STUDENT ARTICLE

LIMITING ARCHITECTS' LIABILITY FOR INDOOR AIR POLLUTION AND SICK BUILDING SYNDROME

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> Architecture should acknowledge the time and its compelling agenda, which include the ecological imperative.[1]

INTRODUCTION

Sick Building Syndrome (SBS) is generally defined as the widespread incidence of illness in certain buildings.[2] Liability for damage resulting from SBS now unfairly threatens architects because of their conspicuous position in the construction industry.[3] Assignment of liability for SBS should be shifted from architects to building contractors, consulting engineers, and building owners because they can more effectively provide remedies for SBS and because most of the causes of SBS are beyond the scope of control held by architects.[4] Complications associated with SBS tend to be more technical in nature and, thus, fall outside the design-oriented focus of an architect's practice.[5] Shifting liability away from architects would provide incentives for more techni-

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1 CHARLES JENCKS, THE ARCHITECTURE OF THE JUMPING UNIVERSE 168 (1995).

2 *See* Kenneth M. Block, *Return of the Sick Building Syndrome*, 2 BUILDING & FIN. (Brown Raysman Millstein Felder & Steiner LLP, New York, N.Y.) 1, ¶ 1 (Winter 1995) <http://www.brmlaw.com/doclib/bfw9503.html> (on file with author).

3 *See* ROBERT GUTMAN, ARCHITECTURAL PRACTICE 14 (1988).

4 *See* DANA CUFF, ARCHITECTURE: THE STORY OF PRACTICE 32-33 (1991) ("[T]he architect's services alone do not produce the product. . . . In some buildings, the architect is no longer involved with the day-to-day functioning, which is designed by specialists [such as mechanical engineers or environmental control consultants].").

5 *See id.* at 33.

cally-oriented participants in the building process to curb the practices that lead to the development of Sick Building Syndrome.

Nonetheless, new regulations and recent litigation resulting from SBS have the potential to permanently alter the practice of architecture. The consciousness of most designers is far from focused on such practicalities as building codes and legal standards of care, and a prolonged ignorance of such issues might, in the near future, relegate architects to a relatively insignificant role in the construction process. While many of the factors causing SBS are beyond the traditional scope of control assigned to the architect in the panoply of construction industry relationships, it is the architect's distance from the technical functioning of the structures she designs that will cause her to have less input in and control over the design process.[6] In recent years, courts have held architects liable for damages to building owners and occupants for a variety of consequences attributed to SBS.[7] Therefore, the scope of the practice of architecture could be significantly narrowed by contractual provisions that shift the burden of damages stemming from SBS to parties in the construction process who are better suited to accept liability for such a phenomenon. Alternatively, architects might have to alter their self-organizing system to accept greater accountability for the technical shortcomings of the buildings they design.

Although others have written journal articles about Sick Building Syndrome, they have approached the topic from the direction of available tort or contract remedies for SBS victims or SBS as a toxic tort.[8] This Student Article approaches the subject from the position that, while the structure of the construction in-

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[6] *See generally* Margaret Crawford, *Can Architects Be Socially Responsible?*, *in* OUT OF SITE: A SOCIAL CRITICISM OF ARCHITECTURE 42, 42-44 (Diane Ghirardo ed., 1991).

[7] *See, e.g.*, Block, *supra* note 2, ¶¶ 4-5 (summarizing the unreported holding of an Illinois trial court in County of DuPage v. Hellmuth, Obata & Kassabaum, Inc., *aff'd*, 698 N.E.2d 723 (Ill. App. Ct. Mar. 21, 1996) (unpublished table decision)).

[8] *See, e.g.*, Robert E. Geisler, *The Fungus Among Us,* 8 ST. THOMAS L. REV. 511 (1996); Gene J. Heady, *Stuck Inside These Four Walls: Recognition of Sick Building Syndrome Has Laid the Foundation to Raise Toxic Tort Litigation to New Heights*, 26 TEX. TECH L. REV. 1041 (1995); David Reisman, *Strict Liability and Sick Building Syndrome: Defining a Building as a Product Under Restatement (Second) of Torts, Section 402(a)*, 10 J. NAT. RESOURCES & ENVTL. L. 35 (1995).

dustry counsels against assigning SBS liability to architects, architects and other construction professionals will need to alter the practice of their craft to account for changes in the statutory and common law.

This Article seeks to account for the legal effects of Sick Building Syndrome on the practice of architecture and to predict the future consequences of existing and pending legislation on the practice. SBS is certainly not the only phenomenon with the potential to alter the design and construction of buildings. Indeed, Sick Building Syndrome is only one subset of phenomena that fall within the broader category of Indoor Air Pollution:[9] other forms of Indoor Air Pollution include radon infiltration, asbestos erosion, formaldehyde exposure, microbial contamination, indoor pesticide exposure, and volatile organic compound concentrations.[10] Sick Building Syndrome can be caused by the presence of combinations of the above problems, but it is still not well defined.[11] For architects and the attorneys who represent them, an understanding of the causes and symptoms of SBS, as well as cures for the Syndrome, is essential to any attempt to stand poised for practice in the beginning of the next century.

I
The Scope of Architectural Practice

A basic familiarity with the architect's role in the construction industry is essential to an understanding of why liability for Sick Building Syndrome should be shifted from architects to other construction industry participants. Many of the theories upon which architects' liability for SBS are based rely on a flawed conception of the actual scope of responsibility assigned to architects. While architects were, at one point in history, the party with primary responsibility for the completion of a building, architects today are complemented by a vast network of specialized consultants in the design of almost any building.[12] As a general rule, liability should attach to the parties responsible for making those mistakes that cause harm. Because specialized

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9 *See* Frank B. Cross, Legal Responses to Indoor Air Pollution at iii (1990).

10 *See id.* at 1-3.

11 *See* Geisler, *supra* note 8, at 515; Reisman, *supra* note 8, at 35.

12 *See* Gutman, *supra* note 3, at 15 (discussing the expanding need for numerous professionals, other than architects, in the construction of increasingly technically complex buildings).

consultants are often responsible for the technical misjudgments that lead to SBS, these consultants—not architects—should be held liable.

A. *The Role of Architects in the Construction Industry*

Architects are often assumed to be the central party responsible for the design and construction of a building. While architects still control the "first conceptual steps"[13] of the design process, they have never been the sole party responsible for the entire production of a building: "[M]edieval records indicate that responsibility for a building's final form has long been distributed among a number of individuals."[14] When modern technology, such as environmental control systems,[15] is introduced into construction, the architect must rely on a vast array of specialized consultants who provide expertise beyond the scope of the architect's training. The architect often coordinates the work of many consultants to realize the finished building design but leaves technical decisions to the consultants themselves.[16]

B. *The Expanding Role of Consultants in Construction and Liability for Sick Building Syndrome*

The array of consultants who complement the practice of architecture expands as building technology becomes increasingly complex. When one examines the network of consultants whose design decisions and actual installations in the finished building can, if errors are made, result in Sick Building Syndrome, this complexity becomes clear. The team responsible for the design and construction of environmental control systems for a new high-rise structure could comprise dozens of consultants including structural, electrical, and mechanical engineers; environmental and energy conservation consultants; materials selection consultants; mechanical systems maintenance consultants; building and fire code consultants; and all the various subcontractors who actually install the systems once they are designed.[17]

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13 CUFF, *supra* note 4, at 77.

14 *Id*. at 73.

15 The term "environmental control systems" refers to mechanical systems that control the heating, cooling, and ventilation within a building.

16 CUFF, *supra* note 4, at 61.

17 *See* EARTH DAY NEW YORK, LESSONS LEARNED FOUR TIMES SQUARE: AN ENVIRONMENTAL INFORMATION AND RESOURCE GUIDE FOR THE COMMERCIAL REAL ESTATE INDUSTRY 65 (1997).

While an architect may sometimes be given the task of coordinating the efforts of all these consultants to produce a buildable product, "the combined impact of all such participants can overwhelm an architect's best intentions."[18] The scope of an architect's responsibility for a building's environmental control systems may encompass the coordination of consultants' efforts, but the design and installation of mechanical systems are usually the responsibility of other parties who possess the appropriate technical knowledge.

Even where architects are responsible for coordinating the efforts of consultants, the systems designed and the decisions made by those consultants are beyond the scope of control that building owners or developers assign to architects.[19] As noted in Part III, indemnification of architects by technical consultants becomes increasingly important as claims for SBS damages are brought against architects: liability for technical errors should not attach to architects when technical issues are beyond the scope of architects' control. Additionally, as discussed in Part V.C, building owners should bear the burden of SBS liability when negligent maintenance of their buildings' mechanical systems compromises air quality: architects should not be liable for owners' failure to properly maintain their buildings.

II
Sick Building Syndrome

A. *Illustrative Incident*

In April 1994, the Department of Motor Vehicles in Boston, Massachusetts moved from its headquarters in an old, drafty building to office space in a new high-rise structure.[20] Within six months, more than half of the department's employees had health complaints: some were plagued by respiratory complications usually exhibited by workers in chemical factories.[21] After a number of employees quit, blaming the air quality in their offices for their health problems, an investigation to discover the source of the problems was initiated.[22]

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18 Cuff, *supra* note 4, at 75.
19 *See infra* Part III.
20 *See NOVA: Sick Building Syndrome* (PBS television broadcast, Dec. 27, 1995) [hereinafter *NOVA*].
21 *See id.*
22 *See id.*

The investigation revealed that the air handling system in the new building utilized the space between the structural ceiling and the suspended ceiling tiles as a plenum[23] through which air was circulated, rather than employing standard metal ductwork to move air through the space.[24] The ceiling tiles, constructed of perlite, cellulose, and other materials, were bonded by an inexpensive, starch-based glue.[25] As moist, warm air from the outdoors mixed with the cold air re-circulated in this ceiling plenum, condensation was deposited on the upper surface of the ceiling tiles, causing them to ferment and release butyric acid into the air.[26] The building survey also revealed that the fireproofing in the building eroded due to the movement of air through the open-plenum ceiling zone, sending particulates into the air circulating through the office work areas.[27] The presence in the air of these fireproofing particulates and butyric acid was suspected to be the cause of the office workers' illnesses.[28]

Such a scenario can be classified as an example of Sick Building Syndrome. Often, as was the case in the Department of Motor Vehicles Building, errors in the design of Heating, Ventilation, and Air-Conditioning (HVAC) systems or misjudgments in the choice of materials used in such systems result in unintended consequences for the ultimate users of the building. The causes of SBS, however, certainly extend beyond design errors in material selection[29] or faults in the ventilation system.[30] There is continuing disagreement about whether SBS is caused by faulty

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[23] The term "plenum" refers to a duct-like shaft through which air is circulated. This assembly may be constructed of standard sheet metal ductwork or, as in the case of the Boston DMV, may utilize building components such as suspended ceiling tiles and concrete structural slabs to create a zone through which air may circulate. *See generally* Charles George Ramsey & Harold Reeve Sleeper, Architectural Graphic Standards 418 (Stephen A. Kliment ed., student ed., 1989); Reyner Banham, The Architecture of the Well-Tempered Environment 215, 259 (1984) (providing an historical account of the indoor environment and including diagrams on the use of plenum ventilation systems).

[24] *See NOVA*, *supra* note 20.

[25] *See id.*

[26] *See id.*

[27] *See id.*

[28] *See id.*

[29] *See* Susan Pearsall, *Connecticut Q & A: Paul Bierman-Lytle—Construction That's Environmentally Sound*, N.Y. Times, Nov. 10, 1991, § 12CN (Connecticut), at 3.

[30] *See* Marcia Saft, *Hazards of Indoor Pollutants Being Examined*, N.Y. Times, Sept. 29, 1985, § 11CN (Connecticut), at 1.

design, improper construction, poor maintenance practices, or an unanticipated use of the space by its inhabitants.[31]

A source of additional confusion is the mischaracterization of Sick Building Syndrome as a conflation of numerous and indistinguishable types of indoor air pollution combining to cause illness in a building's occupants.[32] The variety of possible categories and combinations of indoor air pollution that can cause SBS implies that there are a variety of distinct manifestations of the Syndrome, which must be corrected by equally numerous and distinct remedies. Thus, a basic familiarity with various types of indoor air pollution is essential to understanding how SBS will affect construction professionals and the regulations that govern their work.

B. *Understanding Categories of Indoor Air Pollution*

1. *Radon Infiltration and Indoor Pollution*

Radon is a colorless, odorless, radioactive gas found throughout the earth's atmosphere and is emitted by naturally-occurring, radioactive elements, such as uranium and radium, found in the earth's soil.[33] Most indoor radon results from the construction of a building upon soil that emits radon.[34] Radon enters buildings through cracks or holes in floor or wall assemblies or through other openings, such as pipes and conduits.[35] Differences in pressure and temperature between the indoor and outdoor environments may create a vacuum that draws high levels of radon into a building.[36] While older homes, in which high rates of ventilation ensure adequate circulation of fresh air, can easily vent excess radon gases, newer homes, which are built for greater energy-efficiency, trap gases inside as a result of tighter construction.[37] An older, "leaky" house may ventilate at a rate of 3.0 Air Changes per Hour (ACH), while a newer,

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[31] *See* Block, *supra* note 2, ¶ 2.

[32] *See* David W. Dunlap, *Seeking Remedies for 'Sick Buildings'*, N.Y. TIMES, July 26, 1992, § 10 (Real Estate), at 11.

[33] *See* CROSS, *supra* note 9, at 5.

[34] *See id.* at 7.

[35] *See id.* at 18.

[36] *See id.* at 8.

[37] *See id.* at 9; *see also* Lawrence S. Kirsch, *Behind Closed Doors: Indoor Air Pollution and Government Policy*, 6 HARV. ENVTL. L. REV. 339, 341 (1982).

"tighter" house may only ventilate at a rate of 0.5 ACH.[38] Therefore, energy-efficient homes may be prone to increased indoor air quality problems.

Additional sources of indoor radon include building materials, such as concrete blocks or bricks manufactured with radioactive materials.[39] These materials have radium content similar to that of soil and can have similar effects on the quality of the indoor environment.[40]

While radon has no immediate health effects, long-term exposure to radon may cause lung and stomach cancer.[41] The risk of adverse health effects from indoor radon exposure is significantly greater than most other environmental risks to health.[42] The Environmental Protection Agency (EPA) estimates that indoor radon causes up to 20,000 cancer deaths per year; radon could therefore be second only to tobacco as a cause of cancer.[43]

2. *Asbestos Erosion*

"Asbestos is a broad term for natural fibrous stones that describes minerals known as hydrated silicates" composed of "thin fibers which separate easily."[44] Because of its fire-retardant and insulating properties, the material has been used in construction for fire protection and temperature regulation.[45] Some products that utilize asbestos are "friable" materials characterized by a soft and crumbly physical composition.[46] These friable materials have a tendency to release a substantial number of asbestos fibers into the indoor air. Exposure to high levels of asbestos fibers is known to cause lung cancer, but the risk from typical

38 *See* Cross, supra note 9, at 9; *see also* American Soc'y of Heating, Refrigeration, & Air Conditioning Eng'rs, Standard 62-1989: Ventilation for Acceptable Indoor Air Quality (1989) [hereinafter ASHRAE 62-1989]. "Air Changes per Hour" or "ACH" is the unit used to measure the rate at which interior air is circulated throughout a building or room. For example, a space that ventilates at 3.0 ACH is refreshed with a new supply of air three times during each hour.

39 *See* Office of Radiation & Indoor Air, EPA, The Inside Story: A Guide to Indoor Air Quality (1995).

40 *See* Cross, *supra* note 9, at 10.

41 *See id.* at 6.

42 *See id*. at 13-17.

43 *See id*. at 6.

44 *Id*. at 23.

45 *See* Ramsey & Sleeper, *supra* note 23, at 251.

46 *See* Cross, *supra* note 9, at 25.

indoor asbestos installations is relatively low until the fibers are disturbed and released into the air.[47]

3. *Exposure to Formaldehyde and Other Volatile Organic Compounds*

Hundreds of substances can be classified as volatile organic compounds (VOCs).[48] These compounds release organic gases as they evaporate or decompose.[49] Included in this category of materials are chemicals like formaldehyde, benzene, toluene, and xylene, all of which are "off-gassing" chemicals.[50] VOCs are typical in many standard construction materials, including furnishings, carpeting, wall coverings, varnishes, adhesives, and wood products, such as plywood or oriented strand board.[51] VOCs are also commonly found in office machinery and cleaning solutions.[52]

Buildings, especially those sealed for energy-efficiency but improperly vented during or after construction, may be affected by the release of VOCs into air recirculated and breathed by the building's inhabitants upon occupancy.[53] While some VOCs may simply produce disturbing odors, others have been shown to be carcinogenic.[54] VOCs have also been found to intensify the symptoms of certain health conditions, such as asthma.[55]

4. *Microbial Contamination by Fungi and Bacteria*

Excessive moisture within a building's recesses can also be a source of indoor air pollution because fungi and bacteria tend to propagate in moisture-laden cavities.[56] Air handling units and ventilation systems can serve as "amplification sites" for fungi and bacteria if the moisture and food sources necessary for their

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47 *See id*. at 31.

48 *See id*. at 52.

49 *See* Heady, *supra* note 8, at 1075.

50 *See* Pearsall, *supra* note 29, § 12CN, at 3 (defining "off-gassing" as the process by which construction materials release VOCs).

51 *See id*.

52 *See id.*

53 *See* Janet L. Brown, *The Sick Building Syndrome*, *in* ENVIRONMENTAL DAMAGE CLAIMS AND PROPERTY INSURANCE COVERAGE 185, 187 (Dianne K. Dailey ed., 1997).

54 *See* Steve Conner, *Dirty Air May Cause Cancers*, INDEPENDENT, Oct. 27, 1998, at 6.

55 *See* Tara Aronson, *Getting Fireplaces Ready for Winter: Take Steps to Prevent Indoor Air Pollution*, S.F. CHRON., Oct. 28, 1998, § 3, at 21.

56 *See* Geisler, *supra* note 8, at 522.

survival are present.[57] Poor construction practices and lack of maintenance can lead to conditions in which excess moisture exists in the mechanical systems of a building.[58] Construction crews may "leave behind plaster dust, beer cans and lunch bags" that, combined with moisture, create optimal conditions for fungal and bacterial propagation.[59]

Once fungus and bacteria propagate within the mechanical systems of a building, they move throughout the structure along with the air that the system was designed to distribute. When breathed by the building's inhabitants, bacteria and fungus cause flu- and cold-like symptoms typically associated with Sick Building Syndrome.[60]

C. *Attempting to Define Sick Building Syndrome*

Various professional organizations, government agencies, public interest groups, and international advisory bodies have attempted to define Sick Building Syndrome, leaving the construction industry with little more than a vague and somewhat confusing description of a problem the specific causes of which are not yet clearly defined.[61]

The World Health Organization defines SBS as an excess of work-related irritations of the skin and mucous membranes and other symptoms reported by workers in modern office buildings, including headache, fatigue, and difficulty with concentration.[62] In testimony before Congress regarding the threat of indoor air pollution, the EPA has defined SBS as instances in which office

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57 *See id*. at 520.

58 *See id*. at 524.

59 Mark McCain, *Commercial Property: Sick-Building Syndrome; The Growing Problem of Air Pollution in Offices*, N.Y. TIMES, May 8, 1988, § 10 (Real Estate), at 27 (noting that, because ductwork and other mechanical system components are inaccessible, inspection for construction debris is often neglected). Additionally, poor maintenance procedures, resulting in clogged ventilation ducts or filter banks, encourage the growth of fungus and bacteria. *See id.*

60 *See* Saft, *supra* note 30, § 11CN, at 1.

61 *See generally* SIERRA CLUB, SIERRA CLUB POLICY: INDOOR AIR POLLUTION (last modified Nov. 3, 1998) <http://www.sierraclub.org/policy/indoor-air.html>; OFFICE OF AIR & RADIATION, EPA, FACT SHEET: VENTILATION AND AIR QUALITY IN OFFICES (1990); OFFICE OF AIR & RADIATION, EPA, INDOOR AIR FACTS NO. 4 (REVISED): SICK BUILDING SYNDROME (SBS) (1991) (revised) <http://www.epa.gov/iaq/pubs/sbs.html> [hereinafter OAR, SICK BUILDING SYNDROME].

62 *See* Heady, *supra* note 8, at 1054; *see also* WORLD HEALTH ORG., INDOOR AIR POLLUTANTS (1983).

buildings that were otherwise clean caused eye irritation, respiratory infection, and nausea among workers.[63] The EPA estimates that SBS costs the U.S. an estimated $60 billion annually in worker illness and lost productivity.[64] Experts in the public health field who have attempted to define SBS have focused on symptoms, like fatigue, sore throat, headache, and shortness of breath, and analyzed how these symptoms affect a worker's productivity.[65] Private corporations that monitor building systems and indoor air quality define SBS as "a condition whereby more than 20% of a building's occupants or occupants of a specific location within the building complain about commonly experienced discomforts which cease to exist when the occupants leave the building."[66] The various definitions of SBS available in the public domain all point towards the air quality of indoor environments as the main causal link between a building and its occupants' development of symptoms associated with SBS.

1. *A Brief History of the Indoor Environment*

Throughout much of the history of the built environment, architects have relied primarily on "massive structure" as the means of environmental control within buildings.[67] It is only within the last two centuries that we have begun to efficiently exploit regenerative climate control systems that attempt to regulate the indoor environment.[68]

In the earlier half of the twentieth century, developments such as air conditioning made the connection of indoor spaces to the outside environment unnecessary.[69] Early air-conditioning

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63 *See* Philip Shabecoff, *Congress Is Told Indoor Pollution Is Grave Threat*, N.Y. Times, Apr. 25, 1987, § 1, at 6.

64 *See* Peter A.A. Berle, *Take a Tour of This Building and Save!*, N.Y. Times, June 6, 1993, § 3 (Business) at 13 (discussing the design and construction of the New York headquarters of the National Audubon Society).

65 *See* Saft, *supra* note 30, § 11CN, at 1.

66 Robert L. Scarry, *Sick Building Syndrome (SBS) & Building Related Fitness: A Comparison*, 1 The Indoor Air Quality Insider 4, ¶ 3 (1996) (visited Nov. 7, 1998) <http://www.envirocenter.com/Newsletters/R00004.htm>.

67 *See* Banham, *supra* note 23, at 22-23. "Massive structure" refers to any building composition utilizing the physical mass of building material such as stone or masonry for structural or environmental purposes. *See id.* Before the invention and exploitation of mechanical climate control systems, builders relied on the insulating property of heavy, or massive, material compositions to isolate indoor spaces from the outdoor environment. *See id.*

68 *See id.*

69 *See id.* at 171-94.

pioneers cast themselves in the role of developing "Man-Made Weather."[70] Once air-conditioning was perfected, operable windows were no longer required in homes and office buildings for cooling and circulation; self-contained systems for air-conditioning, heating, and circulation soon became integrated, thus making obsolete the need for natural ventilation in buildings.[71] This sealing of the building's environmental envelope raised the functioning of mechanical systems to great importance.[72]

2. *"Tight Buildings" and the Costs of Increased Energy Efficiency*

As the number of building environments that did not use natural ventilation or cooling increased, building occupants and owners became concerned about the high amounts of energy required to sustain these closed environments. This concern intensified during the 1970s, when energy costs soared as a result of the OPEC Oil Embargo of 1973.[73] In response, buildings were designed to be more energy-efficient by, in effect, tightening the building's enclosural skin, preventing the infiltration of outside air into the building while ensuring that less treated air from the interior escaped from the building.[74] By decreasing the rate at which environmentally controlled buildings release heated or cooled air, the cost of treating such air is, likewise, decreased. "Tight buildings" is a term coined during the years after the OPEC Oil Embargo to describe buildings so designed for greater energy efficiency.[75]

Architects "liked the looks" of tight buildings,[76] perhaps because the delineation of exterior facades was controlled more easily when windows were inoperable.[77] Unfortunately for archi-

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70 *See id.* at 172.

71 *See id.* at 185-90.

72 *See id*. at 9-17.

73 *See* Heady, *supra* note 8, at 1043; *see also* BANHAM, *supra* note 23, at 13 (noting that concern with traditional usage of environmental energy intensified during the 1973 embargo).

74 *See* Heady, *supra* note 8, at 1043-44.

75 *See* Geisler, *supra* note 8, at 513.

76 Patricia Leigh Brown, *A House Built to Be 'Healthy'*, N.Y. TIMES, Apr. 19, 1990, at C1 (quoting architectural historian and critic James Marston Fitch).

77 Many architects actually viewed operable windows with scorn because of the havoc they could wreak on the visual composition of buildings. *See* BANHAM, *supra* note 23, at 190-91 (discussing the effect of privately installed air-conditioning window units on the facade of I. M. Pei's Kip's Bay Apartments in New York).

tects, the effect of "small quantities of pollutants could be enormously magnified" in air-tight buildings.[78] Another unfortunate side effect of tight buildings was their potential to increase the toxicity of the indoor environment since many of the sealants and insulation materials used to make these buildings more energy efficient introduced chemical fumes into the buildings' air.[79] The World Health Organization reports that thirty percent of new or remodeled office buildings worldwide suffer from SBS as a result of tighter construction arising out of concerns about greater energy efficiency.[80]

At first, architects were generally unaware that the practice of designing tight buildings would adversely impact future occupants—these architects' concerns were too distanced from the functioning of mechanical services and environmental devices.[81] Today, however, a rising tide of regulations and litigation has forced an increased awareness among architects of the environmental impacts of their work.

III
Architects' Liability for Sick Building Syndrome

Parties seeking to hold architects and other building professionals liable for the consequences of Sick Building Syndrome often proceed on theories of negligence, breach of contract, implied warranty, or strict liability.[82] Many courts have held some of these theories inapplicable to architects: "[T]he majority position limits the liability of architects and others rendering professional services to those situations in which the professional is

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[78] Brown, *supra* note 76, at C1.

[79] *See* Pearsall, *supra* note 29, § 12CN, at 3.

[80] *See* Carey Goldberg, *When Office Air Is Hazardous—At an East-Side Building, Employees Complain over Fumes*, N.Y. Times, June 14, 1995, at B1.

[81] *See* Banham, *supra* note 23, at 11-12 (noting that the architectural profession has failed to assume responsibility for the maintenance of decent environmental conditions). Sensing a separation between architecture and technology, Banham suggests that the technological aspects of building "have largely passed out of control of architects into the hands of specialist consultants who now comprise a whole range of parallel professions." *Id.* at 11. While he recognizes the trend towards specialization in all professions in the modern world, he laments the "tragically deleterious effect on the discourse and practise of architecture" this separation has wrought. *Id.* at 12.

[82] *See also* Cross, *supra* note 9, at 133-34. *See generally* Heady, *supra* note 8, at 1063-87.

negligent in the provision of his or her services."[83] Architects may contractually obtain indemnification for liability stemming from SBS from the designers, manufacturers, and installers of building mechanical systems; conversely, architects may be indemnified by building owners or managers who are responsible for the operation and maintenance of these mechanical systems.[84] Contractual agreements for indemnification will thus become increasingly important for architects if courts hold them liable for harm due to SBS.

A. *Traditional Bases for Architects' Liability: Negligence or Breach of Contract*

Certain recent cases specifically address Sick Building Syndrome as a basis for liability on the part of architects and other building professionals. In *County of DuPage v. Hellmuth, Obata & Kassabaum, Inc.*,[85] the owner of a county courthouse brought an indemnification action against several parties involved in the construction of the building following an incident involving dangerously poor air quality.[86] Seven hundred employees working in the courthouse had to be evacuated after a widespread outbreak of SBS symptoms including respiratory problems, headaches, and eye irritation.[87] The jury found the county itself to be responsible for the majority of the SBS-related problems because of contributory steps the county had taken to remedy air quality complaints by employees: specifically, the county had altered the ventilation system and had used certain noxious chemicals to clean office furnishings.[88] At the same time, the jury found both the architect and contractor liable for minor damages due to the initially negligent design and construction of the building's ventilation system.[89] Although only minimal damages were ordered against the architect in light of contributory acts by the county and the contractor, it appears that the architect potentially could

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83 City of Mounds View v. Walijarvi, 263 N.W.2d 420, 423 (Minn. 1978).

84 *See* Block, *supra* note 2, ¶ 5 (citing County of DuPage v. Hellmuth, Obata & Kassabaum, Inc., *aff'd*, 698 N.E.2d 723 (Ill. App. Ct. Mar. 21, 1996) (unpublished table decision) to indicate that an architect's liability may be mitigated by a building owner's alteration of the mechanical systems).

85 *See id.* ¶ 4.

86 *See id.*

87 *See id*.

88 *See id.* ¶ 5.

89 *See id.*

have been held liable for any and all environmental consequences of the faulty building design.

While negligence actions against architects for design defects are one manner in which a plaintiff can proceed in SBS cases, *County of DuPage* also suggests that contributions by multiple parties to air quality complications should limit the degree to which architects are held liable for damages. Before assigning liability, courts should examine which parties are responsible for particular design decisions or construction activities that ultimately lead to instances of Sick Building Syndrome.

In *Castelvestro v. Mills*,[90] the plaintiffs alleged that they had suffered damage due to a defective HVAC system in the building where they worked.[91] In denying the defendant's motion for summary judgment, the Superior Court of Connecticut held that if the defendant owner of the building knew of the allegedly defective ventilation system, either actually or constructively, the defendant could properly be held liable for damages.[92] The defect in the system was one of faulty design: insufficient fresh air was circulated into work areas, thus "leading to a buildup of dangerous levels of gases" that caused the plaintiffs' alleged injuries.[93]

The *Castelvestro* court held the building owner potentially liable for SBS caused by a faulty HVAC system without reference to the system's designer or the building's architect. While the opinion states that the building owner installed the system, it is unclear who designed it.[94] Much of the opinion focuses on the fact that the lessor of a building with latent defects in the HVAC system remains liable for damages after a leasehold interest begins.[95] The court left for resolution at trial the question of fact as to the owner's involvement in the creation of the dangerous condition.[96] This leaves open the possibility that, at trial, the building's architect or mechanical engineer could also be subject to claims for negligent design of the faulty HVAC system.

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90 No. CV 910320396S, 1997 WL 80681, at *1 (Conn. Super. Ct. Feb. 5, 1997).

91 *See id.*

92 *See id.* at *11-*12.

93 *Id.* at *12.

94 *See id.* at *1-*2.

95 *See id.* at *1-*13.

96 *See id.* at *13.

B. *Architects' Liability Under Implied Warranty Theory or Strict Liability*

Where architects' negligence cannot be proven, plaintiffs have attempted to recover from architects on an implied warranty theory, which would, in effect, impose strict liability on architects for latent defects in the structures they design.[97] Strict liability claims against architects arise chiefly in the context of mass-produced buildings.[98] Most courts, however, support the view that architects cannot be held strictly liable for damages due to Sick Building Syndrome.[99] For instance, in *Sime v. Tvenge Associates Architects & Planners*,[100] the plaintiffs alleged that they had suffered injuries from carbon monoxide inhalation as a result of the defendant architect's negligent design of a building's ventilation system.[101] The Supreme Court of North Dakota held this strict products liability claim to be untenable because the plaintiff did not produce evidence suggesting that the architectural design or ventilation system was in any way standardized or mass-marketed.[102]

Other cases provide analogical support for the argument that architects should not be held strictly liable for Sick Building Syndrome. In *City of Mounds View v. Walijarvi*,[103] the Supreme Court of Minnesota concluded that

> [a]rchitects . . . deal in somewhat inexact sciences and are continually called upon to exercise their skilled judgment in order to anticipate and provide for random factors which are incapable of precise measurement. The indeterminate nature of these factors makes it impossible for professional service people to gauge them with complete accuracy in every instance. . . . [A]n architect cannot be certain that a structural design will interact with natural forces as anticipated. Because of the inescapable possibility of error which inheres in these

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97 *See* Heady, *supra* note 8, at 1069-70; *see also* Reisman, *supra* note 8, at 39-45.

98 *See* Reisman, *supra* note 8, at 41-45 (describing the history of cases in which mostly mass-produced buildings are considered products for the purpose of imposing strict liability against builders or manufacturers).

99 *See, e.g.*, New Mexico *ex rel.* Risk Management Div. v. Gathman-Matotan Architects, 653 P.2d 166 (N.M. Ct. App. 1982), *cert. denied*, 653 P.2d 878 (N.M. 1982).

100 488 N.W.2d 606 (N.D. 1992).

101 *See id.* at 607.

102 *See id.* at 607, 611.

103 263 N.W.2d 420 (Minn. 1978).

> services, the law has required not perfect results but rather the exercise of that skill and judgment which can be reasonably expected from similarly situated professionals.[104]

The court also stated that "[u]ntil the random element is eliminated in the application of architectural sciences . . . it [is] fairer that the purchaser of the architect's services bear the risk of such unforeseeable difficulties."[105] While *City of Mounds View* did not specifically address an architect's liability for SBS, the court's reasoning extends to all services provided by an architect.[106] The court noted that the plaintiffs remained free to pursue negligence claims against the architects even though an implied warranty or strict liability claim was not available.[107]

Still, some jurisdictions hold that an architect impliedly warrants the fitness of his designs or plans for their intended purpose.[108] In these jurisdictions, an architect might be held liable for SBS-related damages if a plaintiff were able to prove that the architect failed to furnish the allegedly "sick" building with an adequate ventilation system.[109]

Suppliers of building components have already begun to defend against claims that they are strictly liable for damages related to Sick Building Syndrome. In *Heller v. Shaw Industries*,[110] the plaintiffs claimed breach of warranty, strict liability, negligent and intentional misrepresentation, and violation of consumer protection laws.[111] The defendant's carpets were alleged to have been defectively constructed of polypropylene and nylon fibers bonded with a butadiene rubber backing that released the toxic VOCs benzene, xylene, and vinyl chloride into the air, thus causing the plaintiffs to experience respiratory problems.[112] Granting summary judgment for the defendant, the *Heller* court ruled that the plaintiffs were unable to support the strict liability claim on

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104 *Id.* at 424.
105 *Id*.
106 *See id*. at 424-25.
107 *See id.*
108 *See* New Mexico *ex rel.* Risk Management Div. v. Gathman-Matotan Architects, 653 P.2d 166 (N.M. Ct. App. 1982), *cert. denied*, 653 P.2d 878 (N.M. 1982) at 169 (noting that courts in Alabama, South Carolina, Pennsylvania, and Washington have held that architects impliedly warrant the fitness of designs or plans for their intended purposes).
109 *See id.*
110 No. Civ. A. 95-7657, 1997 WL 535163, at *1 (E.D. Pa. Aug. 18, 1997), (mem.).
111 *See id.*
112 *See id*. at *1, *3, *9.

the facts at hand, but the court did not find such a claim to be wholly unavailable to future plaintiffs.[113]

Other courts have noted that architects should be distinguished from suppliers of building materials. In *Bellemare v. Gateway Builders, Inc.*,[114] the Supreme Court of North Dakota held:

> Suppliers and manufacturers, who typically supply and produce components in large quantities, make standard goods and develop standard processes. They can thus maintain high quality control standards in the controlled environment of the factory. On the other hand, the architect or contractor can pre-test and standardize construction designs and plans only in a limited fashion. . . . In addition, materialmen are in a position distinct from the architect . . . in that the materialman provides manufactured goods and should be held accountable under the general tort rules governing liability for defects in those products.[115]

Courts, therefore, should recognize the distinction between architects, suppliers of building materials, and constructors of buildings. Only in very rare instances in which architects have designed mass-produced structures that have undergone quality-testing procedures should those architects be subject to a strict liability standard of care.

C. *Indemnity for Architects' Liability for Sick Building Syndrome*

Because some jurisdictions do allow architects to be held strictly liable for damages due to SBS, contractual indemnification becomes an essential device for shielding architects against liability. The right to indemnification may either be created by express contract or, alternatively, implied by law in order to prevent unjust enrichment or an unfair result.[116] Many courts, however, will not invoke the common law doctrine of indemnity to shift liability from a design professional to a contractor or mate-

[113] *See id*. at *10-*18 (stating that the plaintiff's expert witness provided evidence of questionable scientific value, which could not support the contention that VOCs in the defendant's product caused SBS to develop in the plaintiff's home).

[114] 420 N.W.2d 733 (N.D. 1988).

[115] *Id*. at 738.

[116] *See* County of Westchester v. Welton Becket Assocs., 102 A.D.2d 34 (N.Y. App. Div.), *appeal dismissed*, 475 N.E.2d 123 (N.Y. 1984), *order aff'd,* 485 N.E.2d 1029 (N.Y. 1985).

rial supplier if the design professional had any part in the wrongdoing.[117] Often, as with many laypersons unfamiliar with the construction process, judges do not understand the limited scope of an architect's involvement in a project. Therefore, architects will need to overcome this misperception with affirmative proof that their participation in an ill-fated project was not negligent.

In *Trustees of Columbia University v. Mitchell/Giurgola Associates*,[118] an architect had sought indemnity at trial below from a wall-panel fabricator for liability resulting from a faulty wall installation.[119] Although the installers, not the architect, were responsible for appealing the lower court's decision,[120] the appellate court's reasoning would presumably apply to the architect as well. The court ruled that the defendants were precluded from recovery against the wall-panel supplier on the basis of common-law indemnity.[121] It reasoned that if the defendants had exercised due care and skill in performing their respective tasks—thereby fulfilling their obligations to the plaintiff—these defendants would have been free from liability *irrespective* of whether the supplier had provided faulty materials.[122] As contributors to the alleged wrongdoing, however, the defendants could not receive the benefit of the doctrine of implied or common-law indemnity.[123]

Cases like *Trustees of Columbia University* indicate that architects who have "dirty hands" will not be able to invoke the equitable doctrine of implied indemnity. Because the doctrine of implied or common law indemnity will not adequately protect architects in all jurisdictions, architects must carefully structure agreements with other parties to include express provisions for indemnity where appropriate.

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117 *See* Trustees of Columbia Univ. v. Mitchell/Giurgola Assocs., 109 A.D.2d 449, 453 (N.Y. App. Div. 1985).
118 *Id*.
119 *See id*. at 451.
120 *See id*.
121 *See id*.
122 *See id*. at 453-54.
123 *See id*. at 454.

IV
Regulations Addressing Sick Building Syndrome

Legislative acts and administrative regulations at the federal, state, and local levels attempt to focus attention on the issue of Sick Building Syndrome and to curb its attendant effects on building occupants. Federal legislation addresses SBS by regulating indoor air quality and building materials through the administrative regulations of agencies such as the EPA, the Department of Energy (DOE), the Department of Housing and Urban Development (HUD), the Department of Health and Human Services (DHHS), the Consumer Products Safety Commission (CPSC), and the Occupational Safety and Health Administration (OSHA).[124] State legislatures have also begun to address the issue through the implementation of indoor air quality requirements.[125] Many states adopt, by reference, the widely-accepted standards of independent professional associations, such as the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), which develop design and operation standards for ventilation and mechanical systems.[126] Additionally, local governments have begun to revise building codes to ensure that new construction is completed in such a manner as to avoid the problems associated with SBS.[127]

A. *Federal Regulation of Indoor Air Quality*

In the last decade, Congress has held hearings on the effects of Indoor Air Pollution and Sick Building Syndrome, and now considers the health threat caused by SBS to be a serious priority deserving federal government attention.[128] Indoor air quality research and regulation is coordinated through the inter-agency

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[124] *See* Richard C. Mallory, *Renegotiating Troubled Tenancies*, *in* Current Issues in Negotiating Commercial Leases: 1995, at 851, 882-87 (PLI Real Est. L. & Practice: Course Handbook Series No. 411, 1995) (discussing, in relation to commercial lease re-negotiation, federal agencies that regulate indoor air quality).

[125] *See* Geisler, *supra* note 8, at 527.

[126] *See id.*

[127] *See, e.g.*, New York City, N.Y., Building Code §§ 27-725, 27-776 to -785 (1996) (containing requirements for ventilation, ventilation systems, and air pollution regulation).

[128] *See* Shabecoff, *supra* note 63, § 1, at 6 (discussing hearings before the Senate Environment and Public Works Committee's Environmental Protection Subcommittee).

Committee on Indoor Air Quality (CIAQ).[129] Numerous federal agencies participate in the CIAQ, including the EPA, the DOE, the DHHS, and OSHA.[130] While many federal agencies regulate the problem of outdoor air quality, only OSHA has direct authority over indoor air quality.[131] OSHA's role, however, is restricted to regulation of indoor air quality in the workplace.[132]

OSHA has now proposed Indoor Air Quality Regulations that would protect the seventy million American employees who work in indoor environments.[133] Of these seventy million workers, OSHA has estimated that twenty-one million are exposed to poor indoor air.[134] The proposed compliance requirements are focused on an employer's duty to provide its employees with a safe work environment. They require that:

> Employers must develop and implement indoor air quality compliance plans.
>
> Employers are required to assure proper functioning of building systems which affect indoor air quality.
>
> . . . .
>
> Employers who do not control their buildings' ventilation systems must demonstrate a good faith effort to comply with regulations.[135]

While these regulations have not yet gone into effect, the prospect of their future promulgation should signal to building owners and designers, as well as to tenant employers, that they will bear an increased responsibility for air quality within their buildings. If implemented, these prophylactic laws will seek to eliminate Sick Building Syndrome before it develops, rather than compensating the suffering of workers through post hoc tort remedies.

Other federal agencies, such as the EPA, have no statutory directive to address indoor air pollution.[136] Hence, addressing SBS is not of paramount importance to them. Nonetheless, the

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[129] *See* Mallory, *supra* note 124, at 885.

[130] *See id.*

[131] *See id.*

[132] *See id.*

[133] *See* Proposed OSHA Rule on Regulation of Indoor Air Quality, Health Effects of Poor Indoor Air Quality and Environmental Tobacco Smoke, 1 DISGRUNTLED 3, ¶¶ 5-6 (Oct. 9, 1996) <http://www.disgruntled.com/oshaair.html> (on file with author).

[134] *See id.* ¶ 3.

[135] *Id.* ¶¶ 7-10.

[136] *See* CROSS, *supra* note 9, at 118.

EPA has recognized a need for indoor air quality control. In a report to Congress on indoor air quality, the EPA recommended the application of several strategies, including provisions for adequate ventilation and the avoidance of improper building design, operation, and maintenance.[137] The EPA's report stated that a pollutant-by-pollutant approach, i.e., prohibiting the use of specific pollution-inducing materials, would not resolve the bulk of indoor air quality problems.[138] The report also stated that, to be an effective monitor of indoor air pollution, the EPA would need authority from Congress to implement building-related standards and guidelines designed to achieve better indoor air quality.[139]

The EPA's authority to address SBS under the Clean Air Act is severely cramped, because the Act is limited to outdoor air.[140] The regulation of outdoor air, however, may have important consequences for the control of Sick Building Syndrome. Complications related to SBS often arise in buildings simply because of the location of outdoor air intakes or the condition of outdoor air brought into a building's mechanical system.[141]

Like the EPA, the Department of Energy has an indirect, but noteworthy, authority to regulate indoor air quality and SBS.[142] The DOE has exacerbated the problem of SBS by adopting energy conservation measures that have produced greater concentrations of indoor contaminants.[143] When the energy crisis of the 1970s heightened the concern about the resources required to operate indoor climate control and ventilation systems, the DOE instituted standards that induced a reduction in ventilation.[144] This reduction in ventilation, in turn, led to an increase in indoor air pollution and the proliferation of Sick Building Syndrome.[145]

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137 *See id.*

138 *See id.*

139 *See id.*

140 *See* Mallory, *supra* note 124, at 885; *see also* Clean Air Act, 42 U.S.C. § 7401 (1994).

141 *See* OAR, Sick Building Syndrome, *supra* note 61 (identifying chemical contaminants from outdoor sources as a main cause of Sick Building Syndrome); *see also* New York City, N.Y., Building Code § 27-776(d) (1996) (addressing the location of intake openings for outdoor air).

142 *See* Cross, *supra* note 9, at 125.

143 *See id*.

144 *See id*.

145 *See id*.

Additionally, the Department of Housing and Urban Development has issued guidelines that address indoor air quality and that could have a significant impact on the proliferation of SBS.[146] HUD's Manufactured Housing Construction and Safety Standards outline requirements for building materials used in HUD-sponsored construction.[147] These standards include ventilation requirements and formaldehyde emissions limitations.[148] HUD construction standards could serve as a model for regulations developed in the future by state and local housing authorities.

The Consumer Products Safety Commission is an independent regulatory agency whose primary focus is to eliminate or reduce unreasonable risks of injury associated with consumer products[149] and to regulate the production of household products which produce indoor pollutants.[150] The CPSC can thus help to control SBS. For instance, the agency has developed methods for measuring contamination of viruses, bacteria, and fungi, as well as guidelines for minimizing indoor exposure to these contaminants.[151] The CPSC also controls building materials and components through product bans and labeling requirements on products like vinyl chloride, asbestos, and unvented gas and kerosene space heaters.[152]

B. *State Approaches to the Control of Sick Building Syndrome*

Most states do not currently regulate indoor air pollution and consequently have little control over the main causes of Sick Building Syndrome.[153] States like Washington, New Jersey, Massachusetts, Texas, and California are planning to enact, or have already passed, indoor air quality requirements.[154]

Most states, however, have enacted ventilation and mechanical systems standards by reference to guidelines established by the American Society of Heating, Refrigeration and Air Condi-

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146 *See* Office of Radiation & Indoor Air, EPA, *supra* note 39; *see also* Mallory, *supra* note 124, at 886.

147 *See* Office of Radiation & Indoor Air, EPA, *supra* note 39.

148 *See* Mallory, *supra* note 124, at 886.

149 *See id.*

150 *See* Cross, *supra* note 9, at 124.

151 *See id.*

152 *See* Mallory, *supra* note 124, at 886.

153 *See* Geisler, *supra* note 8, at 527.

154 *See, e.g.*, *id.*

tioning Engineers.[155] ASHRAE develops standards that are commonly accepted by architects and engineers as guidelines for the design and operation of building mechanical systems.[156] The current ventilation guideline, which went into effect in 1989, is ASHRAE 62-1989, entitled "Ventilation for Acceptable Indoor Air Quality."[157]

ASHRAE 62-1989 outlines requirements for building ventilation as measured in the number of air changes required in an hour.[158] The higher the potential pollution level in a space, the more air changes per hour ASHRAE standards mandate.[159] ASHRAE 62-1989 currently recommends twenty cubic feet per minute of outdoor air per office occupant.[160] For areas like smoking lounges, which are expected to have greater levels of pollutants in the air, sixty cubic feet per minute of outdoor air per occupant is required.[161] Engineers designing building systems must estimate the number of occupants who will utilize a building space.[162] When these numbers vary from the actual number of occupants in a space, mechanical systems may not ventilate the space as intended. Such a problem can be remedied by the installation of more flexible HVAC systems that can be adjusted for alterations in the use or occupancy of building spaces.

A revised ASHRAE standard currently under development would use a more complicated system for determining required ventilation capacity.[163] The revised standard combines the effects of human occupants with other factors like emissions from office equipment to better estimate actual building conditions.[164]

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155 *See id.*

156 *See* Eleanor Charles, *In the Region: Connecticut and Westchester—The Problem of Sick-Building Syndrome*, N.Y. TIMES, Aug. 12, 1990, § 10 (Real Estate), at 9.

157 ASHRAE 62-1989, *supra* note 38. ASHRAE standards are not legally binding on construction professionals like architects and engineers unless specifically referenced by state or local building codes. *See id*.

158 *See id.*

159 *See id.*; *see also* Charles, *supra* note 156, § 10, at 9.

160 *See* ASHRAE 62-1989, *supra* note 38.

161 *See* Charles, *supra* note 156, § 10, at 9.

162 *See* OAR, SICK BUILDING SYNDROME, *supra* note 61 (discussing ASHRAE Standard 62-1989).

163 *See ASHRAE's 62-R Takes New Path to "Acceptability"*, 6 BUILDING ENV'T REP. 73, 73-74 (1997).

164 *See* The Hartford Steam Boiler, HSB Indoor Air Quality (last modified Oct. 26, 1998) <http://www.hsb.com/hsbair8.htm>.

The new standard would require that new HVAC systems are designed and installed with the necessary flexibility to account for changes in occupancy.

C. *Local Initiatives for Assuring Indoor Air Quality*

The New York City Building Code (the Code) does not specifically address Sick Building Syndrome but mandates ventilation system requirements and standards.[165] All ventilation systems must be designed, installed, located, and operated so that they will not impair public health or welfare, and certain provisions of the Code do address specific problems typically associated with SBS.[166] The Code, either specifically or by reference, addresses issues such as air intake location, access for maintenance and inspection, as well as the use of plenum spaces as air ducts.[167] Because interior circulation of outdoor air is a main cause of SBS, strategic location of air intake openings is crucial to the design of any building.[168]

Because SBS often results from the recirculation of polluted air in a building's ventilation system, the Code addresses the need to eliminate from circulating systems any air in which flammable vapors, "flyings," or dust is present in quantities and concentrations that would introduce a hazardous condition into the return air system.[169] The Code specifically mandates the location of outdoor air intakes with reference to the prevention of fire and health hazards,[170] but it does not mention the effect of outdoor air quality on indoor air quality.

The Code emphasizes the importance of access to the interior of HVAC ducts for purposes of maintenance and inspection.[171] These provisions ensure that ducts will be accessible for periodic clearings of accumulations of dust and combustible

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165 *See* New York City, N.Y., Building Code, §§ 27-725, 27-776 to -785 (1996).

166 *See id.* § 27-776(c) (safety provisions for mechanical systems).

167 *See id*. (referencing ANSI/NFiPA-90b, Standard for the Installation of Warm Air Heating and Air Conditioning Systems (1980)).

168 *See* OAR, Sick Building Syndrome, *supra* note 61.

169 New York City, N.Y., Building Code, Reference Standard RS13-1(2-3.1) (1984).

170 *See* New York City, N.Y., Building Code, § 27-776(d)(3).

171 *See* New York City, N.Y., Building Code, Reference Standard RS13-1(2-1.4).

materials.[172] While duct accessibility requirements can certainly alleviate some causes of SBS, the Code allows exceptions for ducts in which the air contained therein first passes through filters or a water spray.[173] This provision is meant to ensure that air entering the duct is clean, but it does little to address the problem of material accumulations or water pooling within the duct itself. As previously noted, these types of duct spaces are breeding grounds for microbial contaminants that can lead to the presence of SBS.[174]

The Code specifically allows for the use of plenum spaces in air distribution systems.[175] As noted in Part II.A, this practice can lead to conditions fit for the development of SBS when materials within the plenum deteriorate.[176] The New York City Building Code does not address this problem but rather concentrates on material combustibility to ensure an adequate fire rating for the plenum assembly.[177] Therefore, while the Code does take steps to prevent indoor air pollution, it leaves open the possibility for the development of SBS.[178]

V
Sick Building Syndrome's Repercussions on Practice for Construction Professionals

While most jurisdictions do not require architects to meet ventilation or mechanical system performance standards, recent court decisions have held architects liable to building owners and occupants when illnesses caused by Sick Building Syndrome become apparent.[179] The incentives for architects to better understand the technical functioning of the buildings they design are not, however, limited to avoiding the costs of litigation related to SBS. Indeed, in the future, architects' clients will demand

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172 *See* New York City, N.Y., Building Code Reference Standard RS13-1(2-1.4.3).

173 *See id.*

174 *See generally* Geisler, *supra* note 8.

175 *See* New York City, N.Y., Building Code, Reference Standard RS13-1(2-2.1).

176 *See NOVA*, *supra* note 20.

177 *See* New York City, N.Y., Building Code, Reference Standard RS13-1(2-2.1).

178 *See id.*

179 *See, e.g.*, Block, *supra* note 2.

"healthier" buildings as a market for these types of structures emerges.[180]

Although the scope of many architects' involvement in the construction industry should limit their liability for SBS, other architects may wish to expand their role from aesthetic planning to a more comprehensive management of construction. To accept greater responsibility for liability resulting from SBS, architects will need to expand their breadth of knowledge regarding the technical aspects of construction and take a more active role in the building process with regard to inspection of the work they or their consulting engineers have designed. Alternatively, architects might have to narrow the scope of their involvement in the construction process and contract for lesser responsibility for SBS liability through indemnification agreements with building contractors, engineers, or owners. While architects certainly can maintain control over which materials are selected for construction and may possess some degree of control over the design and installation of building ventilation systems, it seems unlikely that architects will need to be held accountable when building owners do not properly maintain their buildings' HVAC systems.

A. *Consequences for Design Practice*

The choice of building materials to be used in a construction project is usually within the scope of control designated to the architect. For other design decisions or material selections made by other parties, liability for SBS should not attach to the architect of a building. Architects should, however, take active steps towards achieving acceptable air quality and avoiding the development of SBS at the outset of the project.

By selecting less hazardous materials, an architect can prospectively lessen the amount of toxins placed into an indoor environment and eventually circulated throughout an improperly ventilated structure.[181] While most building codes cannot effectively mandate specific materials that would be universally appropriate for selection, building codes could incorporate performance standards that would require the materials chosen

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[180] *See* John Holusha, *Commercial Property/Environmental Sensitivity: For Office Towers, Being Green Can Be Beneficial,* N.Y. Times, June 30, 1996, § 9 (Real Estate), at 9; *see also* Charles, *supra* note 156, § 10, at 9.

[181] *See* Brown, *supra* note 76, at C1; *see also* Pearsall, *supra* note 29, § 12CN, at 3.

to satisfy certain requirements regarding toxic material content.[182] Some architects have already assumed responsibility for incorporating environmentally superior materials into the buildings they design even without the imposition of performance codes.[183] Many commonly-used products, such as fiberglass insulation, floor and furniture finishes, and building adhesives, are known to contain VOCs, which contribute to many cases of SBS.[184] Non-toxic substitutes are available for most of these materials at a slightly higher cost.[185] While there is no empirical data proving that the potential liability for SBS outweighs the cost of non-toxic building materials, these materials may well prove cost-beneficial in the long run.

B. *Practical Effects on Building Construction*

Many complications linked to SBS result from ventilation system failures caused by faulty construction and system maintenance.[186] Indoor air quality is compromised when mechanical systems are not properly maintained: air intakes, filters, ducts, and heating and cooling coils must all be checked and repaired on a regular basis to keep the system in working order.[187] Indoor pollution problems are also caused by foreign objects that enter HVAC systems during construction.[188] Often, construction crews leave behind plaster dust, beer cans, and lunch bags in mechanical duct spaces, which often are not accessible for inspection after construction is complete.[189] Architects are not typically concerned with access to mechanical systems but rather focus on allocating space for such systems within the confines of the usable spaces they are designing.[190] Performance codes could require architects to design more easily accessible spaces to facilitate the maintenance of buildings' mechanical systems.[191]

While architects are usually responsible for the coordination of work completed by HVAC system designers and may super-

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182 *See* Heady, *supra* note 8, at 1058-59.
183 *See* Pearsall, *supra* note 29, § 12CN, at 3.
184 *See id.*
185 *See id.*
186 *See* McCain, *supra* note 59, § 10, at 27.
187 *See id.*
188 *See* Geisler, *supra* note 8, at 523-24.
189 *See* McCain, *supra* note 59, § 10, at 27.
190 *See generally* Ramsey & Sleeper, *supra* note 23, at 470.
191 *See* Geisler, *supra* note 8, at 1058.

vise the installation of such systems, liability for SBS resulting from an HVAC system design should be assigned to the consultant who designed the system: the technical functioning of HVAC systems is beyond the scope of control held by architects. Additionally, construction deficiencies which cause SBS should not serve as the bases for architects' liability if they are beyond the scope of the inspection responsibilities that the architect undertakes by agreement with the building owner.

C. *Effects on Mechanical System Inspection and Maintenance Procedures*

A sizable industry has grown around the need for ventilation system inspection and maintenance consultation.[192] Numerous insurance companies have divisions exclusively devoted to the inspection of buildings' mechanical and ventilation systems.[193] Since so many instances of SBS are attributed to poor system maintenance, increasing numbers of organizations are recognizing the importance of active maintenance programs.[194] Even the American Lung Association—an organization not commonly associated with building construction policy—has published statements indicating that poorly-maintained mechanical systems can lead to adverse health effects, such as those typically linked to instances of SBS.[195] Because easier access to ducts by building owners and managers can facilitate cleaning and maintenance tasks, accessibility to the inner workings of HVAC systems has already become required in certain jurisdictions.[196]

Clearly, building designers cannot unilaterally ensure that a building owner will maintain HVAC systems so as to avoid the development of SBS. Thus, building owners who do not properly maintain the HVAC systems in their properties should not recover damages due to SBS from architects.

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192 *See, e.g.*, Johnson Controls, Inc. (last modified Oct. 21, 1998) <www.johnsoncontrols.com> (providing installation and inspection services for building HVAC systems); The Hartford Steam Boiler (last modified Nov. 3, 1998) <www.hsb.com> (providing HVAC inspection as well as insurance coverage); Care Tech Industries, Inc. (visited Nov. 7, 1998) <www.odatus.com> (marketing "building immune systems" utilizing concentrated oxygen to remedy indoor air quality problems).

193 *See* Charles, *supra* note 156, §10, at 9.

194 *See* Sierra Club, *supra* note 61.

195 *See* Brown, *supra* note 53, at 190-98.

196 *See* New York City, N.Y., Building Code, Reference Standard RS13-1(2-1.4) (1984).

D. *Marketing Incentives*

1. *Effects on Development and Marketing*

In the absence of statutory performance standards for building systems, marketing incentives will be significant for architects, contractors, and building owners.[197] As public awareness of Sick Building Syndrome increases, so will the demand for "healthy buildings."

Developers of new office buildings in major metropolitan areas in the United States have already seized upon the opportunity to make environmentally-sensitive construction profitable.[198] Four Times Square, a new high-rise tower under construction in New York City, has been designed to circumvent many of the common system errors that led to instances of SBS in the past.[199] Most notably, the building design avoids the installation of materials that release toxic gases into the interior air.[200] Presumably, the use of non-toxic building materials will decrease future liability costs to the building's owner. Tenants who have already leased space in the building reiterate that indoor air quality was one of the main criteria for their choosing to lease the new space; careful awareness of the causes of SBS and the marketing incentives of a healthy indoor environment have proven profitable for major developers of real estate.[201] Therefore, a heightened concern on the part of developers for indoor air quality in their new buildings might be effectively motivated by marketing incentives. If the law mandates standards for indoor air quality in the future, these incentives may diminish. Nevertheless, consumer preferences should continue to exert some degree of influence on builders to utilize more environmentally sensitive materials.

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197 *See* Charles, *supra* note 156, § 10, at 9.

198 *See, e.g.*, Kevin Brass, *An 'Emerald City' for a Growing Skyline: Six Green Towers in a Hotel-Office Center*, N.Y. TIMES, May 15, 1988, § 13, at 28 (discussing environmentally sensitive high-rise construction in San Diego, CA); Diana Shaman, *Commercial Property: Sick Buildings—Seeking Remedies for Indoor Air Pollution Problems*, N.Y. TIMES, Apr. 12, 1992, § 10 (Commercial Real Estate), at 13 (discussing buildings that have addressed indoor air quality issues in Garden City, Long Island, NY and Olympia, WA); *see also* Holusha, *supra* note 180, § 9, at 9.

199 *See* Holusha, *supra* note 180, § 9, at 9.

200 *See id.*

201 *See id.*

The shift in the American economy from industrial or manufacturing to service-oriented business will mean that a greater number of workers will be located in office buildings rather than in factories.[202] As the indoor office population increases, so do the number of potential litigants in indoor air quality matters. Those leasing office space will thus seek facilities that are less likely to be plagued by SBS. As a result, the marketing of office space as "healthy" will become increasingly profitable. The regulations that currently apply to factory environments, such as those promulgated by OSHA, could soon be extended to govern air quality in "white-collar buildings," as well.[203] Until such regulations are in place, marketing incentives will play a primary role in guiding builder decisions regarding indoor air quality.

2. *Insurance Implications*

Many insurance companies have begun to offer incentives for building developers and owners to take indoor air quality issues seriously by lowering premiums paid by owners of "clean buildings."[204] Insurance companies often monitor the indoor air quality of the buildings they insure. When a building fails to meet the air quality standards set by the insurance policy itself, the policy is terminated.[205] Many insurance companies now require careful inspections and monitoring programs before they will assume the risk of insuring a new building.[206]

Alternatively, many insurance policies specifically deny coverage for damages resulting from SBS under the commonly-invoked pollution exclusion, which many insurers include in general comprehensive liability policies covering property damage or personal injury.[207] Often, this type of policy provision explicitly states that the policy does not cover losses caused by rust, mold, wet or dry rot, or other contamination.[208] When a building

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202 *See* Charles, *supra* note 156, § 10, at 9.

203 *See id.*

204 *See id*.

205 *See id*. Insurance companies including Aetna, Travelers, and Hartford and companies like United Technologies all incorporate divisions which inspect and monitor buildings' environmental conditions. *See id.*

206 *See id.*

207 *See* Brown, *supra* note 53, at 190-98.

208 *See id.* at 198.

exhibits signs of SBS due to any of these factors, the contamination exclusion could apply to insurance coverage.[209]

CONCLUSION: WHEN SHOULD ARCHITECTS BE HELD LIABLE FOR SICK BUILDING SYNDROME?

Because architects' scope of responsibility in most construction projects is limited to aesthetic matters and the procedural coordination of substantive work by more technically-oriented consultants, the assignment of liability for SBS to architects is justified in very limited circumstances. Plaintiffs proceeding on theories of negligence or breach of contract should be required to prove that errors leading to the development of SBS were within the scope of control of the architect. Theories of implied warranty and strict liability should apply to architects only in the rarest of circumstances where their designs are mass-produced and the random factors that normally affect building design are eliminated.

The practice of architecture could conceivably move in two distinct directions as a result of Sick Building Syndrome litigation and regulations. As a first course of action, architects might rely more on a network of technical consultants, who would carry the risk of SBS liability based on carefully drafted indemnity agreements. The scope of architects' involvement in the construction industry would therefore narrow as environmental technology expands and new environmental controls, manifest in federal regulations, state ventilation standards, and local building codes, are implemented.

Architects, however, need not fear the law as an adversary of quality design practice. The history of architecture is rich with examples of distinct forms resulting from legal or technological restraints. Architects, as a second course of action, could prevent the elimination of their involvement from numerous phases of the construction process by embracing and more fully understanding the technical intricacies of the buildings they design. While this becomes an increasingly challenging option as technology becomes more complex and the construction industry more specialized, architects certainly have the opportunity to learn how design choices affect a building's environmental condi-

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[209] *See id.* at 199-208.

tions and to allow environmental technology to inspire—and not hinder—the process of design and construction.