Learning to engineer

In the last *Build*, we described toy building sets that imitated the process of building. Here we look at engineering models like Meccano and how their complexity fostered their users' ability to problem-solve.

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By the start of the 20th century, the roles of architect and engineer had clearly been split into two different disciplines. This split is reflected in construction toys and also raises the issue of gender and toys. Engineering toys were seen as boys' toys, and it was a brave manufacturer that pictured girls playing with them – usually the girl is to one side, watching admiringly (see Figure 1).

Bricks and blocks have more universal appeal, and girls were sometimes shown playing with the toy on the box lid. Bricks and blocks also make buildings, but many engineering toys make mechanisms, which girls were not thought to be interested in.

Castos

Among engineering toys (which are difficult to define precisely), the idea of making model reinforced concrete on the living room carpet seems improbable. Yet from the 1940s, Castos (see Figure 2) set out to do just that with its plans, wooden moulds, reinforcing and bag of ready mix (just add water in the rubber bowl provided and stir).

The models that can be made with this set are also curious. Plans for a modernist railway signal box and a stadium, which seem to have been inspired by Nervi, seem appropriate for the material. However, there are also full plans for building a model of Monkwearmouth Church on Tyneside, a stone building from around the 7th century. The Romans may have used concrete, but it's pretty certain that it wasn't used in medieval Europe, yet the instructions with Castos are clear.

The survival of relatively intact sets of Castos suggests that parental intervention sometimes precluded this potentially messy toy from being played with.

Figure 1: Girls are not usually shown playing with these toys. Here, the girl watches and admires.

Meccano – top engineering toy

Top of the list of engineering toys must be Meccano, patented by Frank Hornby in 1901. His initial aim was to give children a new toy to play with every day, as the same system could be made into a toy lorry or a toy crane. What he did not foresee was that it was the making of Meccano that provided the play value, not the hours spent pushing the finished toy around. After many hours spent making the model or mechanism, it would sit gathering dust in a corner because no one could bear to take it apart.

Clear instructions? Yeah, right!

It isn't just the level of intricacy that means Meccano models take ages to put together, but the level of knowledge assumed in the instructions. Unlike Lego where the position of every brick is shown, a Meccano model often has no more than a drawing of the finished item with some rather sketchy written orders to go with it. One of the more daunting of these, from the Outfit No. 8 'Lifeboat and tractor' model reads, 'The construction of the lifeboat itself is clear from the various illustrations' (see Figure 3) – yeah, right.

The instructions are frequently perverse and the gear train as shown in the drawing may not work in practice, requiring on-site problem-solving by the boy engineer. Considerable manual dexterity is needed to put together the miniature nuts and bolts, often deep inside the model. Bending the metal plates into curves is not easy either (and flattening them out afterwards is best done with a rolling pin, something else the instructions fail to tell you).

What Meccano taught was a terrific understanding of how mechanisms work. It's hard not to hypothesise that a number 8 wire society must be

Figure 2: Castos.

one brought up playing with Meccano, which was certainly sold in New Zealand as were two of its direct copies.

Ezy-Bilt and Buz Builder

Ezy-Bilt (see Figure 4) is an Australian copy of Meccano, and it is often hard to distinguish between the two. Serious collectors should look for the faint 'Meccano' mark on each Meccano part.

The instructions are just as hard to follow as those of the original, and the models are often direct copies. Buz Builder was another Australian copy, but some of the parts were slightly different to their Meccano equivalents. Both systems were eventually manufactured in New Zealand as well as Australia and, surprisingly, seem to have escaped serious litigation.

Texas Toys

A wooden version of Meccano invented in Eltham, Taranaki, by Swedish immigrant Gunnar Berger was marketed as Texas Toys. It has some of the adjustability of Meccano and wheels for constructing vehicles (see Figure 5) but it lacks the precision of metal Meccano, and the models that can be made with any set are far more limited. That it is made in New Zealand 'from lovely native timber' gives it a particular charm.

Juneero

For real hands-on field experience, there is nothing like building a model Anderson air-raid shelter out of old tin cans from the plans provided with a set of Juneero. Starting just before World War 2, a Juneero set consisted of solid and effective toy versions of the tools required to work metal – a press and cutting, bending and hole-punching tools.

You could make your own Meccano from waste metal, making it a useful toy for wartime. Children could also build a blackout lantern and a transmission station. Perhaps Juneero will experience a renaissance in the current age of austerity.

Modern toys provide less challenge

From looking at these old construction toys, two major changes seem evident over the last 50 years. First, the more modern the instructions, the more detailed they are, requiring a lot less interpretation by the builder. This could be seen as a deskilling – apparently the decline of Britain's engineering prowess has been linked to the decline of Meccano.

Secondly, the older sets were designed to make anything – a library or a cathedral, a crane or a locomotive – whereas a modern Lego set tends to make one specific model. This may be a result of the greater influence of design, but a sense of being able to create anything from a limited set of parts is lost. None of this will bother modern Lego fans, who enjoy countless hours creating their models (see Figure 6).

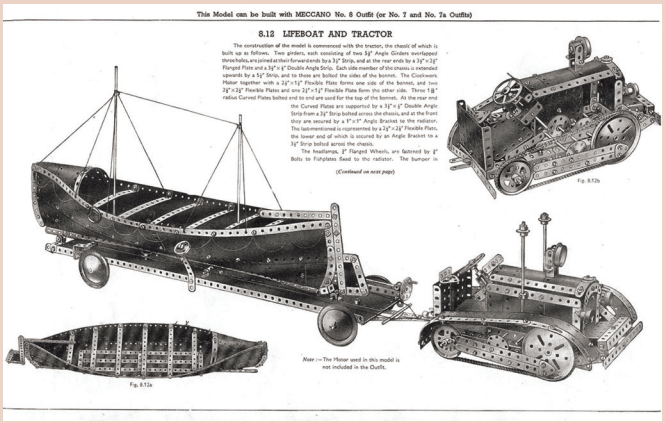

Figure 3: Meccano Outfit No. 8 Lifeboat and tractor.

Figure 4: Ezy-Bilt, an Australian copy of Meccano.

Figure 5: Texas Toys, a wooden version of Meccano invented in Eltham.

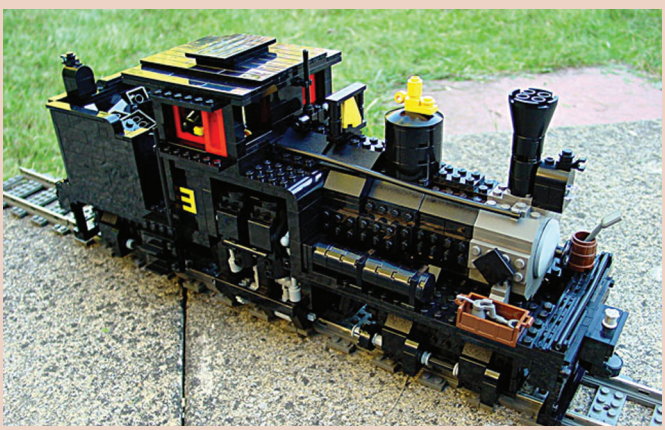

Figure 6: A Shay logging locomotive made from Lego.