From the not-yet-occupied top floor of the sparkling new 7 World Trade Center that rises 52 stories above the heart of New York City’s Financial District, Oregon State alumnus Ryan Dow gestures toward the floor-to-ceiling wall of glass and the Manhattan skyline that falls away into late-summer sunshine glinting off skyscraper windows and the Hudson River far below.

“I always take visitors up here first,” Dow says. “It gives people a little perspective.”

It’s a perspective both magnificent and somber. Not only is the view from this 740-foot-high vantage point a stunning one, but just outside the window is where — until Sept. 11, 2001 — the Twin Towers soared 110 stories to more than twice the height of this building. And where close to 3,000 people from dozens of countries lost their lives on that tragic morning when terrorists flew airliners into the two buildings, leading to the towers’ collapse and altering the course of history.

Looking almost straight down the outer south wall of 7 World Trade Center, Dow points out where the original towers stood, where two square reflecting pools will occupy the original footprints of the buildings in a memorial designed to make forever visible what is forever absent.

Next, Dow indicates where the four main towers of the new World Trade Center — Tower 1 (referred to as the Freedom Tower), Tower 2, Tower 3, and Tower 4 — will soon emerge from the 16-acre construction site. The site is a cluttered mix of excavated earth, piles of construction supplies, and battalions of cranes and other construction equipment, which, from this vertigo-inducing altitude, look like small toys.

In a way, the path Dow travelled from the engineering classrooms of OSU
to being a key player in one of the tallest, most watched and most historic construction projects in the world started with toys. Little plastic blocks.

“As a kid, I was a big fan of LEGO,” he says. “And I helped my dad remodel a house once.”

Of course this doesn’t fully explain how a kid who spent his teen years in the soggy lowlands of rural Oregon wound up — less than eight years after earning his bachelor’s degree — building skyscrapers as an associate with the firm of WSP Cantor Seinuk. The company specializes in high-rise buildings and is structural engineer for the new World Trade Center Towers 2 and 3, where Dow is collaborating as project director.

The towers will rise 79 stories (1,254 feet) and 71 stories (1,155 feet)
respectively, next to the Freedom Tower — also engineered by WSP Cantor Seinuk — which will be the tallest building in the U.S. at the symbolic height of 1,776 feet. For comparison, Portland’s tallest building, the Wells Fargo Center, rises 546 feet.

The soft-spoken Dow shrugs off the express-elevator nature of his career.

“I was always interested in architecture or engineering, and I did well in math and science,” he says. “I’ve always wanted to actually build things, because you get to see a real, tangible result at the end.”

Tangible indeed. Untold millions will see Dow and his colleagues’ work, or at least they’ll see the results of it. The 2000 civil engineering grad focuses on the internal components of the two buildings — the parts that hold them up — an especially sobering responsibility after what happened to the Twin Towers.

“In a lot of ways, a building is like a human body — the structural engineer is the one who designs the skeleton,” Dow says. “We engineer the concrete core walls — the spine that runs up through the center of the buildings that provides much of the wind resistance, as well as the foundations and the steel columns. But we’re also involved in coordinating with many other aspects and disciplines: mechanical engineering, architecture, the exterior.”

Accommodating the new World Trade Center’s state-of-the-art safety features, many of which are confidential, has significantly influenced the design and construction timeline, Dow says.

“Safety has been a tremendous part of the design process, because the most important thing is that when these buildings are complete, people will feel safe working inside them,” Dow says. “The developer (Silverstein Properties) is investing a lot of additional money to make these the safest buildings ever.”

When terrorists flew two airliners into the Twin Towers in 2001, Dow was working for the engineering firm McNamara/Salvia, Inc. in Boston, the city from which some of the flights used in the attacks departed. Experiencing the disaster while living on the East Coast was very different from experiencing it from the Pacific Northwest, where Dow’s extended family still lives.

“Several people who worked on the floor just above our firm’s offices in Boston were on those planes,” Dow says. “And one of the principals of our firm, Bob Fowler, had worked on the original design of the Twin Towers early in his career. He didn’t say much in the days afterward. It’s got to be very emotional.”

The son of a nurse father and school teacher mother, Dow was born in Walla Walla, Wash., but his family moved to Portland when he was a little over a year old. Then it was on to Dallas, Ore. — population about 12,000 — where he started 7th grade and finished high school. Those earlier years spent in Portland gave Dow his first taste of city life and piqued his interest in tall buildings.

“Although I went to a small-town high school, in many ways I grew up in Portland. As a younger child, we lived near the Lloyd Center, so we spent a lot of time downtown. I always enjoyed the city.”

It was the allure of a really big city — not to mention an incredible job opportunity — that drew Dow to what is arguably one of the most famous construction projects ever in one of the world’s greatest cities.

“This is one of those projects you just can’t turn down,” Dow says. “One of those once-in-a-lifetime opportunities that you want to be a part of.”

Most of the politics surrounding the final design selection of the new World Trade Center were resolved by 2006 when Dow joined the project. But there is some frustration among New Yorkers because only 7 World Trade Center (which houses the project’s design team offices, including Dow’s) has risen above ground level and is now complete.

Dow explains that building several skyscrapers on such a small site surrounded by other high-rise structures, streets, trains, and millions of people — and all of it on a narrow island — makes for a highly complicated construction project. One skyscraper adjacent to the work site is being carefully dismantled because it was damaged beyond repair in the attacks and it contains a lot of hazardous materials.

“This is the equivalent of building four Empire State
Buildings within a four-block area, and much of it is below street level,” he says. “It involves blasting 80 feet down into bedrock that’s adjacent to operating subways and occupied buildings. So everything has to be very controlled.”

Once a skyscraper emerges from its foundation and starts to rise, the construction goes remarkably fast, Dow says.

He learned the nuts and bolts of engineering giant structures on the opposite side of the nation, on a campus more famous for its beautiful landscaping than for the height of its buildings.

Living in New York’s Upper East Side with his wife, Tiffany Fox Dow (who was a biology major at Oregon State and now works as lead nurse for a surgical practice at the New York Presbyterian Hospital), while they build a house in the suburbs, he looks back fondly on his days as an undergraduate in Corvallis. He credits OSU civil engineering professor Tom Miller with being a fine mentor and an inspiration.

“Tom was a great professor and an incredible role model,” says Dow, who served as president of the OSU Student Chapter of the ASCE (American Society of Civil Engineers) while at OSU. “His attitude and the way he taught were just phenomenal. He really cared about what he was doing — and not just about the teaching, but he cared about us, the students. He’d always take the extra time and was very dedicated.”

Miller returns the compliment. What impresses him most about Dow is how much he’s accomplished in so few years since graduating in 2000.

“Ryan’s definitely a unique individual,” Miller says. “I can’t think of any other students who have done what he’s done so early in their careers. The projects he’s worked on are way beyond what most other engineers of his age are doing. I’m very proud.”

Before joining WSP Cantor Seinuk, Dow worked for five years with McNamara/Salvia, Inc. in Boston, where he designed hotels, hospitals, and high-rise residential towers. He then managed the structural design for Meadowlands Xanadu, a 4.8 million-square-foot entertainment destination in northern New Jersey that will open next summer boasting interactive entertainment venues, fine dining, retail shops, offices, outdoor amusements, runway fashion shows, and its main attraction — the nation’s first year-round indoor Alpine ski resort, including real snow and chair lifts.

“We were the engineers on that project,” Dow says, noting that the building’s exterior paint job has received

Some commonly used terms in World Trade Center construction, provided by the Port Authority of New York & New Jersey:

**Anchors/rock anchors**
Rock anchors resist forces by means of corrosion protected steel bars embedded into bedrock. The threaded bar is bonded to the bedrock socket wall or virgin soil by using high-strength grout (cement mixture).

**Barnes dance**
The timing of traffic signals at an intersection to give pedestrians simultaneous “Walk” signals in every direction.

**Bathtub**
The sub-grade basement of the main World Trade Center site (divided into east and west sides), whose slurry walls withhold groundwater from the site.

**Cattle chute**
A temporary, protected lane for vehicular traffic.

**Cobrahead**
A standard-issue, stainless-steel street light, 25 to 30 feet in height; the name refers to the lamp at the end of the pole (whose shape
resembles the head of a cobra), though generally it includes the pole and arm as well.

**Guide walls**
Concrete guide walls are constructed in a shallow trench so the deep vertical trenches for larger wall structures/foundations may be excavated. After the form work for the guide walls is erected and the concrete placed, cavities outside the guide walls are filled with earth and timber shores are wedged between the walls.

**Jet grout**
Jet grouting is a general term describing various construction techniques in which ultra high-pressure fluids or binders are injected into the soil at high velocities (800 to 1,000 feet per second). Jet grouting breaks up the soil structure completely and mixes the soil particles in-situ with a binder to create a homogeneous mass, which in time solidifies.

**Jumbo steel**
Refers to the physically large members of structural steel used in steel frame erection.

**Mud slab**
A base slab of low-strength concrete from 2” to 6” thick placed over a wet sub-base before placing a concrete footing or grade slab.

**Oculus**
A circular opening at the top of a rounded structure (seen in World Trade Center Transportation Hub and Fulton Street Transit Center designs).

**Parapet wall**
A low protective wall or railing along the edge of a raised platform, bridge, or roof; may be straight, stepped, curved, solid, or with decorative openings.

**Superstructure**
The part of a building or structure above the foundations.

**Trumpets**
To provide lateral support of a wall as excavation proceeds downward, tieback anchors are installed through sleeves (“trumpets”) in a slurry wall, drilled through the soil using steel pipe casing, and then drilled 30 to 35 feet into bedrock. Each anchor is grouted in place, tested, and locked off.

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Above: The four new towers to be built at the World Trade Center site loom over the Manhattan skyline in this artist’s rendering. The tallest is the Freedom Tower, and towers 2, 3 and 4 are to its right. Image by dbox; courtesy Silverstein Properties

Previous (page 26): This schematic drawing shows the skeleton of Tower 2. Image courtesy WSP Cantor Seinuk

Previous (page 27): This artist’s rendering depicts the major structures to be built at the World Trade center site, with the 1,776-foot tall Freedom Tower at left. Image by dbox; courtesy Silverstein Properties
some negative feedback. “We didn’t pick the colors.”

According to Miller, although it might be surprising how quickly Dow’s career took off, his performance at OSU left little doubt that he would succeed.

“Ryan gained the respect of both students and faculty,” Miller said. “He was definitely one of the top students in his class academically, and the only student in my 20 years of teaching to go on to MIT.”

In 2001, Dow completed a master’s degree in engineering in high performance structures at the Massachusetts Institute of Technology, in a program with a much more theoretical approach than his undergraduate program at OSU. At Oregon State, Dow says, he learned practical aspects of engineering that help him every day on the job.

“OSU is such a great practical school,” he says. “You’re able to leave with your engineering degree and hit the ground running. Employers love OSU grads, because they know you know what you’re doing. You can jump in on day one without a big learning curve.”

Dow is one of only two of Miller’s students who have gone on to work for New York-based engineering firms that design high-rise buildings, Miller says. The other is Katie Walker, a 2005 graduate who works for Leslie E. Robertson Associates, the firm that designed the original World Trade Center and is responsible for the engineering of the new World Trade Center Tower 4.

Dow has met some other Beavers in the Big Apple, mostly business or marketing majors. He misses Oregon, especially the scenery, even while he enjoys big city life.

He often finds himself correcting New Yorkers’ pronunciation of his home state and letting them know he does not hail from the Wild West.

“When I mention Oregon, the response is often, ‘Oh, I’ve heard it’s so beautiful, I’d like to take a vacation there.’ So then I give advice about which time of the year it doesn’t rain as much.”

While most of his focus is on meeting the day-to-day challenges of his incredibly complex job, Dow sometimes contemplates what he might do once the new WTC is done in a couple of years.

“Sometimes you wonder, ‘Will I ever top this?’ It might be one of those things you look back on and think it was one of your greatest accomplishments.

“There might never be as exciting or as big of a project as the World Trade Center.”

But then he mentions a skyscraper being designed by his firm that could dwarf the Freedom Tower, and the glint in his eyes suggests that the boy who loved tall buildings — and became a young man who knows how to build them — will have no problem finding his next career high.

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