanson v. Alpine Valley Ski Area, Inc.* 718 F. 2d 1075, 1076 (Fed. Cir. 1983).

reasonable royalty would be one-third of this savings, or $25 per unit.[35] The magistrate also found that the "proofs offered … do not suggest any basis for establishing profits experienced by the infringing Defendant in the use of the process patent."[36] The Federal Circuit stated that it had "no basis for rejecting that factual determination."[37] In its appeal, Alpine argued that "the royalty the magistrate set is unreasonable because it would not have allowed it to make a profit."[38] In evaluating Alpine's assertion, the Federal Circuit, quoting the Eighth Circuit, stated "that a reasonable royalty would leave an infringer with a reasonable profit … is implicit."[39]

In *Hanson*, the Federal Circuit observed, as the royalty was based on cost savings, that "it is difficult to understand the basis of Alpine's contention that the royalty would not have allowed it to make a profit."[40] The Federal Circuit further commented that the "issue of the infringer's profit is to be determined not on the basis of a hindsight evaluation of what actually happened, but on the basis of what the parties to the hypothetical license negotiations would have considered at the time of the negotiations."[41] Citing *Panduit*, the Federal Circuit commented that "[w]hether, as events unfurled thereafter, [Alpine Valley] would have made an actual profit, while paying the royalty determined as of [1972], is irrelevant."[42] The Federal Circuit concluded, "Alpine has not shown that the royalty the magistrate set would not have allowed it a reasonable profit."[43]

In *Radio Steel v. MTD Products* (Fed. Cir. 1986), the asserted patent covered an improved wheelbarrow, and the plaintiff asserted that the defendant manufactured and sold infringing products.[44] The plaintiff recovered lost profits on the defendant's sales to certain retailers and was awarded a reasonable royalty on sales to other retailers.[45] The district court awarded the plaintiff a royalty of 10%, and the defendant's expected profit margin on the accused products was 6%. The defendant appealed the district court's decision and argued that the "ten percent is unreasonably high because it far exceeds the profit MTD actually made."[46] Despite the defendant's argument, the Federal Circuit stated that "we have no basis for rejecting the district court's selection of ten percent as a reasonable royalty rate."[47] The district court's determination of the 10% royalty rate was informed by Radio Steel's testimony that "its net profit from its sales of patented wheelbarrows was ten plus-or-minus two percent."[48] The Federal Circuit, citing *Panduit*, further stated that the "determination of a reasonably royalty, however, is based not on the infringer's profit, but on the royalty to which a willing licensor and a willing licensee would have agreed at the time the infringement began."[49]

The Federal Circuit did not explicitly address the issue of the 10% royalty rate exceeding the defendant's "expected" net profit "of about six percent."[50] However, some facts specific to this case may offer insight as to why the Federal Circuit upheld the district court's 10% royalty rate. The district court "observed that Radio Steel lost sales not only of the patented wheelbarrows, but also of collateral items … [and] MTD made substantial sales … of noninfringing wheelbarrows with

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35 *Id.* at 1077.

36 *Id.* at 1078.

37 *Ibid.*

38 *Id.* at 1081.

39 *Ibid.* quoting *Square Liner 360°, Inc. v. Chisum*, 691 F. 2d 362, 377, 216 USPQ 666, 677 (8th Cir. 1982) and referencing *Leesona Corporation v. The United States*, 599 F. 2d at 970-971, 202 USPQ at 436 (U.S. Ct. Cl. 1979).

40 *Ibid.*

41 *Ibid.*

42 *Ibid.*

43 *Ibid.*

44 *Radio Steel & Mfg. Co. v. MTD Products, Inc.*, 788 F. 2d 1554, 1555 (Fed. Cir. 1986).

45 *Ibid.*

46 *Id.* at 1557.

47 *Ibid.*

48 *Ibid.*

49 *Ibid.* (citing *Panduit* at 1158).

50 *Ibid.*

the sale of the infringing wheelbarrows."[51] The Federal Circuit also commented that "the district court could well have discounted MTD's profit figures because the treasurer also testified that the infringing [products] might have been utilized as loss-leaders at various times during the period of infringement."[52]

In *State Industries v. Mor-Flo* (Fed. Cir. 1989), the asserted patent covered "a method of insulating water heaters with foam."[53] State Industries ("State") received lost profits on approximately 40% of Mor-Flo's infringing sales and a royalty of 3% on the remaining infringing sales.[54] Considerations pertinent to the determination of a royalty rate included "a growing demand for foam-insulated water heaters" and the patent-in-suit describing "the first method developed to meet this demand."[55] In addition, "there were no other methods available during the pertinent period that were either noninfringing or acceptable as substitutes."[56] The Federal Circuit also summarized that the "water heater industry is intensely competitive and marked by small profit margins."[57]

At trial, State's president testified he would have sought a royalty of 8% to 10%, and State's expert testified the parties would have agreed to an 8% royalty.[58] Mor-Flo "argued that in no event should the royalty rate be above its net profit margin which, for the seventeen months preceding the date infringement began, was 2.1%" and sought an effective royalty rate of 0.163%.[59] For reference, State's incremental profits on its water heaters ranged between 15.76% and 17.51%.[60] However, the Federal Circuit commented that at trial, "Mor-Flo presented no evidence of what it would have paid for a license."[61] The district court awarded State a royalty of 3% on sales that were not subject to lost profits.[62]

In response to the Mor-Flo's position, the Federal Circuit (citing to *Radio Steel*) held that the "determination of a reasonable royalty, however, is based not on the infringer's profit margin, but on what a willing licensor and licensee would bargain for at hypothetical negotiations on the date infringement started."[63] The Federal Circuit also stated, again citing *Radio Steel*, that "[t]here is no rule that a royalty be no higher than the infringer's net profit margin."[64]

In this case, it does not appear that the defendant supplied evidence of forecasted or expected profits, but rather its actual profits. The Federal Circuit did address case-specific considerations relevant to the determination of the royalty rate. Namely, that the "value [of the patented invention] to Mor-Flo was obvious" and that the "value of collateral sales could also be factored into the royalty rate."[65] The Federal Circuit further held that while Mor-Flo presented its net profit margin of 2.1%, "it was not inappropriate for the district court to consider gross profits."[66] Mor-Flo's gross profit over the same seventeen-month period was 19.6%, "with a net incremental profit of 17.48%" and "during the period of infringement, Mor-Flo's net profits varied from 5.9% to 7.3%."[67] The Federal Circuit concluded that "[i]n light of all of this, it seems to us the district court could very well conclude that a royalty of 3% of Mor-Flo's net sales is reasonable."[68]

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51 *Id.* at 1556.

52 *Ibid.*

53 *State Industries, Inc. v. Mor-Flo Industries, Inc.* 883 F. 2d 1573, 1575 (Fed. Cir. 1989).

54 *Ibid.*

55 *Id.* at 1576.

56 *Ibid.*

57 *Id.* at 1575-1576.

58 *Id.* at 1580.

59 *Id.* at 1576.

60 *State Industries, Inc. v. Mor-Flo Industries, Inc.*, Nos. CIV-2-84-276 and CIV-2-85-26, 1988 WL 281580 (E.D. Tenn. Jul. 21, 1988), at *5.

61 *State Industries, Inc.,* 883 F. 2d at 1576.

62 *Ibid.*

63 *Id.* at 1580.

64 *Id.* at 1580-1581.

65 *Ibid.*

66 *Id.* at 1580.

67 *Id.* at 1580-1581.

68 *Id.* at 1581.

In response to State's requested royalty rate of 8% to 10%, the Federal Circuit commented on the requested royalty rate relative to the profits the licensee could earn from noninfringing alternatives, noting that "notwithstanding State's asserted hope to license the method in the 8 to 10% range, it was well within the district court's province to conclude it would not have succeeded, that potential licensees would have stayed with lesser alternatives promising some profit, rather than risk losing money by signing on at that high rate."[69]

In *Lindemann v. American Hoist* (Fed. Cir. 1990), the asserted patent covered hydraulic scrap shears.[70] In this case, the plaintiff had never sold its invention in the United States,[71] and its "sole source of evidence on the damages amount came from its expert, [its] patent attorney."[72] The plaintiff's patent attorney "gave his opinion that a reasonable royalty would be 75%-85% of AmHoist's targeted gross profit, yielding a royalty rate of 20%-25% of the net selling price of the entire machine and sales of spare parts."[73]

The district court granted the plaintiff "nominal" damages of $10,000. In reaching this determination, the district court held that "it can do no more than render substantial justice. Plaintiff's damages calculations are based on the infringer's anticipated profits which bear no relationship to the actual profits. Alternatively, Defendant's damage calculations are based on the anticipated net profits on the sale of the split ram as an option"; and found that this "presents an unacceptable solution given the existing case law" and thus awarded the nominal amount of $10,000.[74]

On appeal, the Federal Circuit found that "the paucity of Lindemann's evidence makes its challenge to the amount of the [royalty] award difficult to understand when an award far less than $10,000 would have been supported by the evidence."[75] The court also found that the plaintiff "failed to carry its burden of proving that its proposed royalty would be reasonable"[76] and noted that the patent damages statute "does not mean that a patentee who puts on little or no satisfactory evidence of a reasonable royalty can successfully appeal on the ground that the amount awarded by the court is not 'reasonable.'"[77] Reiterating that the plaintiff had not met its burden, the Federal Circuit held that the damages opinion testified to by the plaintiff's patent attorney "was based on a nonexistent or at best woefully incomplete understanding of the market and on an estimate of anticipated profits that bore no relation to actual profits, [the patent attorney] having no knowledge of the latter."[78]

As summarized by the Federal Circuit, the plaintiff's patent attorney also erroneously testified "that courts do not consider actual net profits 'in these [hypothetical negotiation] situations.'"[79] Even though it sought a royalty of 20% to 25% of the net sales price, the plaintiff, in one of its briefs, admitted that the defendant's anticipated net profit was 15%. Given this admission, the Federal Circuit stated that the plaintiff's "opinion that AmHoist 'would agree to pay a royalty in excess of what it expected to make in profit' was, in light of all the evidence in this case, absurd."[80]

This case is instructive in that the Federal Circuit did not state that a royalty rate could not exceed the defendant's profit margin. Rather, the court emphasized repeatedly that the plaintiff had not met its burden in demonstrating that a royalty award of more than the district court's "nominal" amount of $10,000 was inappropriately low. The case is instructive also in distinguishing between actual profits and anticipated profits, which can be relevant to determining a reasonable royalty.

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69 *Ibid.*

70 *Lindemann Maschinefabrik v. American Hoist & Derrick Co.*, 895 F. 2d 1452, 1455 (Fed. Cir. 1990).

71 *Id.* at 1455.

72 *Lindemann Maschinefabrik v. American Hoist & Derrick Co.*, 895 F. 2d 1403, 1404 (Fed. Cir. 1990).

73 *Ibid.*

74 *Id.* at 1404-1405.

75 *Id.* at 1405.

76 *Id.* at 1406.

77 *Id.* at 1407.

78 *Id.* at 1407-1408.

79 *Ibid.*

80 *Id.* at 1408 (Fed. Cir. 1990), citing *Hanson v. Alpine Valley Ski Area, Inc.* 718 F.2d, 1081, 219 USPQ 679, 6945-85 (Fed. Cir. 1983).

In *Monsanto v. Ralph* (Fed. Cir. 2004), the plaintiff asserted patents for "recombinant gene sequences that can be inserted into plant seeds to protect them against the effects of glyphosate-based herbicides."[81] The defendant was alleged to have infringed the patents-in-suit for use in various seed types. It merits mention that there was a disagreement between the plaintiff and defendant as to what the reasonable royalty was for. In purchasing the seed from Monsanto, the defendant agreed, at a high level, to not save any seed for planting in the next crop year, and the parties executed a Technology Agreement.[82]

The Technology Agreement contained a Technology Fee of $5.00 per bag for soybean seed and $112.80 per bag for stacked-trait cottonseed.[83] The defendant argued that the Technology Fee was an established royalty.[84] The Federal Circuit agreed in a limited sense, stating that the "Technology Fee is a royalty, to be sure, but it is a royalty for only a narrow, contractually agreed-upon, use of the seed"; and the "Technology Fee is therefore not an established royalty for planting or transferring saved seed, the uses that Ralph made of the patented invention."[85]

The jury returned a royalty per bag based on the seed type: $55.04 per bag of soybean seed, $548 per bag for cottonseed, $52.12 per bag for soybean seeds, $556.80 per bag for cottonseed (a different year's seed), and $1,113.36 per bag for additional bags of cottonseed that the defendant transferred to another party.[86] Monsanto asserted that the royalties were "all reasonable royalties for licenses to save and replant for a single year; and that $1113.36/bag is a reasonable royalty for a license to save and transfer cottonseed, notwithstanding the fact that Monsanto would not agree to ever grant any such unlimited licenses."[87]

The defendant did not have its damage expert testify at trial,[88] and on appeal the defendant argued the district court "erred by refusing to limit damages to a reasonable royalty for the use that he actually made of the seed, rather than for the uses that he could potentially have made."[89] The defendant also argued that "a reasonable royalty deduced through a hypothetical negotiation process can never be set so high that no rational self-interested wealth-maximizing infringer acting *ex ante* would ever have agreed to it."[90] The defendant asserted that under *Georgia-Pacific*, "an infringer be given a reasonable opportunity *ex ante* to make a profit"[91] and that "no sane farmer would ever negotiate a royalty in excess of his anticipated profits."[92]

In response, the Federal Circuit acknowledged that "an infringer's anticipated profit from use of the patented invention is '[a]mong the factors to be considered in determining' a reasonable royalty" under *Georgia-Pacific*. However, the Federal Circuit reiterated that "the law does not require that an infringer be permitted to make a profit."[93] The Federal Circuit concluded that "the jury's determination on reasonable royalties was supported by the evidence of record and was properly accepted by the district court."[94]

In *Golight v. Wal-Mart* (Fed. Cir. 2004), the asserted patent was "for a wireless, remote-controlled, portable search light."[95] The district court applied a royalty rate of $31.80 per unit. This royalty rate was the rate presented by the plaintiff's damages expert. The expert determined this rate by "constructing a hypothetical licensing negotiation and determining that if

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81 *Monsanto Co. v. Ralph*, 382 F. 3d 1374, 1377 (Fed. Cir. 2004).

82 *Ibid.*

83 *Ibid.*

84 *Id.* at 1383.

85 *Ibid.*

86 *Id.* at 1379.

87 *Id.* at 1383.

88 *Ibid.*

89 *Id.* at 1383-1384.

90 *Id.* at 1383.

91 *Ibid.*

92 *Id.* at 1384.

93 *Ibid.*

94 *Ibid.*

95 *Golight, Inc. v. Wal-Mart Stores, Inc.* 355 F. 3d 1327, 1329 (Fed. Cir. 2004).

forced to settle on a royalty rate, Golight and Wal-Mart would have reached a rate equal to 50% of Golight's incremental profit."[96] In reaching its royalty rate determination, the district court pointed to specific *Georgia-Pacific* factors as favoring a higher royalty rate. The district court, citing *State v. Mor-Flo*, stated that "the fact that a hypothetical royalty is not based on the infringer's actual or projected profits does not make the award unreasonable; there is no rule that the royalty not exceed the infringer's net profit margin."[97]

Wal-Mart argued in its appeal that the royalty was too high, as it would have resulted in Wal-Mart selling the accused product below cost. Wal-Mart further argued that "it could not have raised the price of its products to cover the cost of the royalty because it was already selling the products at a loss."[98] Wal-Mart proposed that the royalty be capped at $8.00 per unit, which was Wal-Mart's forecasted profit for the accused product.[99] Wal-Mart presented no expert testimony on a reasonable royalty, and the Federal Circuit commented that the "evidence Wal-Mart relies on for its position is sparse, comprising a few pages of sales data, the testimony of one witness stating the cost of production of the [accused] device, and … testimony of a Sam's Club manager."[100] The Federal Circuit upheld the royalty rate determined by the district court. Also citing *State v. Mor-Flo*, the Federal Circuit reiterated that "[t]here is no rule that a royalty be no higher than the infringer's net profit margin." The Federal Circuit found that "Wal-Mart's evidence in this case establishes nothing more than what it might have preferred to pay, which is not the test for damages."[101]

The Federal Circuit acknowledged $8.00 per unit was Wal-Mart's forecasted profit but did not further address the royalty rate of $31.80 against Wal-Mart's forecasted profit as opposed to actual profit. It is unclear if the Federal Circuit was swayed by the "sparse" nature of Wal-Mart's evidence, or if the Federal Circuit would have ruled differently had Wal-Mart presented different evidence.

In *Mars, Inc. v. Coin Acceptors, Inc*. (Fed. Cir. 2008), the asserted patents related to "technology used in vending machines to authenticate coins."[102] Based on an analysis of the *Georgia-Pacific* factors, the district court issued a "blended 7% royalty rate for the two patents" at issue.[103] The defendant appealed the 7% royalty rate imposed by the district court.[104] The defendant argued that the district court erred by relying on its incremental profit rather than its operating profit to calculate a reasonable royalty.[105] The district court found that the market for coin changers was "very profitable."[106]

The Federal Circuit upheld the district court's finding. With respect to the defendant's position on the royalty rate being too high, the Federal Circuit commented that "we reject Coinco's argument that a reasonable royalty can never result in an infringer operating at a loss."[107] Citing *Monsanto* and *State*, the Federal Circuit reiterated that while the infringer's anticipated profit is among the factors to be considered when determining a reasonable royalty, the infringer is not required by law to be permitted to make a profit ("There is no rule that a royalty be higher than the infringer's net profit margin").[108]

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96 *Golight, Inc. v. Wal-Mart Stores, Inc*. 216 F. Supp. 2d 1175, 1189 (D. Col. 2002).

97 *Id*. at 1182.

98 *Golight, Inc. v. Wal-Mart Stores, Inc*. 355 F. 3d 1327, 1338 (Fed. Cir. 2004).

99 *Ibid*.

100 *Ibid*.

101 *Ibid*.

102 *Mars, Inc. v. Coin Acceptors, Inc*., 527 F. 3d 1359, 1363 (Fed. Cir. 2008).

103 *Id*. at 1364.

104 *Id*. at 1365.

105 *Id*. at 1372. The defendant presented two other arguments that the royalty rate was too high. The defendant argued that the "district court erred by awarding a reasonable royalty rate higher than the cost … of implementing acceptable noninfringing alternatives" and that the royalty rate could not exceed 4% given the plaintiff's representations to a government tax authority. The Federal Circuit rejected both arguments. In rejecting the argument that the acceptable noninfringing alternative argument is a limit on the reasonable royalty, the Federal Circuit stated that "an infringer may be liable for damages, including reasonable royalty damages, that exceed the amount that the infringer could have paid to avoid infringement." *Id*. at 1373.

106 *Id*. at 1374.

107 *Ibid*.

108 *Ibid*.

In *Douglas Dynamics, LLC v. Buyers Prod. Co.* (Fed. Cir. 2013), the plaintiff asserted various patents related to snowplow mounting assemblies.[109] The plaintiff and defendant competed against each other.[110]

The Federal Circuit vacated the district court's royalty rate for two reasons. The royalty rate was based on application of "the infamous 25% rule of thumb," and "the district court clearly erred by limiting the ongoing royalty rate based on Buyers's profit margins."[111] The Federal Circuit added that "the district court clearly erred by ensuring the ongoing royalty rate it awarded would 'leave some room for profit' by Buyers at its current prices."[112] Citing *Golight*, the Federal Circuit restated that it "has held that an infringer's net profit margin is not the ceiling by which a reasonable royalty is capped."[113] The Federal Circuit further stated that the "infringer's selling price can be raised if necessary to accommodate a higher royalty rate, and indeed, requiring the infringer to do so may be the only way to adequately compensate the patentee for the use of its technology."[114]

Aqua Shield v. Inter Pool Cover Team et al. (Fed. Cir. 2014), is distinct from the other cases discussed thus far. In this case, the royalty rate (set by the district court) did not exceed the defendants' profit margin. Nevertheless, *Aqua Shield* is instructive as, on appeal, the Federal Circuit addressed the issue of actual profits and anticipated profits and held that what an "infringer could profitably pay by going about its business in its particular way does not set the market value that the hypothetical negotiation aims to identify."[115]

The asserted patent in this case claimed "enclosures designed to cover pools or create sun rooms."[116] The district court awarded a royalty of $10,800, which was calculated by multiplying infringing sales of $2,700,000 by a 5% net profit margin to yield net profits of $135,000. On this amount, the court applied a royalty of "eight percent to reflect the *Georgia-Pacific* considerations that pointed toward a higher royalty"[117] to reach the royalty amount of $10,800. In determining the royalty rate, the district court considered specifically the benefits of the patented invention "while still allowing Defendants a profit on infringing sales."[118]

The plaintiff argued that, absent other evidence to determine a royalty, the district court could consider the defendants' profits. The plaintiff asserted that the defendants' "net profit on infringing sales ranged from 12% to 39%."[119] Upon review of these figures, the district court observed that the plaintiff's asserted net profit "figure does not represent a credible net profit figure because it reflects only transaction expenses related to the sale of each individual infringing [product]. It does not reflect company-wide salaries or non-transaction related overhead."[120] The district court concluded that "the percentages that Plaintiff cites are not accurate net profit figures" and that it could not "rely on these figures to represent Defendants' net profit in determining a reasonable royalty."[121]

On appeal, the plaintiff challenged the district court's royalty-award methodology. The plaintiff challenged how the district court applied the *Georgia-Pacific* approach to arrive ultimately at the reasonable royalty damages.[122] The Federal Circuit found that the "district court correctly noted that the infringer's actual profits earned during the period of infringement

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109 *Douglas Dynamics, LLC v. Buyers Prod. Co.*, 717 F. 3d 1336, 1338 (Fed. Cir. 2013).

110 *Ibid.*

111 *Id.* at 1346.

112 *Ibid.*

113 *Ibid.*

114 *Ibid.*

115 *Aqua Shield v. Inter Pool Cover Team et al.*, 774 F. 3d 766, 771 (Fed. Cir. 2014).

116 *Id.* at 770.

117 *Ibid.*

118 *Ibid.*

119 *Aqua Shield, Inc. v. Inter Pool Cover Team et al.,* No. 2:09-CV-13 TS, 2013 WL 6410975, at *6.

120 *Ibid.*

121 *Ibid.*

122 *Aqua Shield v. Inter Pool Cover Team et al.*, 774 F. 3d 766, 770 (Fed. Cir. 2014).

can be relevant to the inquiry … but it erred in the use it made of [the] profit figures."[123] The Federal Circuit, citing *Dowagiac v. Minn. Moline (S. Ct. 1915)*, stated that the "'value of what was taken'—the value of the use of the patented technology—measures the royalty."[124]

The Federal Circuit addressed the issue of actual and anticipated profits again by adding that:

> … [w]hat an infringer's profits actually turned out to have been during the infringement period may be relevant, but only in an indirect and limited way—as some evidence bearing on a directly relevant inquiry into anticipated profits. Thus, when the infringer is a profit-making enterprise, a reasonable royalty is the amount that 'a person, desiring to manufacture[, use, or] sell a patented article, as a business proposition, would be willing to pay as a royalty and yet be able to make[, use, or] sell the patented article, in the market, at a reasonable profit.[125]

The Federal Circuit went on to state that in:

> … hypothetical-negotiation terms, the core economic question is what the infringer, in a hypothetical pre-infringement negotiation under hypothetical conditions, would have anticipated the profit-making potential of use of the patented technology to be, compared to using non-infringing alternatives. If a potential user of the patented technology would expect to earn X profits in the future without using the patented technology, and X + Y profits by using the patented technology, it would seem, as a prima facie matter, economically irrational to pay more than Y as a royalty—paying more would produce a loss compared to forgoing use of the patented technology.[126]

The Federal Circuit held that the "hypothetical negotiation is hypothetical not only because, in the typical case, no successful pre-infringement negotiation ever occurred, but also because the negotiation is constructed on hypothetical assumptions."[127] One such assumption, "bearing particularly on the anticipated-profits inquiry, abstracts away from the particular infringer's degree of efficiency."[128] The Federal Circuit held that "[a]n especially inefficient infringer—*e.g.,* one operating with needlessly high costs, wasteful practices, or poor management—is not entitled to an especially low royalty rate simply because that is all it can afford to pay without forfeiting or unduly limiting its profit if it uses the patented technology rather than alternatives. Thus, the royalty the particular infringer could profitably pay by going about its business in its particular way does not set the market value that the hypothetical negotiation aims to identify."[129]

In reaching its decision, the Federal Circuit noted that "two points are key. First, anticipated incremental profits under the hypothesized conditions are conceptually central to constraining the royalty negotiation, as recognized in *Trans-World Mfg* [130]… Second, '[e]vidence of the infringer's actual profits generally is admissible as probative of his anticipated profits.'"[131] The Federal Circuit concluded that "the district court did not err in considering [defendant's] profits. But it did err in treating the profits [defendant] actually earned during the period of infringement as a royalty cap. That treatment incorrectly replaces the hypothetical inquiry into what the parties would have anticipated, looking forward when negotiating, with a backward-looking inquiry into what turned out to have happened."[132]

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123 *Ibid.* referencing *Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.* 750 F. 2d 1552, 1568 (Fed. Cir. 1984).

124 *Ibid.*

125 *Ibid.* citing *Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.* 750 F. 2d 1552, 1568 (Fed. Cir. 1984) (internal quotations omitted, brackets in originally quoted text).

126 *Id.* at 770-771.

127 *Id.* at 771.

128 *Ibid.*

129 *Id.* at 771.

130 *Id.* at 772. Here, the Federal Circuit cited its earlier ruling in *Trans-World Mfg.*, 750 F. 2d at 1568 (Fed. Cir. 1984), in which it stated that "[a]mong the factors to be considered in determining [the reasonable royalty] is the infringer's anticipated profit from use of the patented invention" and that "[e]vidence of the infringer's actual profits generally is admissible as probative of his anticipated profits."

131 *Ibid.* citing *Interactive Pictures Corp. v. Infinite Pictures, Inc.*, 274 F.3d 1371, 1385 (Fed. Cir. 2001) and referencing *Sinclair Ref. Co. v. Jenkins Petrol. Process Co.*, 289 U.S. 689, 698, 53 S.Ct. 736, 77 L.Ed. 1449 (1933) and *Lucent*, 580 F.3d at 1333.

132 *Ibid.* citing *Interactive Pictures Corp.* at 1385, commenting that "expectations govern, not actual results."

Another distinction the Federal Circuit drew was that the:

> ... district court's analysis also incorrectly replaces the inquiry into the parties' anticipation of what profits would be earned if a royalty (of amounts being negotiated) were to be paid with an inquiry into what profits were earned when [defendant] was charging prices without accounting for any royalty. Thus, the district court seems to have simply assumed that any royalty paid by [defendant] would have directly reduced its profits, dollar for dollar. But that would not be true, in general, if [defendant] could have raised its prices (over what it actually charged for infringing sales) to account (fully or partly) for a royalty payment.[133]

In this respect, the "district court did not find, and [defendant] has not argued here, that [defendant] was selling in a perfectly competitive market in which it was forced to act as a pure price-taker. We have not been shown proof that this case is different from the typical one in which pricing might be adjusted to account for a royalty based on sales price."[134] The Federal Circuit also cited its ruling in *Douglas Dynamics* (2013) regarding the infringer's ability to raise its selling price to accommodate a higher royalty rate.[135] The Federal Circuit vacated the district court's royalty calculation, drawing attention to its "correction of the [district court's] erroneous focus on the net profits [defendant] *actually* earned."[136]

VI. Summary

Based on the cases reviewed, it does not appear that the Federal Circuit has explicitly set forth how the hypothetical negotiation should unfold where there is no bargaining range (i.e., the licensee's willingness to pay is less than the licensor's willingness to accept).[137]

The practitioner may consider whether the infringer's business practices artificially constrain the profits on the infringing product. From an economic perspective, an important question is why the infringer's profitability is lower than the patentees. This may occur due to various circumstances. To take one example, consider the scenario where the defendant sells various products and the infringing product is a "loss leader." In this case, the defendant may unprofitably sell the infringing product because customers for the infringing product also purchase more profitable, noninfringing products and/or services. In such case, constraining the royalty given the infringing product's lack of profitability would result in a royalty that is not commensurate with the value of the patented invention to the infringer. In such case, the practitioner can evaluate carefully the impact of convoyed sales on the royalty rate (i.e., *Georgia-Pacific* factor 6).

Also, consider another example where the infringing product (or service) is given away by the infringer to (potentially) reap the benefit of obtaining network effects through an increased base of users/subscribers. The infringer may desire to leverage the subscriber/user base to generate advertising revenues or sell noninfringing products or services. Still another situation could arise where multiple defendants infringe, and although the patented technology is valuable, its economic value and positive impact on an individual infringer's profitability is diluted due to widespread infringement (i.e., "tragedy of the commons").[138]

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133 *Id.* at 772.

134 *Ibid.* (original italics omitted).

135 *Id.* at 772-773.

136 *Id.* at 773 (italics in original).

137 The Federal Circuit does not require use of the hypothetical negotiation framework. As the Federal Circuit stated, "[a] reasonable royalty can be calculated from an established royalty, the infringer's profit projections for infringing sales, or a hypothetical negotiation between the patentee and infringer." See *Wordtech Sys. V. Integrated Network Solutions, Inc.*, 609 F. 3d 1308, 1319 (Fed. Cir. 2010).

138 Related to this point, in *Seymour v. McCormick*, 57 U.S. 480, 489 (S. Ct. 1854), Justice Grier commented that "[a] man who invents or discovers a new composition of matter, such as vulcanized India rubber, or a valuable medicine, may find his profit to consist in a close monopoly, forbidding any one to compete with him in the market, the patentee being himself able to supply the whole demand at his own price. If he should grant licenses to all who might desire to manufacture his composition, mutual competition might destroy the value of each license"; and "[i]f any person could use the invention or discovery by paying what a jury might suppose to be the fair value of a license, it is plain that competition would destroy the whole value of the monopoly." Although the applicable patent damages statute was the Patent Act of 1836 at the time of this case, and the justice's comments are oriented toward the impact of widespread licensing, the same basic principle elucidated by Justice Grier may also hold in the case of widespread infringement prior to infringers taking a license.

Also, the parties may, in fact, have a viable bargaining range if the infringer is not a price taker and can pass on all or part of the royalty expense to customers. As noted earlier, the Federal Circuit has stated that the "infringer's selling price can be raised if necessary to accommodate a higher royalty rate, and indeed, requiring the infringer to do so may be the only way to adequately compensate the patentee for the use of its technology."[139] If the defendant's position is that it could not raise prices, this position might be supported by evidence demonstrating the defendant is in effect a price taker, although it is unclear whether being a price taker alone would be dispositive of an infringer's inability to pay a royalty in excess of its profits on the infringing product.

As discussed throughout this paper, it is useful to examine evidence of the infringer's anticipated profits. If no evidence to this effect is in the record, it may be possible to obtain useful information in the public domain, although care should be taken to confirm that information is, in fact, pertinent to the defendant's business and an appropriate comparator. As noted earlier, the bargaining range at the hypothetical negotiation is not limited by the infringer's present-day profitability, and a viable bargaining range may have existed at the time of the hypothetical negotiation, as the parties may have considered the infringer's anticipated profits.

If still no bargaining range exists, the practitioner can of course employ other accepted methods of determining a reasonable royalty. There is always the possibility, however, that other methods may prove no more fruitful depending on the case-specific facts and information. Thus, a patentee may take a conservative approach and seek a royalty less than its willingness to accept; however, such behavior may be suboptimal from an economic perspective. Alternatively, a patentee may take solace from the Federal Circuit's holding in *Golight* that what the defendant would "prefer[] to pay … is not the test for damages."[140] At the same time, a patentee must ensure that the royalty reflects the value of the patented invention and that damages are tied carefully to the claimed invention's footprint in the marketplace.[141]

To the author's knowledge, the Federal Circuit has not ruled on the determination of a royalty rate exceeding the defendant's willingness to pay where it is indisputable that no viable bargaining range exists. It is unclear how one should reconcile a situation in which (1) the royalty is tied appropriately to the value of the claimed invention, (2) said royalty exceeds the licensee's (anticipated) profits, (3) the licensee has no economically viable way of accommodating the royalty without reducing profitability further (e.g., passing the royalty expense to customers, increases in operational efficiency), (4) the parties must reach a licensing agreement, and (5) the parties' positions are supported appropriately by evidence and testimony. Against these criteria, perhaps *Golight* is most instructive, although the Federal Circuit commented in its ruling that the "evidence Wal-Mart relies on for its position is sparse, comprising a few pages of sales data, the testimony of one witness stating the cost of production of the [accused] device, and … testimony of a Sam's Club manager."[142] It is unclear how the court would have ruled in *Golight* with a different and expanded set of information presented to it.

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139 *Douglas Dynamics, LLC v. Buyers Prod. Co.*, 717 F. 3d 1336, 1346 (Fed. Cir. 2013).

140 *Ibid.*

141 *ResQNet v. Lansa, Inc.*, 594 F.3d 860, 869 (Fed. Cir. 2010). The need to apportion patent damages should be considered in each case, particularly where the accused product is a multi-component product.

142 *Golight, Inc.*, 355 F. 3d 1327, 1338 (Fed. Cir. 2004).

Finally, this article has not directly addressed potentially important determinants of a reasonable royalty, such as application of the *Georgia-Pacific* factors, apportionment, the availability and cost of acceptable noninfringing alternatives, and the existence of comparable licenses. The practitioner should carefully draw reasonable royalty conclusions based on the case-specific evidence, facts, and circumstances. The infringer's profit is but one potential input into this analysis.[143]

143 While the Federal Circuit has allowed a royalty rate to exceed the infringer's profit margin, the court has indicated that proposed royalties that also eliminate an infringer's revenues might be subject to exclusion. In *WesternGeco LLC v. Ion Geophysical Corp.*, 791 F. 3d 1340 (Fed. Cir. 2015), the plaintiff's damages expert presented a reasonable royalty in which the royalty base was not the defendant's revenues, but rather the revenues of the defendant's customers. Under the proposed damages theory, the defendant would have paid royalties in excess of its profits and even its own revenues. The district court excluded the expert, and the Federal Circuit upheld, noting that the district court "expressly based its ruling on two facts – that the royalty was profit eliminating and that it was revenue eliminating." (WesternGeco was subject to further proceedings before the Federal Circuit and the Supreme Court; however, those proceedings did not address the narrowly defined reasonable royalty issue quoted here.)

INTELLIGENCE THAT WORKS

Hybrid Productivity Measurement in Hospitals

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Abstract

The traditional productivity model used in hospitals relies on a worked hours per unit of service (WHPUOS) metric to determine target staffing levels appropriate for given levels of volume. In this model, the amount of total staff required is assumed to be proportional to department output volume.1, 2 A common criticism of this model is that positions in many departments do not vary proportionately with volume (e.g., managers, educators, analysts). This paper explores an alternative model that accommodates fixed staff in productivity measurement. This alternative model predicts more accurately staffing need for a given level of department output.

1 Patterson, P., "Benchmarking labor productivity: How is your OR being compared?" OR Manager 29(3) (2013): 1–5, available at: https://www.ormanager.com/download.php?pid=6627

2 Kirby, K., "Hours per Patient Day: Not the Problem, Nor the Solution," *Nursing Economics* 33(1) (2015): 64–66, available at: https://www.nursingeconomics.net/necfiles/2015/JF15/64.pdf

Traditional Model of Productivity

A key objective of hospital finance leaders is to maintain a positive profit margin across their organizations. Doing so necessarily requires managing labor costs in relation to revenues. The primary financial metric used to measure this objective is labor cost as a percentage of operating revenue. At a departmental level, a proxy for this is the ratio of productive hours (worked hours) to department volume. This metric ("worked hours per unit of service" or WHPUOS) is monitored regularly to ensure labor resources are utilized in proportion to demand.

The traditional model of productivity measurement assumes a department is either entirely fixed (i.e., staff is invariant with volume changes) or entirely variable (i.e., all staff varies in proportion to volume changes). In variable departments, when actual volume is below the projected level used to build the productivity target, the traditional variable model tends to show overstaffing relative to actual. This is because most variable departments contain at least some fixed staff. Because the level of fixed staff remains constant, even if the variable staff is flexing to volume, the percent decrease in volume is greater than the overall percent decrease of the staff. Conversely, when volume is above the projected level, the traditional model tends to show understaffing relative to actual.

Consider the simple example of a radiology department with one fixed manager position (invariant with exam volume, and assumed to be one full-time equivalent below) and technical staff that flexes perfectly with exam volume.

Table 1. Example Traditional Productivity Model

		WORKED FTEs[3]			WHPUOS[4]	
Pay Period	**Volume**	**Manager**	**Rad. Techs**	**Total**	**Rad Tech**	**All Staff**
Projected	*1,600*	*1.0*	*10.0*	*11.0*	*0.500*	*0.550*
1	1,280	1.0	8.0	9.0	0.500	0.563
2	1,520	1.0	9.5	10.5	0.500	0.553
3	1,600	1.0	10.0	11.0	0.500	0.550
4	1,680	1.0	11.0	12.0	0.500	0.545

Note, first, that that the technical staff productivity in each of the four pay periods is exactly equal to its target (0.500 hours per exam). Due to the fixed manager position, when volume is below the projection used to set the productivity target, total WHPUOS is above the target of 0.550. The converse is true when volume is above the projection. The traditional model of productivity gives senior leadership an inaccurate picture of how the department is operating. While technical staff is being flexed perfectly with volume, the total WHPUOS shows varying levels of productivity.

Going one step further, the above example does not reflect the fact that the manager of the department would take paid time off (PTO) periodically, which would also impact the WHPUOS. If the productivity target were built with an assumed PTO factor, the department would appear overstaffed where the manager is *not* on PTO, all else equal. Moreover, some positions are "backfilled," which means that the position is filled with another staff member when PTO is taken. Whether or not the position is backfilled will impact the total FTE need significantly. A more robust model of productivity must accommodate variable, backfilled, and non-backfilled staff.

3 Full-time equivalent (FTE) represents the number of hours worked by a full-time employee in a given time period.

4 A standard pay period has eighty hours. The radiology tech WHPUOS is calculated as worked FTEs × 80 / volume.

Benefit of a Hybrid Model

Healthcare organizations have deployed several techniques to address the measurement issues inherent in the traditional model of productivity measurement. One approach employed by organizations that want to keep labor costs consolidated to a single department is to "exclude" the fixed labor from productivity measurements. In the radiology example above, the technical staff would be measured against 0.500 hours per exam. A shortcoming of this approach is that the hours of the fixed staff (in this case, the manager) are not monitored at all by the productivity system. Another technique commonly used is to create additional cost centers. In the radiology example above, an organization may create a "radiology administration" cost center for the manager. While this approach would address the productivity measurement issue illustrated, it would create additional work for the finance department to manage an ever-expanding general ledger when this concept is applied broadly.

A hybrid model of productivity measurement accounts for both variable and fixed staff such that organizations can optimize their general ledgers for financial reporting, while ensuring labor costs are appropriately managed. In pay period 1 of the example above, the traditional model would conclude that staffing was 2% above target, while the hybrid model would show more accurately that staffing was in line with the projection.

In addition to improved accuracy, the hybrid model provides additional insight into a department's productivity. Where traditional models would show that a department is over- or underproductive, a hybrid model provides productivity results by staff grouping. This insight can be invaluable to a manager looking to fine-tune a staffing model.

In the following section, we will examine an outpatient physical therapy department composed of fixed and variable staff members.

Hybrid Model

A hybrid model of productivity considers three types of staff: variable FTEs, fixed-worked FTEs, and fixed-paid FTEs. The differentiation between the two types of fixed FTEs is the propensity to backfill (i.e., replace with other staff) when leave occurs. Fixed-worked positions are backfilled, causing the worked FTE of this group to be constant over time. An example of a fixed-worked position would be a security guard or an environmental service technician. Alternatively, a fixed-paid FTE would not be backfilled. This position would have a constant paid FTE over time. Examples of this position would be executives, educators, and analysts.

The target worked FTEs for a department is described by equation (1):

$$T_{Total} = T_{Variable} + T_{Fixed\_Worked} + T_{Fixed\_Paid} \quad (1)$$

Each component target worked FTEs is described by equations (2), (3), and (4):

$$T_{Variable} = \frac{[Variable\ Hours\ per\ Unit\ of\ Service\ Target]*[Pay\ Period\ Volume]}{80} \quad (2)$$

$$T_{Fixed\_Worked} = [Fixed\_Worked\ wFTE\ Target] \quad (3)$$

$$T_{Fixed\_Paid} = [Fixed\_Paid\ pFTE\ Target] * \frac{[Actual\ Fixed\_Paid\ wFTEs]}{[Actual\ Fixed\_Paid\ pFTEs]} \quad (4)$$

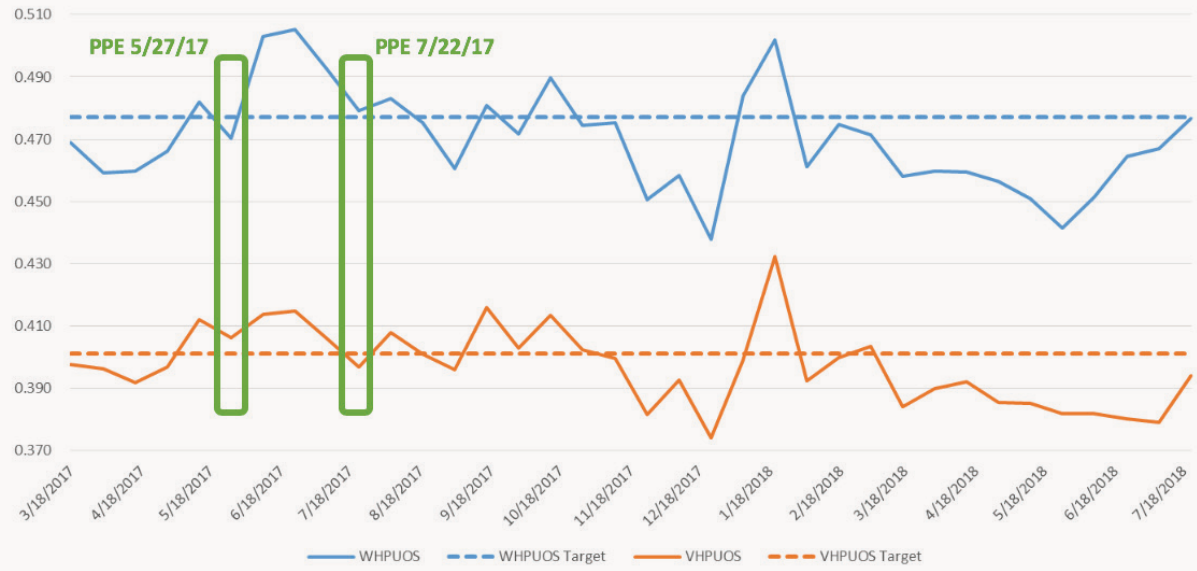
To start with a simple example, we review data from a hypothetical physical therapy department with rehab therapy techs (fixed-worked) and therapists (variable). We will expand this model to include a manager (fixed-paid) later in this section.

The hypothetical department is projected to have 4.5 rehab therapy tech FTEs, 24.1 therapist FTEs, and 4,800 units of volume (billed time units) per pay period. Therefore, the projected variable hours per unit of service is 0.401.[5] Using equations (1) through (4), the target worked FTEs for this department are described by equation (5):

$$T_{Total} = \frac{0.401*[Pay\ Period\ Volume]}{80} + 4.5 + 0 \qquad (5)$$

We will now examine conflicting productivity measurement results observed between the traditional and the variable portion of the hybrid model. Figure 1 compares the total WHPUOS to the variable hours per unit of service (VHPUOS) in our example. While the level of WHPUOS is higher than the level of VHPUOS, the pattern is similar over time. This similarity results because a large portion of the department is composed of physical therapists, which is a variable position.. Figure 1 graphs the WHPUOS in blue and the VHPUOS in orange.

Figure 1. Comparison of WHPUOS and VHPUOS

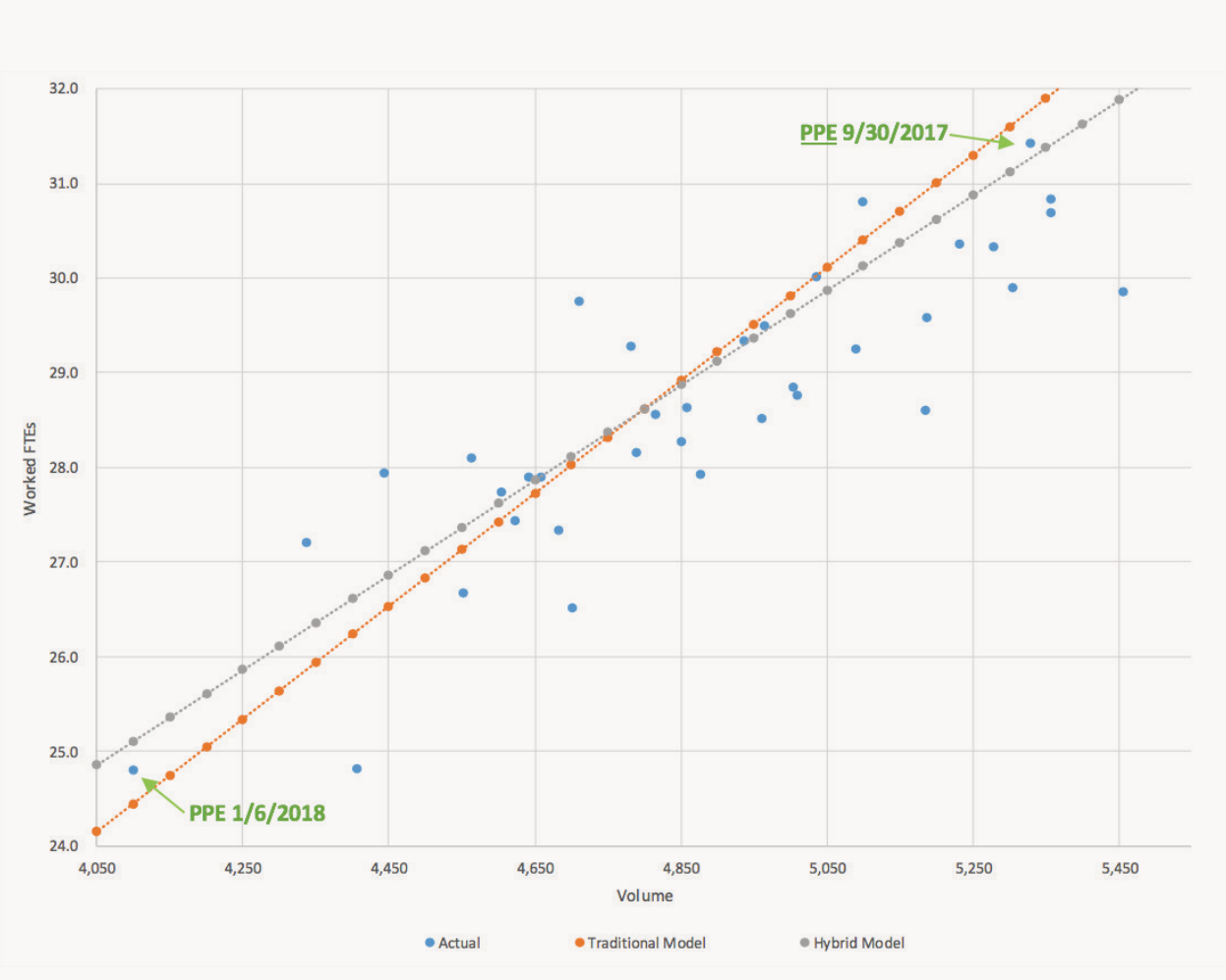


For several pay periods the qualitative results of the two models are not the same. In the pay period ending (PPE) 5/27/2017, VHPUOS (0.406) was above the target of 0.401. However, WHPUOS (0.470) was below the corresponding target because of the decreased level of rehab tech. The answer to the key question of "Is the staff flexing?" has been skewed in this pay period by decreased fixed staff.

Similarly, in the pay period ending 7/22/2017, volume was below projection, and the traditional model of productivity showed overstaffing. However, the VHPUOS line in Figure 1 shows that variable staff was flexed appropriately in this pay period and actually *outperformed* its target. Looking at only the variable staff, however, does not give the full picture of productivity. As shown below, the hybrid model combines both the fixed and variable components of the department.

5 Projected variable hours per unit of service is 0.401 = (24.08 therapist FTE × 80 hours in standard pay period) / (4800 units of volume during standard pay period).

In Figure 2, the orange line represents the set of combinations of volume and worked FTEs that exactly meet the traditional productivity target. The gray line is the corresponding line for the hybrid model represented in equation (5). Note the shallower slope in the hybrid model, reflecting the assumption that not all staff in the department flex to volume. Each blue dot represents actual worked FTEs and output for a pay period. Points above these lines represent an "overstaffed" situation, and points below represent an "understaffed" situation.



In the pay period ending 9/30/2017, volume is 11% above projection. Since the rehab techs do not flex, the traditional model (orange line) shows the department is understaffed. However, looking at the VHPUOS (0.403), we see that the technical staff is above its target. Since the rehabs techs in this pay period are close to projection, the overall conclusion of the hybrid model is overstaffing. In the pay period ending 1/6/2018, low volume caused the traditional model to produce an overstaffed result, while the hybrid model shows understaffing.

Adding a fixed-paid manager to the model requires a pay-period-specific PTO conversion factor to convert the paid target for this position into a worked FTE target. For example, in a pay period with no PTO for the manager, the worked target would be 1. If the manager were to take PTO for one week of the two-week pay period, the worked target would be 0.5. This adjustment allows the manager's FTE to be compared to a target with the other staff while still holding it to the projected paid FTE target.

Including the manager in the model changes the target worked FTEs in the hybrid model to equation (6):

$$T_{Total} = \frac{0.401*[Pay\ Period\ Volume]}{80} + 4.5 + 1.0 * \frac{[Actual\ Fixed\_Paid\ wFTEs]}{[Actual\ Fixed\_Paid\ pFTEs]} \qquad (6)$$

When adding a manager to the hypothetical department, the traditional model of productivity would calculate a WHPUOS target of 0.492 for the department that would include a 0.9 worked FTE for the manager, based on long-term PTO projection. When the manager takes little or no PTO, fixed-paid FTE creates the same challenge as the fixed-worked FTE (i.e., they do not flex to volume). However, since fixed-paid FTEs are not backfilled, in cases of PTO, an additional inaccuracy is presented.

An example of this is the pay period ending 8/5/2017. Because the manager takes time off, the traditional model shows a positive result (actual WHPUOS of 0.483, less than target of 0.492). From equation (6), the hybrid model calculates a target worked FTE of 30.1, which represents a negative result against the actual total worked FTEs of 30.8. By incorporating the actual PTO experience of the manager (in this case 100%), the hybrid model accurately reports the variances caused by the other two positions.[7]

Conclusion

By separating and accurately modeling the assumed behaviors of each staff type, the hybrid model offers a more accurate picture of departmental staffing. The simple assumptions of the traditional model can lead to erroneous findings that could lead to suboptimal business decisions. That said, in order to ensure the fixed positions remain appropriate, relative to volumes, a department's WHPUOS should be monitored over the long term.

6 Target worked FTEs = (.401)×5100/80 + 4.5 + 1.0×(0/1) = 30.1.

7 Rehab techs were 0.3 worked FTEs over their target, and the variable staff ran at a rate (0.408) that was less productive than their target (0.401).

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