

スロー、スロー、クイック、クイック、スロー ——未来へ向けて木材をめぐるフォックストロットダンスを踊る

Slow, Slow, Quick, Quick, Slow:
Foxtrot Timber.. Dancing Our Way into the Future

アンドリュー・ワウ

Andrew Waugh

英国ロンドンの設計事務所Waugh Thistleton Architects (WTA)の創設者、共同経営者。中高層木質建築分野における先駆者。WTAは創造の精神をもっとも重んじる気風を有し、建築の教育、調査、学習、施工における研究を基盤とした実務設計事務所である。

どのように建てるか、どの建材を使うか、建築がわれわれの惑星にどんな影響を与えるか、人類は意識的に戦略的に考え始めなければならない。現代建築は二つの課題——気候変動と都市密度上昇——に直面しているが、気候変動を悪化させずにどのように都市をつくり上げていけばよいだろうか？

1980年代から90年代にかけて、軽くて加工性に富み、強度のある大型木質パネル、直交積層材 (CLT) が欧州で開発された。2003年のハットリ邸の経験をもとに、われわれは木でつくられる都市、建築における「木の時代」を真剣に考え始めた^{図1}。

しかし、当初は木質建築構想への周囲の関心は乏しかった。そこでわれわれは一般建築の約半分の現場人員数で工期は半減、より少ない搬入量、より小さな基礎、というCLTの迅速な施工方法を論証した。並行して、自治体や地元政治家を含む地域コミュニティへ働きかけ、木質による真にサステイナブル (持続可能) な建物の建設は交通量を半減し、騒音量も少ない点を説明した。われわれは仲間を集めた。それは時間のかかるプロセスだった。

2007年、2層分の追加面積とともにStadthausプロジェクトの建設許可が下りた。着工からわずか12カ月で入居開始、とてもファストな動きだった^{図2}。

成文憲法を持たない英国では、建築法規も完全な性能規定だ。すなわち、証明できれば、実現できる。われわれは大きなCLTサンプルと欧州でのふんだんな試験結果を揃えて建築許可の所管部署へ行った。Techniker (構造エンジニア)やKLH (材料メーカー)が設計チームへ参画するだけでなく、自治体や施主も巻き込んだ。関係者全員の熱意と努力な

しにこの建物は建たなかっただろう。Stadhausプロジェクトは、木質建設に対する考え方を決定的に変えた。

われわれのビジョンは、木材がコンクリートや鉄に代替しうる現実的な材料だと論証することだ^{図3}。材料がわれわれの創造する建築そのものへ与える影響についてももう一度考え始めている。進化の途上において、発明当初の自動車が馬車の形に似通っていたように、われわれの建物もまだコンクリート造りの先導者にそっくりだ。100年前、コンクリートの再発見によって形づくられた建物のタイポロジーがわれわれの創造の源泉に深く宿っており、そこで参照するイメージもまた具体的だ。そればかりではない。施工のプロセスもコンクリート造の取り決めがまだ染みついていて、契約形態や施工現場の状況もまた産業化時代に成立したルールに基づいている。気候変動を考慮した精神文化へ急速に移行するにあたり、これらのプロセスは抜本的な再設計の必要に迫られている。

われわれは多くのCLT材料をオーストリアから輸入しているが、いつか地元でつくられたCLT材を使えれば理想的だ。うれしいことに、現在イングランド北部には加工工場が建設中である。一方で、われわれは英国でリチャード・ロジャースと、米国でSHOPと、そして、ロンドンで坂茂と共にプロジェクトを進めている。毎週のように世界各国から学生や教授たちがたくさん質問とともにわれわれを訪ねて来る。エキサイティングな時間だ。

今われわれがすべきことは二つ。都市をより自然に、美しく、効率的につくり直す方法を迅速に習得すること。より多くの植林を進めること。二酸化炭素を吸収し、土壌を肥沃にするため、地球を木々で満たす必要がある。それも今、実行する必要がある。なぜなら木質建築はものすごく速く建つが、樹木の成長はとてもゆっくりだから。(抄訳)



図1 2003年、英国初のCLT建築。南ロンドンのハットリ・ジョウジ邸、3階建て45m²の増築工事。大工3人によって運搬車両から直接パネルを吊り上げ、わずか半日で精確に施工された。
図2 2009年、9階建集合住宅のStadthaus竣工。毎年9月、建物の前ではオープンハウスイベントに合わせて木質建築の公開トークを行う。住民自らが彼らの住まいのよさ：防音性、快適な室内温熱環境、住み心地そのものについて語る。プロジェクトを重ねるに従い、木材が石やコンクリートとは異なる熱力学的傾向を有することが明らかになった。
図3 精密なプレカット技術は20世紀までの従来方法を超える高い精度で現場での組み立て施工を実現した (Whitmore Road)。
図4 最新プロジェクトDalston Lane。延床面積17,000m²の10階建集合住宅。設計事務所の3D図面データはエンジニア、CLTプレカット工場と共有された。デジタルな直結により、建築家は単なるグラフィックデザイナーではなく、再び施工プロセスへ深く関与する。ミスなら何と言ったのだろうか？

More than Just Extra Insulation and Solar Panel 断熱とソーラーパネルを加えるだけでなく

Everything we do now should be done with our planet in mind. Touch the ground lightly is the mantra of Australian Aboriginals. However, the international Architectural community seems en-masse to believe that a little extra insulation and a couple of solar panels should do the trick. Keep calm and carry on the conceit. This really is not a tenable attitude, humanity has to start thinking consciously and strategically about how we build, what we build in, and what affect our architecture is having on the planet.

Through the 1980's and 90's engineers and wood scientists in Switzerland and Austria worked with sophisticated harmless new adhesives laminating timber planks in perpendicular layers to form large panels. The genius of these simple panels was to create a building material that is light, adaptable, and very strong. Commercial production of Cross Laminated Timber (CLT) began in Austria in the late 90's. By 2008 50,000m³ a year were produced in Austria, Germany and Switzerland, by 2017 more than a million m³ will be produced across the world.

In 2003 my practice built the first CLT panel building in the UK; a 45sqm, three-storey extension for classical musician Joji Hattori in South London. It was a small but perfect experience. Three carpenters built this accurate little building on a Saturday afternoon, craned directly off the delivery truck.

We took the notion of that modest building and extrapolated it. To face the two challenges for contemporary architecture; climate change and urban densification, how can we build up our cities without exacerbating climate change? Through our experience of the Hattori building we contemplated of a city built from timber, of a new timber age for architecture.

Slow Process; Dancing with Communities and Clients 地域コミュニティを動かすスローなプロセス

We drew a lot of timber buildings over the next few years, but found little interest. So we honed our argument. We demonstrated that this is a quick method of construction, very quick. We drew programmes for our clients that demonstrated that we could build buildings in half the time with half the people on site, fewer deliveries and fewer foundations. We got better and better at this argument... Alongside this we got better at politics, both with our clients and in local politics. We were able to encourage local politicians that by using timber we could build truly sustainable buildings quietly and with half the construction traffic. We persuaded them to let us propose taller buildings if they were timber... we generated allies. It was a slow process.

In April 2007 we presented our ideas to a housing co-op for a building in Shoreditch, East London. We took the principle of the design to the local authority and were permitted two extra storeys. We laid this news at the feet of our client with other facts; it was faster, less expensive and cheaper. By January 2008 we started construction and by January 2009 the first people were living there. It was a fast ride.

Proposing a nine storey timber building was a challenge in many ways and we had only weeks to demonstrate it feasible. We have no written constitution in the UK, if you can prove it - you can do it - a completely performance based building code. We arrived at the code official's office with a large piece of timber and arms full of European test results, between us the structural engineer Techniker, the manufacturer KLH and finally our client we raced around the UK persuading and encouraging people not into immediately signing off the structure but into becoming part of the design team. We could not have built this building without the enthusiasm and passion of everyone involved. I believe that the completion of Stadthaus changed the perception of timber construction forever. Our vision to demonstrate that timber is a viable alternative to concrete and steel was built.

Continuous Learning after the Completion 竣工後も学びは続く

Every September we give a public talk about timber architecture outside Stadthaus as part of the Open House weekend. Invariably a resident of the building will come down and tell us all what it's like to live there - that she

can't hear her neighbours.. or that he's never used the heating. Because beyond the fact that we are using this wonderfully renewable carbon based material is that timber is a beautiful material to build in. Timber builds healthy breathing buildings - buildings fit for people to live in. We are learning more about how the material works on each building we complete. For instance, to meet the energy-use building code the envelope of the building must meet a certain thermal resistance. We know that timber has a completely different thermal dynamic to masonry - timber manages a temperature equilibrium, cooler in summer and warmer in winter. In each of our timber buildings the thermal performance outstrips expectation. We shouldn't be surprised, timber is a natural material, prone to the same climatic conditions that we are.

Since 2009 we have built seven more CLT buildings, I now live in one! Our latest project Dalston Lane is 17,000sqm, ten storeys tall and built for a large UK house builder. On this project another piece of the puzzle was complete - we were able to transfer the 3D design drawing files from our desktop directly to the engineer and then to the CLT factory where the timber panels were cut precisely to size with window and door openings cut out and recesses routed for services. Prefabrication this precise allowed the panels to be assembled on-site with accuracy unknown to twentieth century construction methods. Prefabrication takes preparation. A little more time spent at the earlier stages of the job ensured that all the pieces were present and correct.

Changing Role of Architects: Re-engagement and Re-configuration 変化する建築家の役割：施工段階へのコミットと設計知識の再編

Through this immediate digital connection the architect is brought so much closer to the process of construction. Knowing that what we draw will be precisely what is built gives the architect a amazing opportunity to re-engage with construction and to re-learn our craft. Surely the role of the architect should be more than just a dandy involved in style alone. What would Mies have said!?

We are learning at a faster rate than I thought possible in architecture, we are once again beginning to understand how the materials we build can influence the architecture we create. We are at the beginning of an evolutionary process, as the first cars resembled carriages our buildings are very similar in conception to their concrete forebears. The typology developed a hundred years ago through the re-discovery of concrete is deeply embedded in our creative psyche, the visual references that we hold for buildings are concrete ones. Beyond this the processes of construction are still steeped in concrete the disciplines, the contracts and the building sites we see around us are those of an Industrial Age. Moving rapidly forward into a climate sensitive culture these processes must, by necessity, be completely re-configured.

Producing Locally and Working Globally 地元でつくり、グローバルに活動する

Ideally one day our CLT will be locally produced. There is a factory under construction in the North of England, which is an exciting and long hoped for development. To feed our CLT plants we need to all plant more trees, the manufacture of CLT should be a local process but for that we need locally grown timber. For now we import most of our CLT from Austria a slow 15-hour drive - but not much further than Scotland.

Truly we are seeing the emergence of the Timber Age in architecture. We are now working alongside architects such as Richard Rogers in the UK, SHOP in the USA and with Shigeru Ban on a project in London. We have students and professors from around the world knocking on our door every week with bags full of questions, exciting times

For now we need to do two things; we need to quickly learn how to re-build our cities naturally, beautifully and efficiently. And we need to grow more trees, we need to fill our planet full of trees, soak up the carbon and re-fuel the soil. We need to do this now, because although our timber buildings go up quickly trees really do grow very slowly.