

A Lego Technic history

1977 – 2017

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August 2020

Four periods

- **Man and machine**

boxy, under-the-hood models, based on a frugal parts list

- **The game changer**

removing of studs from beams radically expands the modeling landscape

- **Lost in toydom**

kitsch models that have no relation to real-world machines, a move towards the building of a toy to be used

- **I'm not a toy**

recovery of the building experience and of realistic machines, proliferation of parts

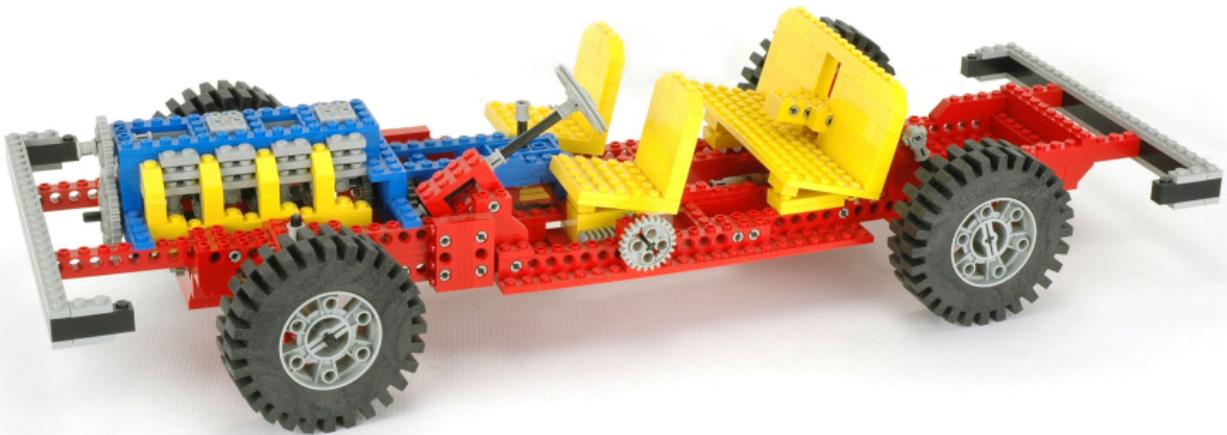
Man and machine: 1977 – ca. 1997

- Focus is on models of agricultural vehicles and cars, and vehicle related things, such as engines
- Early models made much use of standard Lego parts, and with the new ‘Technic’ parts added one or two functions
- The emphasis seems to have been to offer models that give an idea of how something works, even if the function in and of itself barely works

1977: 851 Tractor (320 pc.)



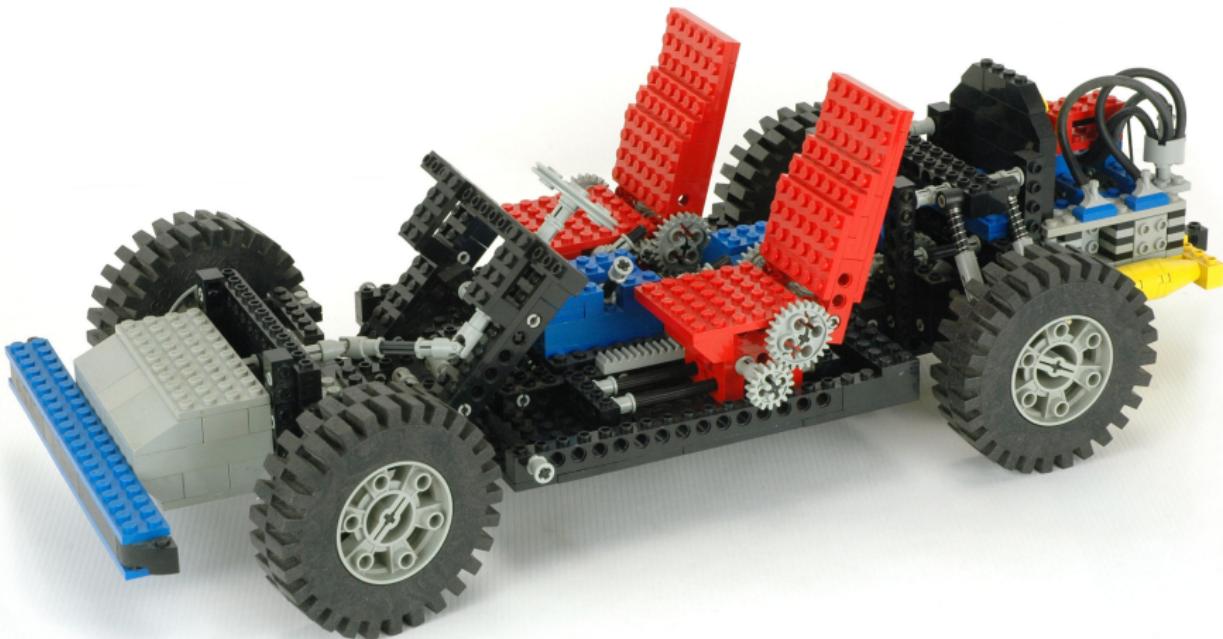
1977: 853 Auto chassis (619 pc.)



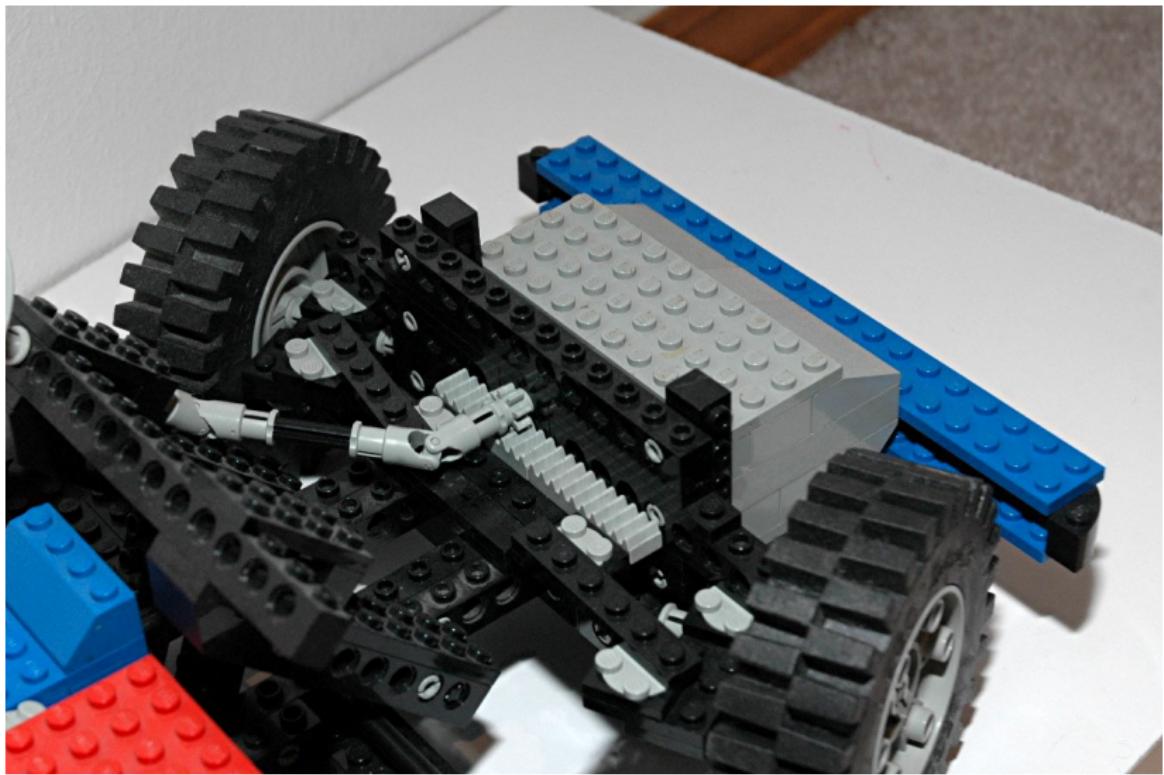
1978: 855 Mobile crane (520 pc.)



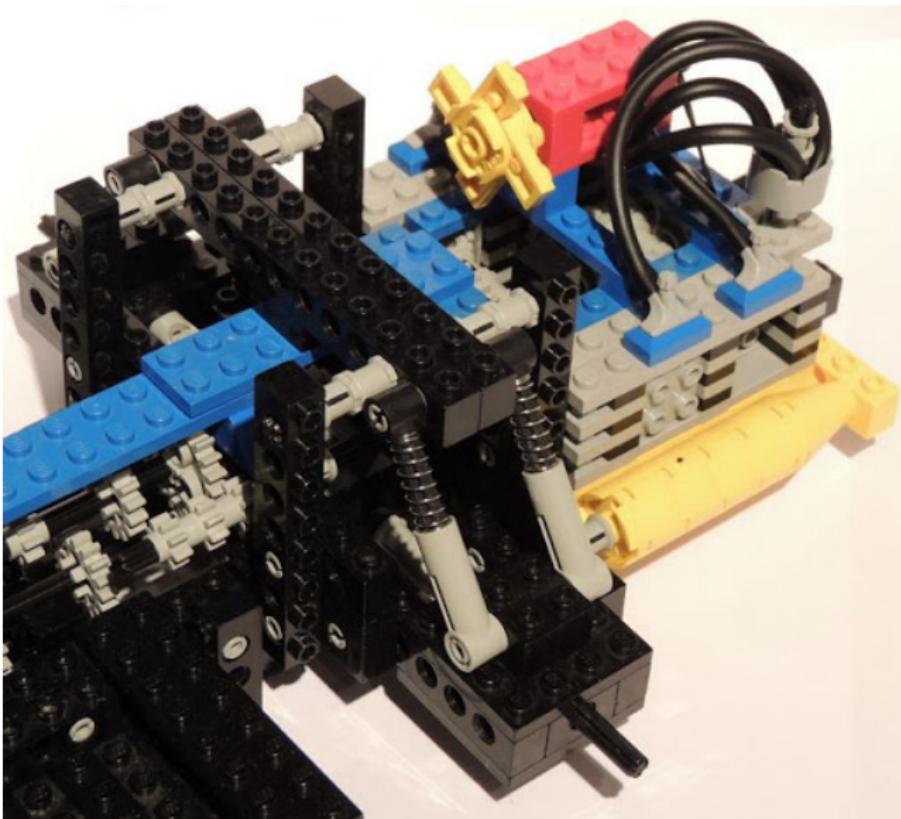
1980: 8860 Auto chassis (669 pc.)



Steering



Suspension

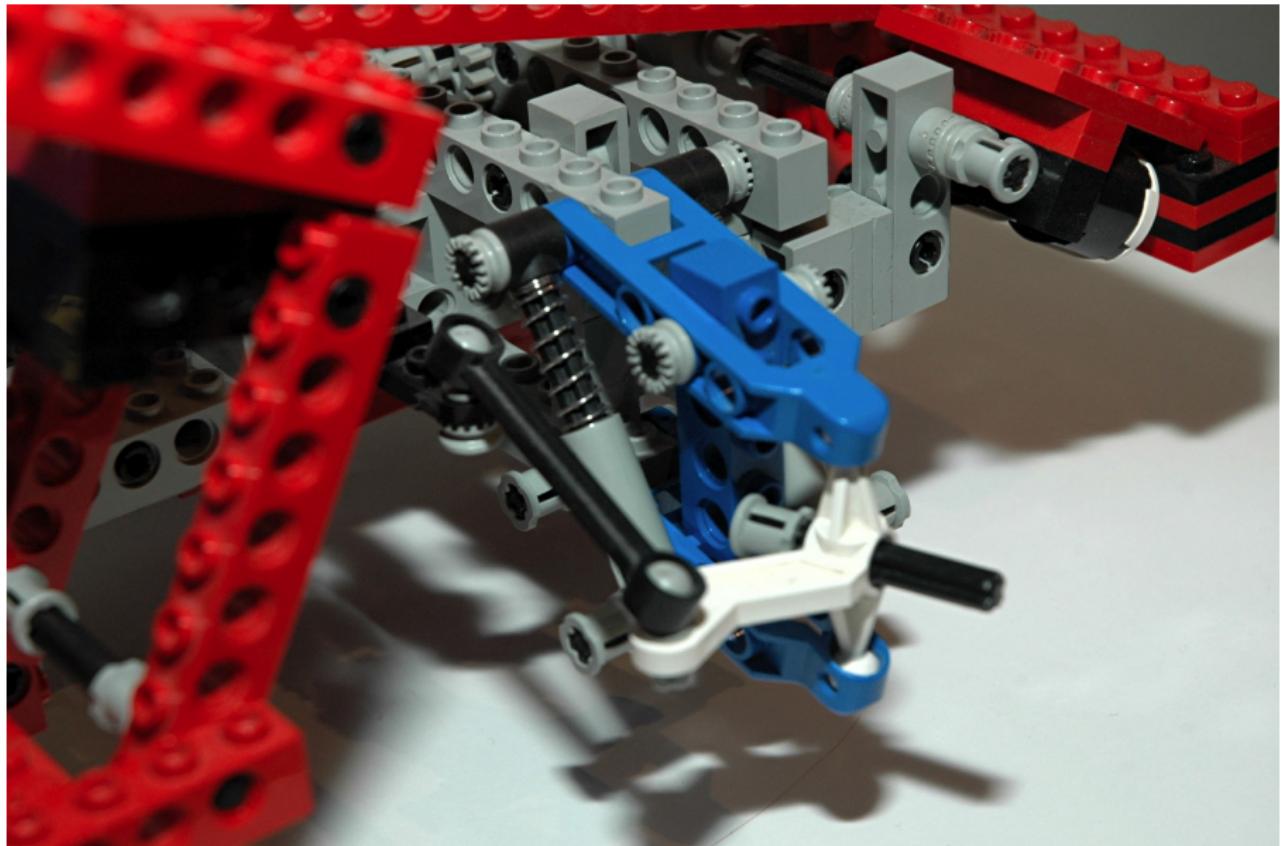


- Steering is primitive on the 8860, but at least is an Ackerman steering linkage
- Suspension, and later drive, is added to the steering in later models
- Rear suspension is single wishbone, but this too soon gets revised to double

1988: 8865 Test car (911 pc.)



Suspension

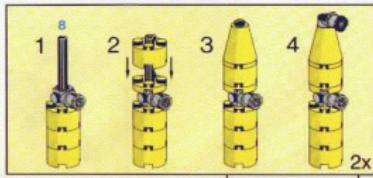
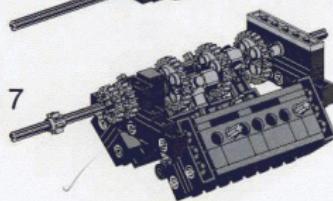
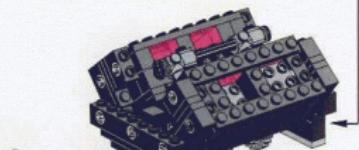
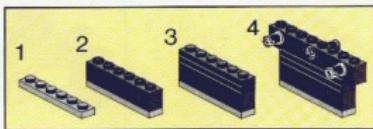
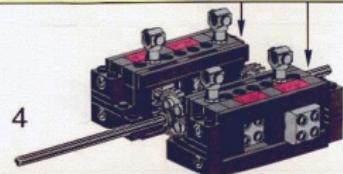
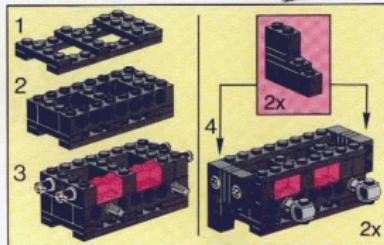
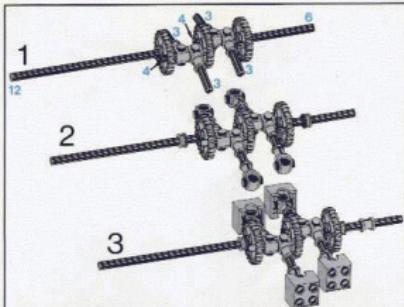
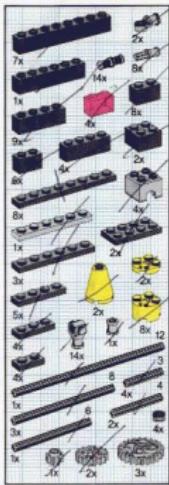


New part. Used once.



Instructions

18



- Steering and suspension are now combined, requiring new parts specially for the task
- Instructions are quite involved: for this model there are 24 steps, and step 18 is the entire engine
- A first attempt at offering some sort of body is made which strikes a good compromise between seeing the insides of the car and making it look like a car

1989: 8862 Backhoe Grader (677 pc.)



1990: homework

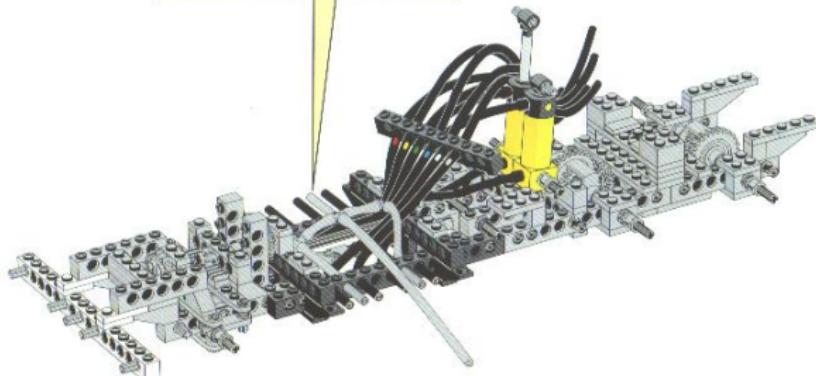
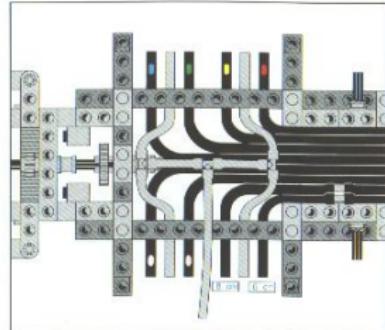
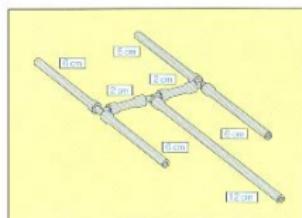
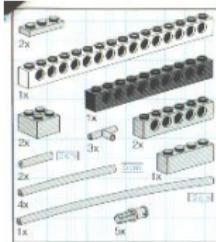


1992: 8868 Air Tech Claw Rig (969 pc.)

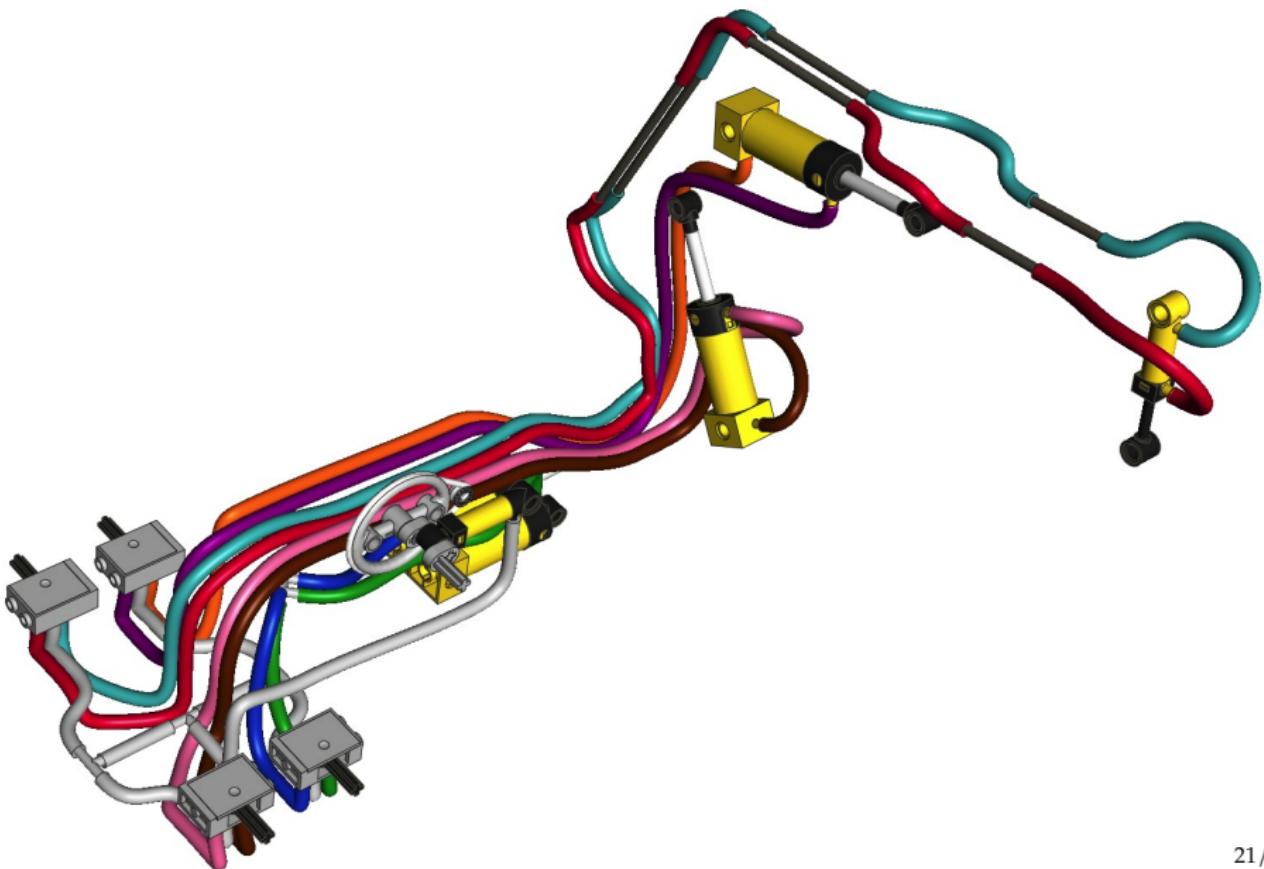


Instructions

10



Pneumatics

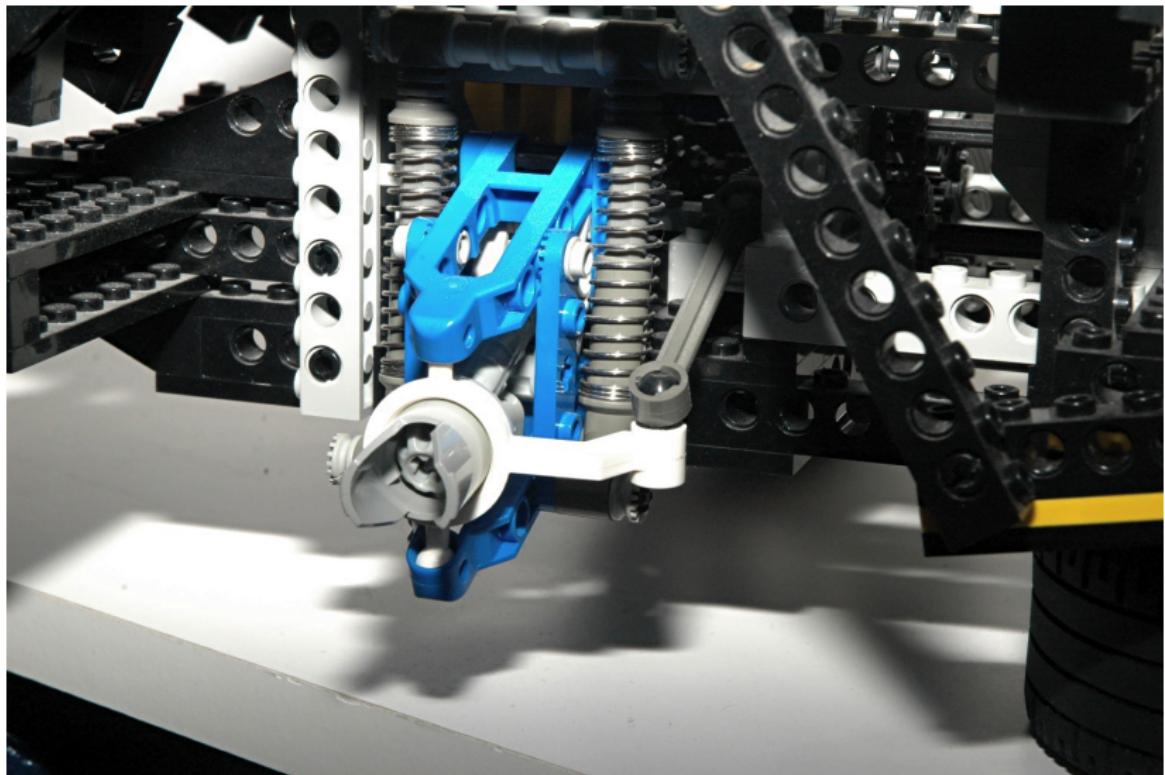


- Makes use of revised pneumatics, which for the first time is powered by a motorised compressor
- The model is significantly more complex than anything so far, and instructions are still quite dense, involving only 32 steps.
- A well crafted and realistic looking model with many sophisticated functions

1994: 8880 Super car



Suspension



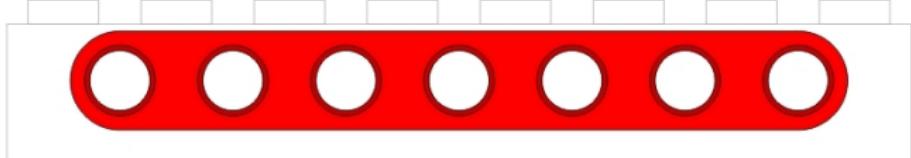
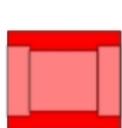
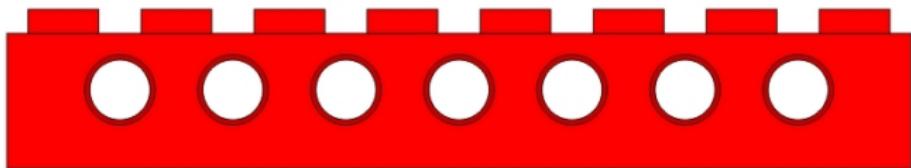
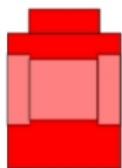
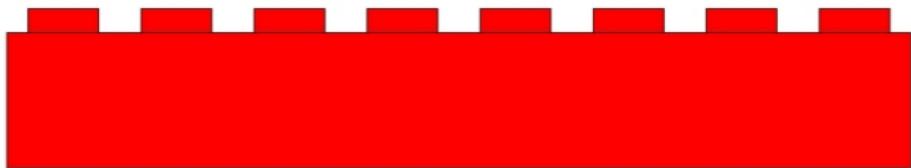
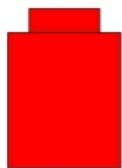
Chassis



- This model represents the limits of what could be done with the existing Lego parts range.
- For the first time, the build of the model was too complicated to understand during the process of building
- Steering, suspension and drive are all combined (and on all four wheels!)

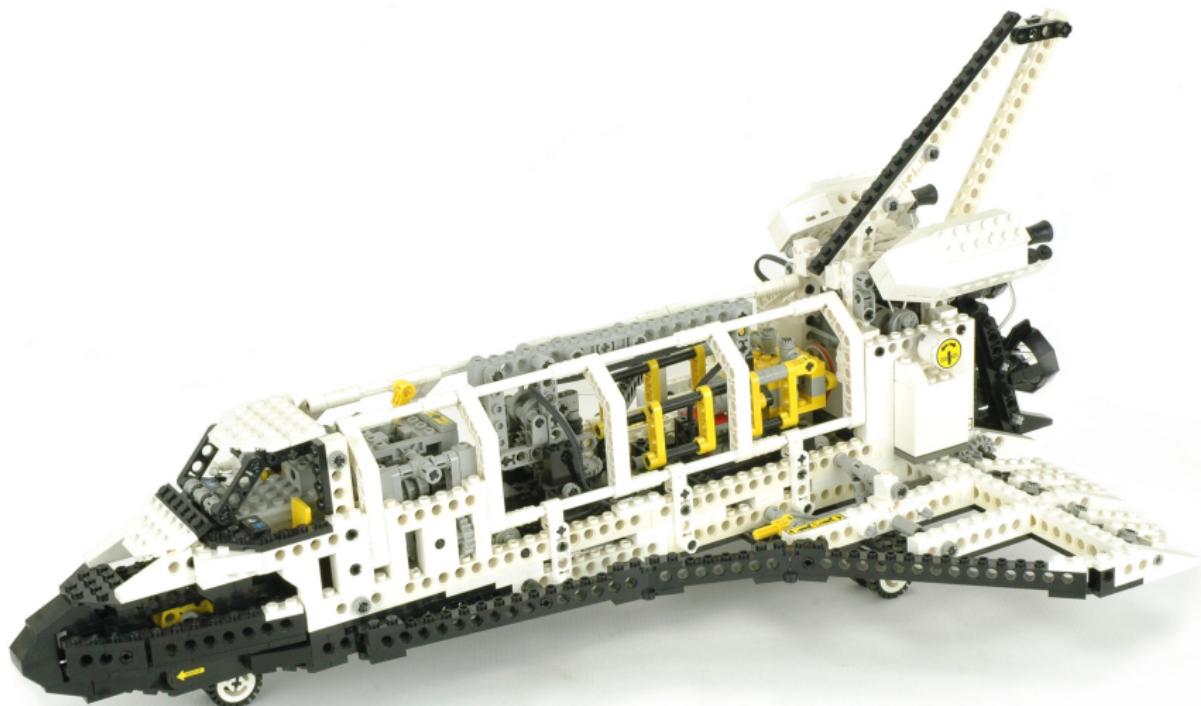
The game changer: ca. 1996 – 2010

1996: Going studless



Brighton Toy and Model Museum

1996: 8480 Shuttle



- The transition from studded beam construction to studless took a long time. Early use was superficial, mainly for styling.
- Building studlessly required a very different approach: building from inside out, rather than bottom to top.
- This small change was a stroke of genius: it kept backward compatibility whilst facilitating angular beams

Backward compatibility elsewhere...

KEYNOTE: Bridge to

NewThingia:

How to answer

"why will yours
succeed, when X,
Y, and Z have
failed?"



Herb Sutter



Counterexample: Python

2008: Python 3

Source breaking change (can't compile 2 as 3)

	Python 2	Python 3
x = 3/2	x == 2	x == 1.5

Manual migration + tools (2to3, Pylint, Futurize,
Modernize, caniusepython3, tox, mypy)

2017: Most Python code still written in "2∩3"

2020: 2.x frozen and unsupported

~12-year transition

vs. 8 years per major version for 1→2→3
(1994→2000→2008)



Python 3 vs Python 2

- Python 3
- Python 2



Although Python 2 is no longer maintained, 10%
respondents still actively use it.

Source: JetBrains Python Developers Survey (Oct 2019)

Breaking change costs 10 years

KEYNOTE: Bridge to

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Herb Sutter



Quick recap: A “**lost decade**” pattern

C99 – ~12 years

Added `_Complex` and `VLA` in **1999**

Walked them back to “optional” in **2011**

C++11 string – ~11 years

Banned `RC` for `std::string` in **2008/2010**

Major Linux distro enabled it in **2019**

Python 3 – ~12 years

Shipped 3.0 in **2008**

10% still using 2.x as of early **2020**

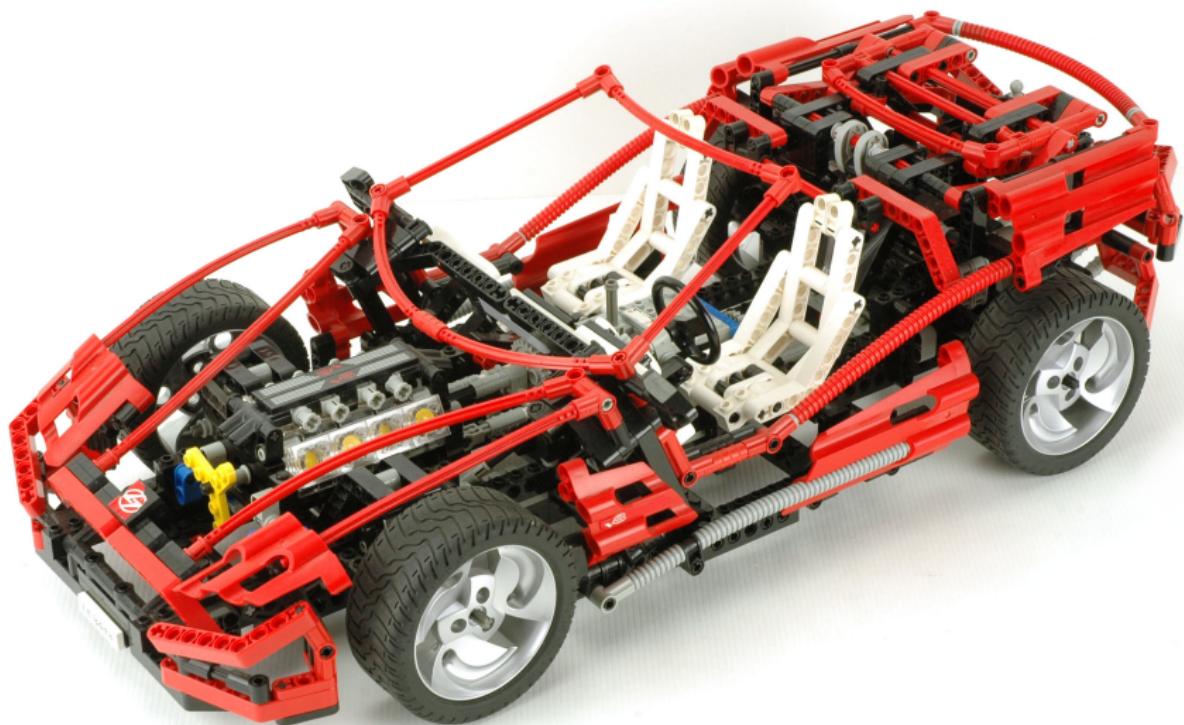
If you don't build a
strong backward
compatibility bridge,
expect to slow your
adoption down by
~10 years
(absent other forces)

Lost in toydom: ca. 1998 – 2001

1998: 8462



1999: 8448

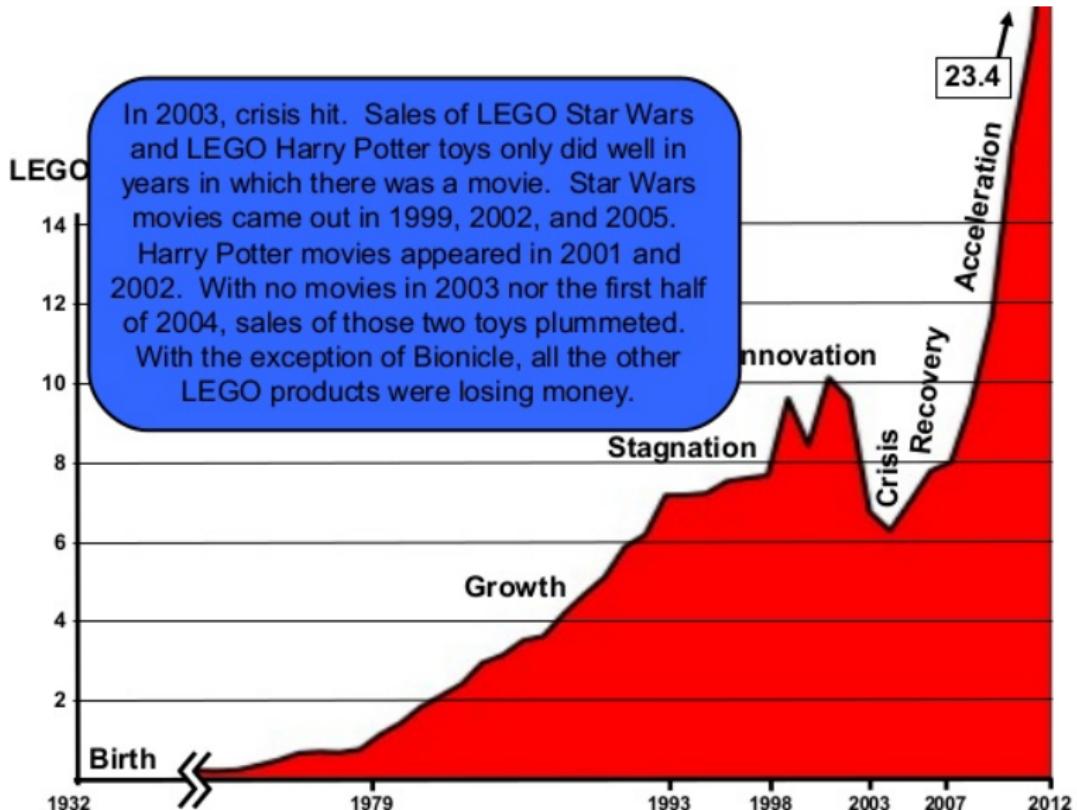


2001: 8466



- For some reason, coincidentally with the introduction of studless beams, models took a turn for the worse, attempting to appeal to the kool kids
- This was a grave error of judgement. Lego Technic was never cool (but it was acceptable)
- There seemed to be wider trends throughout Lego, seeming to lose sight of its roots. Consequently, the business almost went bust

2003 financial crisis



I'm not a toy: ca. 2003 – present

2005: 8421 Mobile crane (1884 pc.)



2007: 8275 Bulldozer (1405 pc.)



2010: 8043 Excavator (1127 pc.)



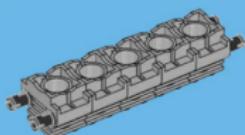
2015: 42043 Mercedes-Benz Arocs



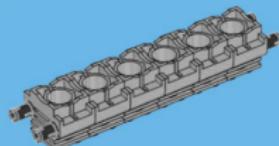
Instructions (484 pages, 2793 pc.)



5



6



- Technic gets back on track, offering new versions of classic models. This time the level of sophistication is dramatically increased, along with the number of pieces.
- With the full transition to studless beams, the models then become branded, now that styling can really capture the actual vehicle it represents.
- However, with a return to tradition one thing remains different from early models: instructions are generally trivially easy to follow. Arguably, long term attention becomes the challenge rather than working out each step of the build.



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