

The Rise and Fall of Acoustical Panel Ceilings

KEITH PEIFFER

Oklahoma State University

The standard acoustical panel ceiling (APC) developed in the late 1950s and is still installed widely today. Since its inception, there has been a significant shift in architectural discourse on the APC, from being seen as a revolutionary system that was an instrument of modernity and progress to a common signifier of soul-sucking office environments less than 50 years later.

This paper will chronicle the rise and fall of the APC over the second half of the 20th century within office spaces. At its introduction into the market, the APC was a key technological development aiming to integrate building systems, support flexibility, and humanize the interior. Better yet, the APC promised to do all of this cheaply, quickly, simply, and beautifully, while requiring little maintenance. The use of the APC accelerated due to its easy adaptability over the next few decades. By the late 1990s, the APC appears to have failed to humanize the interior, with the office environments they graced seen as alienating and the ceiling system itself seen as “symbols of bland conformity.”

In 1999, there was a particular resonance and alignment between popular culture and architectural discourse with the release of three popular films—*Office Space*, *American Beauty*, and *Fight Club*—that marked the nadir of the APC. Each film featured a protagonist who overcomes the monotony of their banal office environment and the APC played a key role in setting this context. This telling of the APC’s story demonstrates the interplay between culture and architectural discourse and the ways that attitudes toward elements of architecture are constantly shifting.

The year 1999 saw the release of *Office Space*, *American Beauty*, and *Fight Club*, three well-known films with strikingly similar storylines. Each film follows a middle-aged white male protagonist who seeks escape from a soul-sucking corporate desk job. The backdrop against which each story unfolds is an office environment composed of the exact same elements—monotonous cubicles, cool fluorescent lighting, and endless acoustical panel ceilings—rendered with such consistency that these images suggest a specific cultural currency for this type of architectural space at the turn of the millennium.

This paper will focus on one of the building components setting the scene in these films, the standard acoustical panel ceiling (APC)¹ developed in the late 1950s and still installed widely today. Since its inception, there has been a significant shift in architectural discourse on the APC, from a revolutionary material as a symbol of modernity and progress to a common signifier of the insipid environment depicted in these films less than 50 years later. Of course, the meaning of the APC is complex, and the material continues to be used to quite different effects, but the following analysis will highlight part of the APC’s history as a story of exciting potential that ultimately resulted in the disappointment of unmet expectations – a story of “utopian promises, dystopian deliveries.”²

THE ACOUSTICAL PANEL CEILING

The APC is a specific form of suspended ceiling system composed of 2’x2’ or 2’x4’ modular acoustical panels supported by a metal suspension system hung from the floor or roof structure above. The acoustical panels are typically made of either mineral fiber or fiberglass with a fissured surface texture that is both aesthetic and performative in absorbing sound. While other versions of suspended ceilings were being explored during the 1950s and -60s, the APC with its exposed grid and lay-in panels became the type that is most commonly used today.

As the APC continues to assert its relevance in contemporary architecture, currently representing a \$1.5 billion industry,³ it is interesting as an example of a building material that achieved a broader cultural relevance while falling out of favor within architectural discourse. It is only because this ceiling system is so common in the U.S., forming the backdrop for so much of our interior lives, that it can be such a powerful cultural symbol.

PROMISE

Our familiarity with the APC obscures its innovative beginnings. In the introduction to *The Architecture of the Well-Tempered Environment*, Reyner Banham made a passing reference to the suspended ceiling as a truly revolutionary invention despite its significance being completely overlooked in disciplinary literature.⁴ Seeking to begin to fill in the gaps, Banham then dedicated nearly an entire chapter to the more general concept of the suspended ceiling as a “multi-purpose membrane of concealed power.”⁵ The significance of the suspended

ceiling was in its ability to integrate new building technology as a single armature for delivering conditioned air, lighting, fire protection, and acoustic absorption.

The suspended ceiling was designed to offer flexibility through standardization. In a 1952 issue of *Progressive Architecture* (PA), author Suzanne Sekey discussed new offices for Foote, Cone, & Belding and the U.N. Secretariat Building, both award-winning office interiors projects, as examples of the current trend toward standardization. In the former, all 170 private offices were designed to be identical, the individual module “perfected” and made more cost-effective through economies of scale. For the Secretariat, space allocation needed to be flexible, leading to a modular ceiling with regularly spaced light and air outlets to allow for reconfiguration.⁵ If the regular distribution proved inadequate for a desired new layout, lights and diffusers could be shifted to other locations in the grid relatively easily and inexpensively.

As developed in “Acoustical Panel Ceilings: Origins,” the emergence of the APC was driven by the confluence of specific, theoretical, historical, and technical developments. “The suspended ceiling was a materialization of the desire for complete integration of curtain wall, structure, and ceiling to create a flexible, universal space to facilitate the efficient activity of the corporation.”⁷ Integration within the suspended ceiling itself was often noted in architectural journals covering significant projects of the time, with images of the ceiling design included as notable aspects of documenting these projects.⁸

This integration was not seen as simply a technological advancement. In a special feature in *Architectural Record* on new trends in office design in 1945, the authors noted the modern office’s perceived ability to deliver spaces with “better light, better ventilation and better working conditions, but also improved and more cheerful surroundings.”⁹ Acoustical tile ceilings were notably included in their descriptions of spaces “planned for workers’ welfare,”¹⁰ spaces which ultimately led to improved effectiveness and efficiency. In rethinking corporate interiors, companies invested money into their workspaces for tax benefits, but also to get ahead of their competition in attracting and retaining valuable staff in anticipation of strong economic growth following the end of World War II.¹¹

Martin further links the shift in emphasis on the interior design with the development of the field of human relations (HR). HR’s original goal, despite current popular connotations of the field, was “to improve productivity by appealing to the employee’s sense of identification with the corporation.”¹² Through the implementation of HR practices, “workers... were themselves in the process of being converted from Taylorized machines into ‘humans,’ in recognition of the operative value of an empathic relation between manager and employee, clothed in the image of modernity.”¹³ The extension of scientific management from productivity in manual tasks to efficiency in the office reflected the broader goal of HR to nurture workers’ connections with the corporation as a form of managerial control. Workers were integrated socially into the corporation through appealing to the employee’s “humanity.” Martin clarifies that architects were not consciously applying HR principles in design, and argues that this strong correspondence is evidence of a larger organizational framework that caused these patterns to develop concurrently with one another.¹⁴

The APC as an image of modernity and progress is vividly rendered in its advertisements. In 1960, the Armstrong Cork Company introduced their Acoustical Fire Guard product, a lay-in ceiling system that was UL-approved to protect structural steel without the need for additional fire-resistance treatment. Armstrong’s current corporate history retroactively identifies this product as “the most important event in commercial ceilings history,” propelling Armstrong to “overnight recognition as the industry leader.”¹⁵ Modernist renderer Helmut Jacoby created renderings for ads for Acoustical Fire Guard, depicting the system’s assembly, applications, maintenance, and detailing. The advertisements highlighted the advantages of the exposed grid suspension system as “economy, fast installation, complete accessibility,”¹⁶ while offering a UL-approved assembly.

In the APC, there is a conceptual confluence between an industrialized product, itself a refinement of efficiency in manufacturing processes, and its use in spurring efficiency through the creation of an environment for work. The APC, as a symbol of modernity, had a lot to offer: able to integrate and efficiently deliver building services in a standardized way, support flexibility and reorganization in the office layout, humanize the



Figure 1. Renderings by Helmut Jacoby from the 1960 Acoustical Fire Guard advertisement. Credit: Armstrong World Industries.

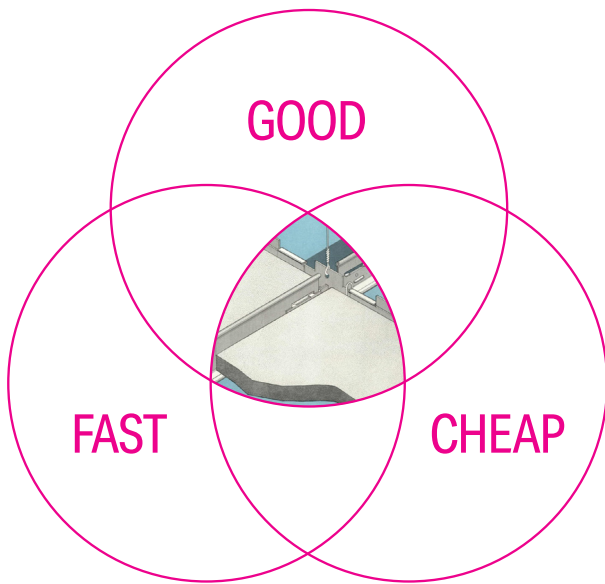


Figure 2. Good, fast, AND cheap. Credit: author.

interior environment through delivering better light and air, and strengthen the connection between employee and corporation. Maybe most importantly, the APC promised to do all of this cheaply, quickly, simply, and beautifully,¹⁷ while requiring little maintenance.

PROLIFERATION

As discussed above, high-rise office culture helped generate the conditions under which the APC developed and thrived. Demand for acoustical suspended ceilings grew quickly, resulting in a five-time increase in sales from 1947 to 1956.¹⁸ Eventually the use of a suspended ceiling in tandem with air-conditioning systems was considered standard practice, as advertisements from industry leader Carrier featured several sections showing common solutions for integrating perimeter mechanical units with suspended ceiling systems and exterior curtain walls.¹⁹ The use of suspended ceilings in offices was seemingly inevitable.

In his analysis of the curtain wall's relationship to corporate architecture, Martin deemphasizes the singular importance of any one building, rather seeing each precedent as an instance of the curtain wall switching "architectural channels."²⁰ This approach is consistent with the treatment of the 1950s office building in architectural publications of the time. In June 1957, *Progressive Architecture* published a special feature on the high-rise office building, emphatically declaring



Figure 3. The ubiquitous APC. Credit: author.

it "the best-known symbol of U.S. architecture today."²¹ The magazine then highlighted 12 recently completed projects, showing them as a group of similar projects featuring similar approaches with technical stats like gross floor areas, floor-to-floor heights, mullion spacing, and types of curtain wall and air-conditioning systems being the distinguishing features.²² The "science of the office"²³ was a standardized approach to the typology that became increasingly formulaic, and each new project became a new channel for the suspended ceiling.

By the early 1960s, the suspended ceiling reached near ubiquity, with Walter Netsch of SOM declaring the "suspended ceiling as the soft underbelly of US building."²⁴ Despite the promise associated with the suspended ceiling from the 1950s, architects began to become disenchanted with the system and look for ways to make it either more expressive or more technologically efficient.²⁵ Later, in 1967, *Architectural Record's* feature on the office building acknowledged that those commercial buildings constructed in the preceding decades that were not intended as prestige buildings for a single corporation were subject to "constraints of cheapness and standardization [that] were synonymous with economy."²⁶ During this time, there was a trend toward simplification in building components in pursuit of cost savings. The trend toward bad copies of notable 1950s high rise office buildings is well documented, but perhaps most striking is Mies' own acknowledgement of this reality: "Looking back over a

professional trajectory spanning almost half a century, instead of finding solace in the fact that his prophetic ideas had in large measure been realized, Mies observed the production of off-the-shelf buildings that so gratuitously paid obeisance to his work and wondered what had gone wrong.”²⁷

The tight modular correspondence between curtain wall, structural grid, ceiling system, and interior partitions, which reached a high point in projects like SOM’s Inland Steel and Union Carbide,²⁸ was less rigorously executed in other “channels.” While on the one hand the APC is constrained to the rigidity of the grid for its overall effect, it is also cheaply and easily adapted to the various contingencies of architecture on the other. The grid as lightweight T-bar is mutable as field modifications to address oversights in design and construction, lack of coordination, and construction tolerances. The APC as a system provides this adaptability through the use of a kit of parts, easily adapted to awkward conditions. The edge trim for the suspension grid can be cut to follow the ins and outs of the perimeter of the spaces, and the lay-in panels can be cut with a utility knife. The system is also adaptable to the vicissitudes of taste and preference, simply updated to keep changing with architectural sensibilities. In Armstrong’s APC offerings there was a shift in the 1970s and 1980s to deemphasize the grid and add new patterns, decoration, and even color to the product offering,²⁹ a trend that echoed the aesthetic interests of the transition to Postmodernism. APC’s continued use is also owed to the fact that the product never

included asbestos, unlike many of the innovative building products introduced at the same time.³⁰

APC’s ability to adapt to different conditions is evident in that nearly 2/3 of Armstrong’s current APC sales are for remodel and renovation projects. Almost sixty years after the introduction of Acoustical Fire Guard, Armstrong continues to lead the APC industry, responsible for about 53% of sales in the mineral fiber market with sales just over \$800 million in 2018. However, Armstrong recognizes the need to continue to revitalize the APC, investing \$100 million into innovating their mineral fiber products over the last five years, as well as expanding into architectural specialty ceilings so the company can deliver multiple ceiling types within a single project.

ALIENATION

The “humanizing” effect of mid-century office design was a prevalent theme in architectural criticism of the time. In one notable example, Lewis Mumford effusively praised Lever House upon its completion in 1952 for the building’s ability to humanize the office worker through a return to human scale, integration of air-conditioning, views and proximity to windows, and the interior decoration and use of color.³¹ Ironically, however, Mumford used an agricultural metaphor in comparing the module of the cubicle in Lever House for people to the stall for cows used as the fundamental unit of design within industrialized farms.



Figure 4. Analytical drawing of curtain wall grid structuring *Overexposed*. Credit: author.

Martin's analysis of the deployment of HR in the office reveals the tension between the ends and the means unwittingly demonstrated by Mumford. Despite the rhetoric of humanization, sociologist C. Wright Mills saw HR "as ideology, a false consciousness that could be stripped away to reveal the alienated, machinelike soul of the white-collar worker."³² This worker was identified by William H. Whyte as the "organization man," a figure that was "hopelessly and even comically conformist"³³ to his corporate environment, internalizing the logic of organization itself. This logic was manifested in both the architecture as well as the social dynamics of the office. Despite Whyte's optimistic outlook on the possibility for the organization man to reassert his individuality, Martin sees this conundrum as inescapable – the individual is "always already a product of the machine" and seeking humanity through the modularization of space within the office will always result in alienation.³⁴

In his signature writing style, Rem Koolhaas also captures this connection between the flexible office environment and the alienation it creates in his meditation "Typical Plan," published in 1998. Typical Plan is the environment of celebrated 1950s high-rise office buildings, but it is also the countless derivatives that followed them. It is an open-plan office building featuring arrays of cubicles and modular suspended ceilings. It is an abstract background defined by repetition that allows business activities to occur within it. Koolhaas describes Typical Plan as "zero-degree architecture, architecture stripped of all traces of uniqueness and specificity,"³⁵ a typology that is offensive to a discipline preoccupied with producing uniqueness.³⁶ In contrast to its stated ambitions in humanizing the office, Koolhaas echoes Mills in suggesting that "an environment that demanded nothing and gave everything was suddenly seen as an infernal machine for stripping identity."³⁷

Overexposed, a video installation by Diller + Scofidio from 1995, highlighted the mundane nature of the everyday office environment. The installation focused on a key example of mid-century corporate architecture, the Pepsi-Cola Headquarters designed by SOM and completed in 1959, in exploring transparency and surveillance through the curtain wall. The Pepsi-Cola building is particularly noteworthy in this regard because the curtain wall mullion spacing was increased to fall on the full module of the enclosed offices – 13'-0" wide. The grid of the curtain wall acts as the frame highlighting the constrained actions of the workers within, with each module providing an episode of office life. Through his emotionless delivery, the narrator describes the mundane activity witnessed within, visually constrained by the frame in the film while the actions are also clearly constrained by the logic of the organizational complex within.

In considering the curtain wall, Diller + Scofidio identified the conflict between the theorized promise of the new material and its reality in deployment. The democratic promises of transparency and disclosure also offered their inverses of

surveillance and false appearances. Similar to the 1999 films, this project can be read as a retrospective evaluation of the claims of mid-century office architecture, with Diller + Scofidio ultimately citing modernism's use of glass as "utopian promises and dystopian deliveries."³⁸ The *Elements of Architecture* publication accompanying the 2014 Venice Biennale exhibition observed this same tension in the suspended ceiling. "Like the office cubicle, the false ceiling starts out as an ennobling and democratic innovation – before being reviled as symbols of bland conformity – here offering a perfectly uniform field of light under which anyone can work, anywhere in the floor plate."³⁹

Aside from poignantly identifying the entanglement between the office environment and its architectural expression that will provide the setting for this cadre of films in 1999, Koolhaas also touches on why the APC has persisted. As noted above, the Modernist ideal was to create a tight integration between the modular system that defined the curtain wall, structural system, interior partitions, and ceiling plane. In contrast to the early explorations of this integration, Koolhaas notes that the gridded quality of Typical Plan is not absolute, but rather operates in a "metaphysics of slack"⁴⁰ that provides order in even the messiest of geometries, extending the grid around irregularities.

"THE OFFICE-WORKERS' RAMPAGE"⁴¹

Much has been written about the uncanny similarities between *Office Space*, *Fight Club*, and *American Beauty*.⁴² Each features storylines in which their protagonists ultimately confront their managers, figurehead of the organizational complex, to overcome and take control of their environment. In fact, there are more than these three; *The Matrix* and *Being John Malkovich* were released the same year and feature similar themes. However, the parallels in the three films highlighted are particularly noteworthy and provide the basis for this close reading.

In early scenes for the films, we meet the protagonists in their work environments, pure expressions of Typical Plan. Floors, walls, ceilings, and cubicles are rendered in neutral grays and whites, with filters applied that cast an alienating glow on the scene. The office is the abstract space in which the activities of business occur, behaviors meticulously described in *Overexposed*. The space is rendered productive through the flurry of simultaneous activity going on in the space – people talking on the phone, shuffling papers, making copies – while contrasted with the meaninglessness of its effects: TPS reports, the repetition of the copier, and a frustrating phone call. Typical Plan's endlessness is emphasized through panning shots that convey the horizontality and continuity of the space. The grid of the APC converges in a vanishing point within the center of the scene. The office context is established early in each of the films and is an important plot device.

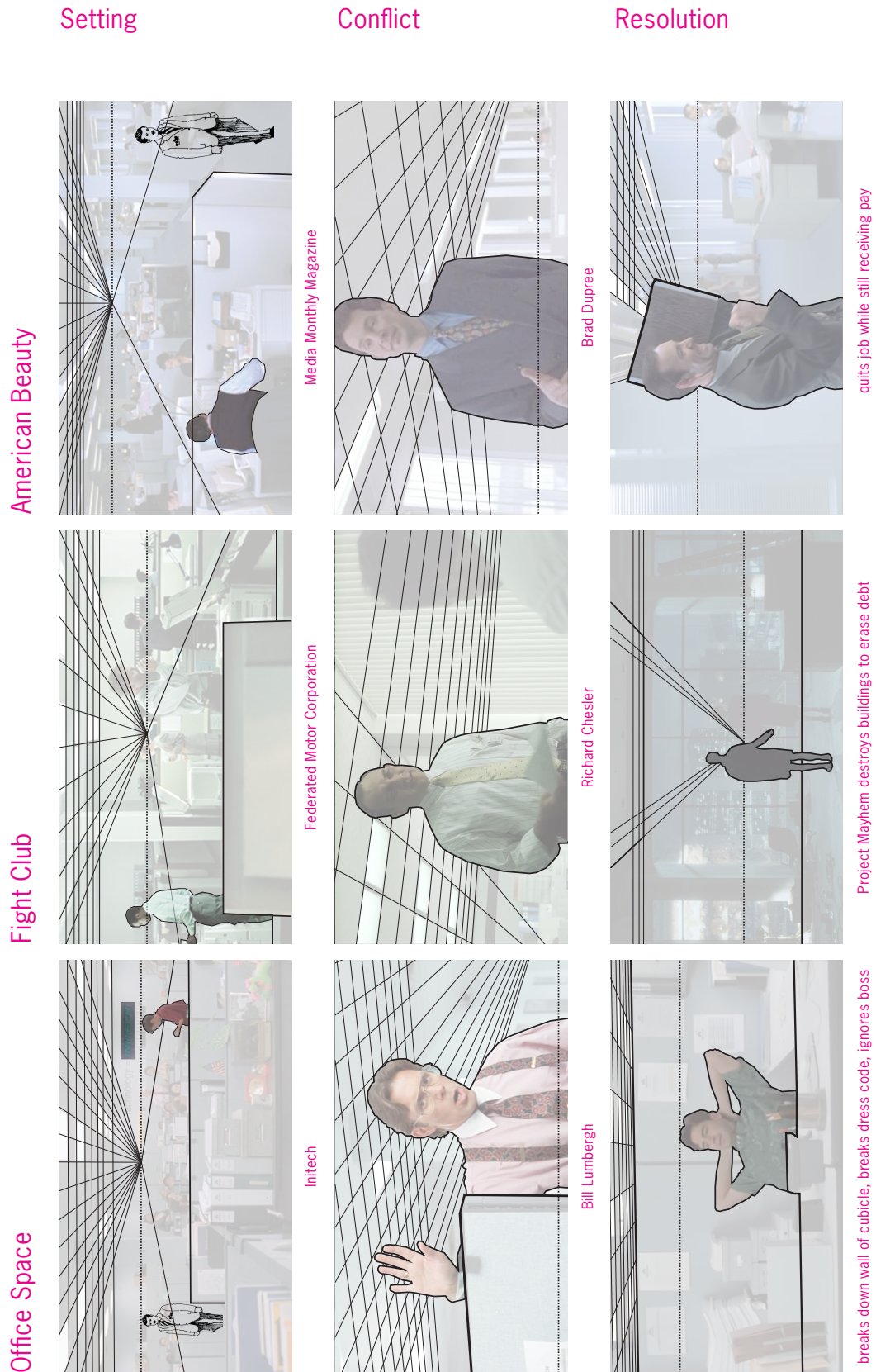


Figure 5. The Office-Worker's Rampage. Credit: author.

Office Space's Peter Gibbons is a programmer at software company Initech, with an overbearing boss named Bill Lumbergh. The unnamed Narrator in *Fight Club* has to contend with regional manager Richard Chesler in his role as a traveling automobile recall specialist, while Lester Burnham's nemesis in *American Beauty* is Brad Dupree, recently hired to find opportunities to downsize. The films structure interactions between the protagonists and their bosses within Typical Plan, and the standard APC is significant in establishing the power dynamics of their interactions. Each film features shots from the perspective of the seated office worker in his cubicle, looking up at the standing figure of their superior towering above them with the endless grid of the APC as a backdrop. The organizational complex receives physical representation through the grid, while it is performed through the figure of the overbearing boss.

Although each story line continues in vastly different directions and toward different ends, each of the main characters experiences conflict that begins to shift the power balance in the office as part of their liberation from it. Peter, in a relaxed state from a hypnotherapy session, is extremely candid in his interaction with the Bobs, two men brought in to increase efficiency at Initech. Emboldened by his participation in *Fight Club*, the Narrator aggressively addresses Richard's questions about a paper accidentally left at the office copier regarding *Fight Club*. Lester begins to smoke weed, openly expresses hostilities towards his wife, and confronts Brad with information that he has about a superior using company money to pay for a prostitute. Within these scenes, the shots between the disgruntled office worker and the boss feature them on the same level. The scene between Lester and Brad deviates somewhat from the type in that it does not feature a space with APC, but the other two scenes do. In leveling the view in all three scenes, the previous effect of the APC is less significant.

Ultimately, each character breaks free from the constraints of the office environment. Peter unexpectedly gets promoted for his candor with the Bobs and breaks office protocol by ignoring his boss and knocking down his cubicle wall for a better view. Consistent with *Fight Club*'s tone, the Narrator's process to achieve freedom is much more violent. He blackmails his boss to keep his salary by pretending to be assaulted by him in a graphic scene which includes throwing himself into a glass bookshelf. The full arc of the story is completed in which the Narrator faces his alternate identity Tyler Durden in an office space under construction with an incomplete APC in the background. During their second meeting, Lester also blackmails his boss and is shown leaving the office triumphantly with a box of his personal items on his shoulder.

In all three films, the three protagonists' relationships with the office environment is critical to the plot development. As the APC is the signifier of the oppressive office environment,

each character's relationship to the ceiling plane reflects his progress toward liberation.

CONCLUSION

In *Mechanization Takes Command*, Sigfried Giedion looked to everyday objects as "outgrowths of fundamental attitudes to the world,"⁴³ namely the role of the process of mechanization as a dominant cultural logic. Similarly the APC can be understood as emerging out of broader disciplinary preoccupations with modularity, standardization, and flexibility that coincided with a postwar economic boom and new technology. However, the APC also demonstrates the way that the cultural context and architectural discourse toward a material is constantly shifting as well.

Echoing Yaneva and Bruno Latour's meditations on architecture within the context of Actor Network Theory,⁴⁴ building materials like the APC are actors as well, not static, with their agency constantly evolving within architectural theory and popular culture. While selection of these three films to examine the cultural meaning of APCs might seem arbitrary, the cultural moment represented by these three films is significant because it suggests a fleeting moment of particular resonance and alignment with architectural discourse's own orientation towards the APC. After its low point in the "Revolt of the Office Drone"⁴⁵ films of 1999, shows like *Mad Men* (2007-2015) and *The Office* (2005-2013) featured the APC in a much more positive light: nostalgic and romanticized in the former and humorous in the latter. The discipline, however, seems to be completely uninterested in romanticizing the APC. Meanwhile the APC continues to be specified in practice, cheaply and easily adapted to the various contingencies of architecture, mutable in field modifications to address oversights in design and construction, lack of coordination, and construction tolerances, and adaptable to the vicissitudes of taste and preference.

ENDNOTES

1. The term "Acoustical Panel Ceilings" was selected for use as it is the typical nomenclature for this system adopted in the MasterSpec format, section 095113.
2. Elizabeth Diller, "In Plain View," *ANY 18 – Public Fear: What's So Scary About Architecture* (1997): 31.
3. Armstrong Investor presentation.
4. Reyner Banham, *The Architecture of the Well-Tempered Environment* (Chicago: University of Chicago Press, 1969), 12.
5. Banham, 212.
6. Suzanne Sekey, "Design and Furnishing of Offices," *Progressive Architecture* 33, no. 01 (January 1952): 108-109.
7. Keith Peiffer, "Acoustical Panel Ceilings: Origins," *ACSA108 Open Conference Proceedings*.
8. Crown Hall, UN Secretariat, Lever House, Inland Steel, etc.
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11. Reinhard and Hofmeister, "New Trends in Office Design," 99-100.
12. Reinhold Martin, *The Organizational Complex: Architecture, Media, and Corporate Space* (Cambridge, MA: The MIT Press, 2003), 91.
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15. "A History of Armstrong," Armstrong World Industries, 2015.
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17. Armstrong, "Another Significant Development," 81-92.
18. "Beautiful Buildings, Horrible Sounds," *Architectural Forum* 105, no. 3 (September 1956): 157.
19. Carrier, "Which is the Best Way to Air Condition an All-Glass Building?" *Progressive Architecture* 38, no. 6 (June 1957): 112-113. This advertisement was also featured in other architectural journals of the time.
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21. "High-Rise Office Buildings: Introduction," *Progressive Architecture* 38, no. 6 (June 1957): 159.
22. Martin, *The Organizational Complex*, 82.
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24. "Technology: Cleaning Up the Ceiling," *Architectural Forum* 118, no. 5 (May 1963): 146.
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28. See "Modular Architecture," *Progressive Architecture*, 158 and Martin, *The Organizational Complex*, 117-120.
29. Armstrong, "Registron Series" advertisement, *Progressive Architecture* LVII, no. 6 (June 1976), 3-4. Armstrong, "Second Look Series" advertisement, *Progressive Architecture* LVI, no. 6 (June 1975), 3-4. Armstrong, "Colortone Series" advertisement, *AIA Journal* 71, no. 1 (January 1982), 2-3. Armstrong, "New Cirrus Travertone Ceilings" advertisement, *Progressive Architecture* LXIV, no. 6 (June 1983), 3.
30. Armstrong World Industries, <https://www.armstrongceilings.com/commercial/en-lr/technical-downloads/faqs-suspended-ceilings-other-aspects.html>, accessed 10/14/19.
31. Lewis Mumford, "House of Glass," in *Writing About Architecture: Mastering the Language of Buildings and Cities*, ed. Alexandra Lange (New York: Princeton Architectural Press, 2012), 25. Originally published in the *New Yorker* (August 8, 1952).
32. Martin, *The Organizational Complex*, 120.
33. Martin, 5.
34. Martin, 121.
35. Rem Koolhaas, "Typical Plan," in *S,M,L,XL*, ed. Jennifer Sigler (New York: The Monacelli Press, Inc., 1998), 335.
36. Koolhaas, 343.
37. Koolhaas, 346.
38. Elizabeth Diller, "In Plain View," *ANY 18 – Public Fear: What's So Scary About Architecture* (1997): 31.
39. Manfredo di Robilant and c-lab, "Ceiling," in *Elements of Architecture*, ed. Rem Koolhaas (Köln: Taschen, 2018), 330.
40. Koolhaas, "Typical Plan," 340.
41. Nicholas Barber, "The Matrix's male power fantasy has dated badly," *BBC Culture*, March 26, 2019, accessed May 28, 2019, <http://www.bbc.com/culture/story/20190319-the-matrixs-male-power-fantasy-has-dated-badly>.
42. See the following for some examples: Darren Franich, "Entertainment Weekly: An Attempt to Explain White Dude Problems Movies," *Entertainment Weekly*, October 13, 2014. Arthur Chu, "Complaining Like It's 1999: 'Fight Club,' 'American Beauty,' and the Revolt of the Cubicle Drone," *Daily Beast*, June 3, 2014. Nicholas Barber, "The Matrix's Male Power Fantasy Has Dated Badly," *BBC Culture*, March 26, 2019.
43. Sigfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (Minneapolis: University of Minnesota Press, 2014), 3.
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