

Trains

1-million people per interchange

It works out to 330 interchanges for the US, or thereabouts. If it is half a million people per interchange, then we have 660 interchanges. If it is 330,000 per interchange that is 1,000 interchanges.

Accurate train movement

If we can do Segway's, we can easily couple and de-couple our passenger railcars at freeway speeds.

No possibility of bot collision

Let's run the track maintenance bots in a different track position than the trains with no overlaps. This is so the slow and flat moving track maintenance bots can run 24 hours.

Impact couplings

While these can handle say an 8-km/h collision, all the trains approaching another train are going at less than 1-km/hour difference when they do their final approach to couple. It should all be computerized and totally smooth every time.

Trains coupling while in motion

Our trains are going to go very precise speeds over and over again, hundreds of times a day, on their own viaduct shared with no other trains, and with no on-grade crossings. They will do the exact same coupling over and over all day long every day. So the connections will be super smooth and flawless.

Plague cars

If the world is using the same train gauge, we could have a great number of plague cars standing by, ready to be sent to the next Wuhan.

Trains with compartments

In our new trains, people are not going to sit in giant airplane-style fuselages, but in compartments, such as the old European trains had. On the metro trains, these may be transverse with each compartment getting a door on either side and at 90° to the track, like a royal poinciana tree seed pod.

Bio-safe metro trains

The Doublewide metro cars have doors on both sides, of each transverse compartment, but no central hall, and no communication between the compartments. Also, the interchange stations are outdoors, with a roof like the Siam station, or the the binarios of Napoli Centrale train station. Also, maybe in times of quarantine, everyone's compartment numbers and times can be tracked by an app.

Disinfecting public space

Maybe there are UV lights on our planes, trains, metro cars and stations... so we can run disinfection cycles between passages.

No attached cloth in shared areas

Nothing should be covered in cloth in shared places, especially in transit. There should be no carpet on the floor, no cloth on the chairs, And all shared mattresses should be covered in a waterproof and air tight covering. This should be seen as a basic sanitation law, something especially needed in times of plague. For how do we deal with the hotel carpets and drapes during a viral outbreak?

Automatic fever screening

perhaps there should be constant fever monitoring by computer. If you want to enter either a township, or the metro system, you must pass by a thermal camera with AI that detects people with fevers.

Bridges without trolls

The rail bridges are made of open trusses and there is no shelter under this sort of bridge.

H trestle systems

1/ The H-Trestles are brought out on cars that can roll on either rails or naked and unfilled H-trestles. Essentially we imagine a truck that has guidance wheels so it can run on the tops of concrete tilt-up walls. And it only takes a 15 seconds per car to transition from rail to wall-edge in either direction.

2/ The H-trestles loads are repeated on each previously laid trestle. Also the conveying cars are supposed to vibrate so as to get the initial settlement out and stabilize the H-trestles as a foundation.

3/ Once cast, the structure is backfilled, covered and skirted with sloped concrete to keep seasonal soil moisture differences from causing the soil to heave.

Drivable viaduct

The top edge of the H-viaduct might be drivable with special vehicles. Thus we might send a sort of vibrating steam roller down the viaducts to stabilize them. In fact, this might go back and forth 10 times before we set tracks.

Over designed for the load

The bottom bolts will be quite fat. But this will not be due to the vertical loads, but the shear loads for panic stops.

Wheels cheaper than rail flanges

Maybe the ideal config is to use 20cm dia. X 50cm wheels and 20 to 25cm rail flanges. The axils are bracketed on both sides, unlike with bike and automobile wheels.

Mid track car exit

The rails of course need to be at the same elevation as the paving. But there is a sort of hydraulic boat ramp either permanently put between the tracks or on wheels. Either that or the railcars can be lifted off the tracks with a crane.

Infrastructure tech must be ubiquitous and open source

The Senate should only be allowed to use ubiquitous tech in its automobile network, on its train system, in its delivery system, and perhaps in its healthcare system.

3m trains and mountain tunnels

For the short spur trains in mountainous Iran, Turkey, and Pakistan, We may want to use 2m or 3m trains, so the tunnels are easier to build. Then people and goods change trains when they hit the flatland station.

Railroads on top

Everyone shall be required to stay out of the way of railroads and no railroad shall pay any settlement to any non passenger injured by a collision with a rail vehicle on either a raised or fenced viaduct.

Track gauge spacing

When I look at the absurdly narrow gauge (spacing) of railroad tracks, I understand how the dutiful German herd was marched off to war... twice.

Rail tech is 170 years old tech

looking back, what a stupid future we have had.

The air is 3X thinner at 30,000-ft, but The wind profile is 3x less without wings

The air is 3X thicker at sea level than 30,000 ft, but there is no wing or engine drag. So the wind resistance for trains is probably smaller than for jumbo jets. And if the viaducts are raised and paved/planted around, maybe they can go aircraft speeds on rails... With no take-offs or landings, and no energy to stay aloft.

Jumbo jets

1/ The A-380 can be configured to have up to 850 sardine slots.

2/ I see sloped catapults", super-powerful maybe the HP of 800 Tesla cars. When thrust upon the landing gear reaches X, the thing auto-engages and boom, the craft is coming off the catapult at rail speeds that are far above current stall speed. Maybe 500kph. So take off failures are not as deadly.

3/ The landing runways will be few and far between, maybe only 6 in the US. So they can be super long. So maybe we can consider 300kph stall speeds.

4/ Faster is better when we are using energy to cancel gravity. The wings will sweep back much like those beautiful Mach-2 Concord airplanes. So the planes will go

2.3X as fast as today's pokey-jets. So it's not going to be 11 hours from Los Angeles to Europe, instead it will be under 5-hours.

5/ Once we have a 500kph speed rail system in place, the US will only need a few airports. So one airport will serve the US northeast, one will be near Georgia, one in Texas, one in Chicago, one in the southwest, one in the north west. And the choices of destinations everywhere else will likewise be more limited than today. So we need big supersonic aircraft that are A-380 size. Also, it is one thing to be a flying sardine for 4 hours and another for 9 hours.

Much faster trains

It is probably safer to go airline speeds tethered to a track on a raised viaduct. I mean, we don't have to worry about weather or lightning, or engine failure, or volcanic ash.

<https://www.youtube.com/watch?v=cZINeaDjisY>

Why Concrete Needs Reinforcement

Look at 0:46 to 6:50

<https://www.youtube.com/watch?v=UOHURuAf5iY&list=PLTZM4MrZKfW90PdaBFt70BLTbz1bTF6Mn>

[v=UOHURuAf5iY&list=PLTZM4MrZKfW90PdaBFt70BLTbz1bTF6Mn](https://www.youtube.com/watch?v=UOHURuAf5iY&list=PLTZM4MrZKfW90PdaBFt70BLTbz1bTF6Mn)

What is Concrete?

0:35 to 7:22

<https://www.youtube.com/watch?v=PLF18H9JGHs&list=PLTZM4MrZKfW90PdaBFt70BLTbz1bTF6Mn&index=3>

[v=PLF18H9JGHs&list=PLTZM4MrZKfW90PdaBFt70BLTbz1bTF6Mn&index=3](https://www.youtube.com/watch?v=PLF18H9JGHs&list=PLTZM4MrZKfW90PdaBFt70BLTbz1bTF6Mn&index=3)

Does Rebar rust?

0:40 to 7:30

<https://www.youtube.com/watch?v=SW-NoiM726U>

How Soils Destroys Buildings

0:00 to 6:12

The tracks flexing at 4:09

<https://www.youtube.com/watch?v=rpkC4dTUPFY>

Train tracks don't dip

Any track dipping is pure energy waste. Do not

<https://www.youtube.com/watch?v=HxkR-DIizWA>

Large Diameter Shaft Drilling Timelapse Drilling large holes in the ground videoi

<https://www.youtube.com/watch?v=A0sM6xVAY-A>

Divergent Diamond interchanges

This would work better if we used double-decker bridges with top going in the opposite direction from the bottom. Then:

- 1) We can eliminate all semaphores, and all wait time and collisions.
- 2) The bridges become a bit cheaper overall.
- 3) The interchange is less confusing to unfamiliar drivers.

<https://www.youtube.com/watch?v=OdDsV19DBC>

Why New Yorkers Insisted On a "Worse" Subway Map - Cheddar Explains

- 1/ This video is a brilliant example of people lying to your face.
- 2/ Design aesthetic is absolutely unimportant to these maps.
- 3/ Bad metro maps are part of the Arab struggle.
- 4/ There is absolutely no reason for the subway map to lack surface features and scale. That it lacks these things is an act of sabotage.
- 5/ Government should be prohibited from making distorted maps like this.

<https://www.youtube.com/watch?v=fwjwePe-HmA>

Why Trains are so Expensive

- 1) At 1:38 we see how Amtrak uses 20,000 staff to transport 85,000 passengers a day. However in Europe we normally see 4-5 people staffing a train for 800 people. Assuming two shifts, that is about 89 seats per worker in contrast to the US trains that are 4.25 passengers per worker.
- 2) These US staffing levels are crazy.
- 3) How is it that a locomotive costs \$6,500,000? They only have about 3x the power of a semi truck which costs about \$115,000 new. Why does a locomotive cost 56x as much?
- 4) Why do motor-less passenger cars cost \$400,000 each? If each car has 72 seats, that is \$5,555/seat. A 15 seat Ford Transit costs \$36,000, or \$2,400/seat and that includes engine, transmission, fuel system, steering, etc.
- 5) I like that line at 4:03, "Railroad tracks are extraordinarily expensive to build. Typically more than \$1,000,000 per mile
- 6) This is obviously Arab propaganda. Note the accent of the narrator.

Train illustration

- 1/ 6:3 height ratio not 2:3 as today. Much more stable.
- 2/ Dynamic loads need proper foundations even more than static loads.
- 3/ Raised viaducts means 100% safety and total convenience of passage.
- 4/ The trains have dip recorders and there are robots to adjust the track and keep it super smooth.
- 5/ Small flat rolling wheels.
- 6/ The braking wheels push out against the tracks. So they use the track as a tether or straps to brake much faster than any loose vehicle ever could.
- 7/ Guidance wheels to keep the rolling wheels precisely on track.
- 8/ The guidance and braking wheels interlock with the web of the track and all but prevent derailment.
- 9/ Noise shroud. This is much cheaper than building walls everywhere. And if we get our trains quiet enough, thanks

to using proper foundations and noise shrouds, people won't mind living near the lines.

10/ Going by car/truck instead of train uses about 50 times as much energy, and makes about 50 times as much pollution.

11/ Cars kill 1.25 million people a year worldwide. It is like a nasty ongoing war and economic catastrophe that we will never be able to stop.

12/ These trains will go much faster than the patched-up, 150-year old train technology we use today.

Monorail backup stabilization

The trains run like bikes once they get going. And we can deal with docking by having grooves at the stations as they slow down. But we probably still need a way to keep the cars from flopping over too much and righting themselves if they have to stop along the way. Maybe there are wheels that engage with the bottom flange and these can be projected as the car gets going.

Monorails and hills

1/ There is no matching of the two rail curves, so it is easier to do curves.

2/ The curves can be more extreme if there is only one rail.

3/ They can have splined climbing grades.

4/ The vehicle is like a catamaran with 2 wheels at the bottom of each hull. Or maybe more accurately the catamarans have two funicular cabins, with a catamaran deck between their roofs.

5/ At a certain point the rail line dips to where the catamaran wheels start rolling on the ground. There the vehicle can depart one rail and enter another, perhaps backwards. Thus it is easy to scissor up a hill.

Comparing bats to squirrels

The mountain trains will be different from the high speed flatlands trains, very different in form.

The track bender

1/ If we are talking say 1-ton of bending force delivered by a number of bolts over the length of a railcar, I bet our rail I-beams are rather flexible over say the length of a rail car. So the track bender does not need to be exactly precise.

2/ The mechanism must be carried on the end of the train. It must also detach and move around on the ground.

3/ It should not be very hard to have a semi-precise and consistent and standardized track bending mechanism that we use worldwide to bend our tracks right. Maybe there are 9 shapes of track (straight, left, right, up, down, up right, etc.) and say 10 "arcrates", turning speeds, speeds that will eternally determine the speed of the trains that use those tracks.

Cube of velocity

100 mph	100hp
150 mph	200hp
200 mph	400hp
250 mph	800hp
300mph	1600hp
350mph	3,200hp
400mph	6,400hp

It should also be pointed out that moving at 400mph uses 64X the fuel of moving at 100mph. However if there are 1,000, or even 50 people using the vehicle, then it really doesn't matter. The main advantage is that we can have cities in $m^4 \times 4 = 16$ times the area, thus ending urban land scarcity.

Balancing the monorails

They will have scales and people will know that they will have to balance loads before they can go. And these things are just going back and forth on the same dedicated track every single day.

Bearing Strait bridge

1/ We make these ship-borne devices for drilling or perhaps more accurately "lathing" 5 meter holes in the sea floor. These allow us to key our "pier" columns into the sea floor.

2/ Maybe we tow out neutral weight hollow concrete structures with collapsed plastic bags in them. First we flood the structures with water and sink them in place. then we pump concrete into the bags to increase weight and strength and cement the columns to the keys in the sea floor.

3/ Maybe we make 2 of these seafloor holes every say 60m and use this to bear a truss bridge.

4/ Maybe there are up to four 7m train lines on each of on four levels for a total of 16 train lanes (8 in each direction).

Duck-train transport ships

Maybe we don't bridge the bearing straight. Maybe we just make 3,000 segmented ferry boats that are essentially multi-car trains where one boat pushes the water and several draft it. These run in and out of funnel docks that rise from the ocean. Maybe the docks have conveyor system that lift the vessels by their deck flanges. Maybe this is what we use for freight to Java, Taiwan, Japan, and Madagascar.

Texas city to Dallas train

Maybe there will be a station around Grandview TX, 50 mi south of Dallas. Here the Dallas bound trains might break into individual cars that all go to their own destination in Dallas. There are maybe 3 to 9 two-stop viaduct lines going into the various greenbelts around Dallas. And there is a shopping center at each stop like with the Schonhauser Alle shopping center in Berlin — but with the shopping center directly astride the platform.

Remember the train on the platform is behind glass while it is moving. Also maybe there is a Singapore-style food center with maybe 20 or 30 stalls.

300 mph trains via Texas City

Houston to TXC (~135mi) = 32 minutes.

Austin to TXC (~50mi) = 15 minutes.

Dallas to TXC (~140mi) = 33 minutes.

San Antonio to TXC (~150mi) = 35 minutes.

The Southeast Asian train loop

1/ This starts at the mountains west of Bangkok, a bit inland from Kanchanaburi. Then it runs on the plane along the edge of the mountains to Tak where one line heads up around and past Chiang Mai to the Burmese border. Another heads up around and past Chang Rai to the Burmese border. The station at Chang Rai collects many lines from the northern valley areas. These two areas will be the largest re-settlement areas in Thailand.

But we get back to the main line at Tak: This heads east to Phitsanulok and Loei. But along the way there is a stop for the line that heads up towards past Nam into Laos.

Getting back to the main line at Loei: This heads south of Vientiane to the Bueng-Kan area. Then south to between and past Ubon Rachathani. and Pakse. Then the line heads to south of Nakhon Ratchasima, Lopburi and then Kanchanaburi. Also Nakhon Ratchasima has lines to the hills of south Cambodia. The Ubon station connects to the southern hills of Vietnam in a few places. Also, in Eastern Thailand, there might be two stops (and spur line connections) between Loei and Vientiane.

In this hot part of the world, you need to put your new townships up high where it is cool and the air is clean. Also where you are safe from tsunamis. You should probably put your trains up at over 70m above sea. And if the terrain is not that much rougher at 120m, you should put the lines up there if you can. Whatever they cymology survey says.

Cargo interchanges

1/ The lighter cargo cars will probably have truck wheels of their own for going 10-kph (brisk walking speed) with no ability at all to make sharp turns or accelerate or decelerate fast. Because they move so slow, they will have 2-to-10 times the weight capacity of container trucks today.

2/ Maybe the heavier railcars roll onto these heavy duty tractor trailer frames on tires, like the trailers they use for transporting giant equipment on the highway. These back their rail ramps right up to the rail outlet and the cargo car mounts the trailer for the ride to the other rail spur.

Cargo rail lines go on top

Everything else goes under the cargo rail lines, and wherever practical these have 2m clearance on either side, so cars as much as 11m wide can be used.

Oversized cargo system

This is something that is supported on a limited basis between industrial areas.

I conquer gravity

The main reason we need to conquer gravity is logistics and transport. My trains will use energy to move air, but they will use very little conquering gravity. I also conquer gravity with rail-gun space shots.

Earth on rails

50x more energy efficient and less costly. 4x as fast.

Wide trains and precast houses

What a thing it will be when we are casting precast structures up to 8 or 9 meters wide and putting them on our 7m gauge rail system. That is a structure that is up to 9-meters by 40meters, that is 360 meters, or 3,920 square feet. So we will be moving pretty big structures around. These are made from rebar reinforced concrete in giant robotic molds. And these structures are designed to stack, so one foundation can bear maybe 20 floors if we really wanted it to. But these units will be finished out completely turn-key. Then they will go on a train for shipment.

Now probably most houses will come from within that region, but some high quality builders might sell all over the nation. And it will be a super competitive industry, so they will all design and build our homes with the same precision that people use to build our vehicles today. And because of this factory-made modular type of construction, it will cost maybe half or a third as much to build, especially with regard to quality construction.

Hotels on wheels

Our new 7m wide tracks will offer mini hotel rooms and suites on wheels, private bathrooms, and no real sense of motion in the trains. The door will lock from the inside. People will get on in New York at say 7:00pm and at 11:00am the next morning they will be in Los Angeles. Maybe there are 10 hotel rooms per car. The trains all quietly and gently de-couple and re-couple at rail interchanges, taking your car to its proper destination.

This is incidentally how to mostly eliminate the costly domestic air industry in the US, and provide the same level of transportation service for maybe 2% of the energy footprint and cost.

Sleeping cars

On sleeping cars, you need a tap ticket to move between car segments and to enter a compartment. Also, most sleeping is either a private room with a private bathroom or a 2 bunk compartment with a private shower-less bathroom, or a 6 bunk compartment with a shared shower-less bathroom.

Multi-family motorhomes

If our railcars are 8x30m, that is 240m per floor, and four 60m footprints. In this configuration, the 4 groups split the moving costs 4-ways. There are also probably triplexes and duplexes of 120m units.

So we might be able to swap-out 50m of viaduct in 8 points (one night) and install a complete new interchange. Build it anywhere along the line and then one night connect the new interchange and interchange city to the system.

Rails how cheap?

In India, the townships are perhaps 5 to 10 to maybe a 20km line. And maybe there are 18 lines, so that is 90 or 180 townships of say an average of say 10,000 people. So that is 900,000 to 1,800,000 people on 360km (360,000m) of metro line. So that is like 20-40cm of line per person.

California has 394,383 miles of roads and 39,510,000 people. So California has 100 people per mile of road. In feet that is one person per 52.8-feet, or one person per 16 meters of road. However with the urban rail system above (which does not include intercity lines) the amount of rail road is only 0.33 meters per person. So rails are much more efficient because we need to build and maintain 50 times as much roadway.

For a city of 2-million, we have either:

- 1/ A city with 600km of rails and maybe another 1,200km to 2,400km of loop roads. or we have,
- 2/ A city with 32,000km of roads like we see in so many parts of California.

When the interchanges grow crowded

We have to stop adding townships and add a new interchanges instead.

Metros

The transport system comes first

In designing new cities, the transit/ transportation system is the aspect that needs to be the most optimized because it presents the greatest challenge. So we must first make the most optimized and efficient transport system we can. Then once we have this figured out, we make our communities as close as possible to the transit. Then we do everything else.

Why are we reducing transit use by charging fees?

The exchange trains

These might be up to 800m long and 15m wide. That is 12,000 sqm., or say 12,840 seated passengers every 6 minutes, or 128,000 passengers an hour, in each of 2 or 4 directions. That is if we need trains that big.

Interchange platforms

I use both the Siam interchange and the Alexanderplatz S-Bahn platform as my mental model. I imagine both at rush hour. But even these platforms are a bit too narrow. And there are not enough escalators on these existing examples. Also, again, if you are going to one of the townships, the exit to your rail line "Tentacle" will be via an exit on the outside of the rails, and not between the rails. and that is where the escalators and lifts are.

Carswaps

This is where you don't go from platform to platform, but instead you walk across the platform, or down the platform to another car like in the Siam BTS station. It also can encompass going down the escalator to a parallel car swap on different level.

15m metro gauge

Something like this will certainly help keep our platforms shorter.

Carswap rail gauges

With carswaps the length of the station is critical. It is one thing to use a 500m long carswap and quite another to use a 2,000m long carswap. So with carswaps we use the widest gauge tracks we can.

Here we come to trains that are real wide, maybe 15m gauge trains that are 35m long, a whole train in one car. So they fit closer together and walking distances are reduced. Six 35m cars are 210m.

24 townships via 'dragonfly' carswap

Here a train stops a station and people board and exit from both sides, onto platforms. On the other side of the platforms are 4 local trains, two on each side. One heads left to 6-townships, one heads right to 6-townships, This on each side making 24 townships. And the entire thing is repeated on two levels. And there are lots of escalators. And maybe there is a roomy 30m (99-ft) between the trains for personal space. And the platform must be 420m to accommodate two 210m lines.

So here we get say 1.2 million people (24 x 50,000) using a linear station. Then again, maybe the townships have ~25,000 each and it is only 600,000 people using this interchange. But the exchange is a bit faster than when the township trains T-in to the exchange. However it is not very expandable... which may not matter due to natural

limits to the scale of an interchange before it becomes congested like overlarge Los Angeles is.

Train frequency

We assume 300kph operating speed, 30 second stops, and 60 seconds to reach then 60 seconds to stop:

5 minute trains range = 18km (12 trips/hr)

6 minute trains range = 24 km (10 trips/hr)

7.5 minute trains = 33km (8 trips/hour)

10 minute trains = 48km (6 trips/hr)

12.5 minute trains = 63km (5 trips/hr)

15 minute trains = 78km (4 trips/hr)

It's synchronized

In the example above, All of the cars leave at mostly the same time and they all arrive at mostly the same time.

And it takes 21 minutes to get to any other Township.

50X less energy

Would it be OK to burn coal if we only needed 2% of current energy consumption?

Make transit free

Cars burn over 50x more fuel per person/mile and make over 50x more carbon than trains.

Countdown clocks till doors close

The cars will have countdown displays till the doors close.

If you get caught jamming into a door and delaying a train, you have to clean stations for 100-hours.

The metro system has wall grappling for droids

This so you can get on, and your follow-me droid can carry your stuff. The droid follows you onto a railcar, and it just grapples by itself to the car. Then you get off and it follows you off. You interchange, it interchanges.

Why haven't corporations created transit communities?

Pathogen safe trains?

Fresh air vents should be no problem on vehicles going 300kph.

Transit vs. Driving

1) 98% less energy used.

2) 98% less CO2.

How come we tax transit & reduce its use?

Socialized logistics

It is such an easy thing, getting things from here to there in our day of smart machines and paving and railroads.

And we already have a socialized logistics service all over the world, called the mail.

Box droids

What if we had 1kg, 5kg, 20kg, 100kg box delivery droids... like the MSE-6 droid from the first Star Wars film? What if these could be dispatched from the cargo interchange (next to the human interchange) and all by themselves get on the trains to make deliveries in the townships?

Train occupancy colors

Full and empty seats are shown on the outside of rail cars by total number.

Red flashing = full

Red = over 95% full,

Yellow-Orange = over 80% full

Yellow Green = over 40% full

Blue = over 20% full

Purple = under 20% full.

Vinyl seats must be used

On all shared vehicles.

1/ There should be no holes in the waterproof vinyl seat cover—none. All ventilation must be through perforations in the underside of the support bench.

2/ All seats are padded with a 2 layer sandwich of foam that is softest on top. These pads are made of plywood and screwed from underneath to attach to the bench. There are about 30 small screws (that use a special allen driver) and a light adhesive to prevent vandals from unscrewing the seats.

3/ There is a drip welt around the edge of the seats so that any liquids spilled on the seat are shed onto the waterproof floor. The backs should be hard plastic.

4/ Where it never snows hard bench seats like in the NY subway should be used.

5/ All seats in all metros and non-intercity trains must have ridges that make the benches uncomfortable for sleeping horizontally.

Comparing apples with apples

Except in Los Angeles (the high speed freeway tailgating capital of the world) the average freeway lane generally does not handle more than about 1,800 vehicles per hour. So 4 lanes can only do about 7,200 vehicles/ hour. And we all know what excess traffic does to vehicle flow once the road is full.

Now a New York subway car is 2.62m wide and 15.65m long. This is 41-sqm. of floor area. Cars that are 15m X 40m will have 600m of floor area, 15-times as much floor area. So here we have two entire 7.5 car subway trains in one railcar. So this is about 15 X (43 seats + 200 standing) or 645 seated + 3000 standing per 15m X 40m railcar. If we have one train every 10 minutes, that is 3,870 seated and 18,000 standing per hour. Or maybe it is 8,000 seats and 2,000 standing per hour. (1.07 pax/ sqm)

If we use 7-meter gauge tracks instead of 15m gauge and T T T T T platforms, then the capacity of the trains is only perhaps 4,000 seats and 1,000 standing per hour per car. But we can also use 2 cars per township. It is just more walking down the platform.

Now let's compare a 4-lane highway side (half of an 8 lane highway) with a 7m gauge rail line with regard to cost and capacity.

1/ If the highway including shoulders has six 3.5m lanes, it is 21m wide. Compared to a 7m rail line, this is 3X as much surface area that must be prepared. So the cost of earth cutting and moving is 3X higher for roads.

And as far as concrete is concerned both the freeway and the viaduct trestles. are made of concrete that is just under 12" thick. A freeway thus uses under 48 cubic feet of concrete per lineal foot. A 14' tall viaduct (buried 2') would use 28 cubic feet per lineal foot for the outside walls. Then there is maybe another 4 cubic feet per lineal foot for the Z web holding the two walls together. But the highway uses about 50% more concrete to build than 4m long viaduct H-trestles. And if we use 2m H-trestles, the highway still probably uses 40% more concrete.

2/ The four highway lanes can handle 7,200 vehicles/ hour and no more. But the rail line side can handle 6 times 8,000 seats and 2,000 standing per hour. Or maybe maybe we use two cars per township and it is 12 times 8,000 seats and 2,000 standing per hour. And maybe we have outer township railcars for towns farther out that must skip every other cycle to join half the trains going to and from the interchange.

3/ Not counting viaduct vs. paving aspect. The 4+4 lane highways are much more expensive, but the railcars have around 6 to 16 times the carrying capacity.

Buggies & cars

Township buggies

In one version, I see the township buggies as shaped like an alpha Romeo spider. But it has moped wheels and a light frame and the doors and a padded bench seat that is maybe 110cm wide... like in an old Ford F-100 truck. And maybe this car has a top speed of 60kph and powered by a 200cc engine, or batteries, or compressed air.

Buggy = under say 8 miles

Scooter = under 40 miles

Car = unlimited distance

In general the vehicles we will used to get around our township suburbs will be scooters and have very short ranges. The vehicles we used to get to the exurbs around or townships will be will have a longer range.

Safety and shared vehicles

All shared vehicles should have live remote agency/recorder backup video available to assure their safety and encourage their use. This will be free and many women traveling alone will opt for this.

Electric cars as hard to fix as bicycles

Everything should just bolt together. The motors should be replaceable by disconnecting 4-bolts and unplugging a standard connection buss. Likewise for the batteries, the seat bottoms/back, the various roofs, and the axils.

Shared vehicles end car jacking

Convertibles

The vehicle operation system will eventually become totally safe, so removable top vehicles may become popular.

Township cars

I would have an outside car lot (with both covered and uncovered spaces) outside the ring road along the train line, down the rail viaduct line from where the entrance to the livery is. And most of these vehicles will be shared, but some people may keep private cars here, particularly if they live outside in the exurbs or nearby old cities and need to commute to access the new transport and urban system.

The right electric vehicle for the job

In our townships some electric vehicles can have a range of 5km, some of 10km, some of 20km. This is a huge thing for electric vehicles, not having more battery than is needed.

Close to the ground

The township buggies will be rather close to the ground, close like a formula car, but with smaller diameter wheels. And there will be no swales or crests to bottom-out on.

Car shoes

Our single-wide cars will all be self parking. And all should also have a shoeing function, where they park and lock to a standard parking/ transport/ and charging shoe. This is how cars will mount to railcars and ferries.

Downhill/uphill

There should be this standard algorithm for the speed of a self-drive road depending on the slope up or down. The vehicles should go faster when going uphill and slower when going downhill.

Icebear Maddog

These are tricycle mopeds. They weigh 258 pounds. So if we have four wheels and a plastic shell like a motorcycle windshield, opaque in places, sandwiching Styrofoam in places we imagine a lightweight enclosed township self-

driving shared car that weighs maybe 360-lbs. The paving it smoother, and the wheels much narrower, like the racing moped wheels. Lighter frame material, box structure. and the suspension much lighter because the roads are all properly engineered for this type of vehicle.

These are about 10% of the weight to the average "car" today. And maybe the engines have 8 hp like the mopeds or maybe they have a 12 or 14 hp. Maybe in the mountains they have to have 20 hp, but in places that are really flat they can get away with 5 hp because the vehicles never go faster than 50 km/h...with no traffic lights.

Airport bus ground clearance

The low ground clearance of airport busses should be noted and emulated for municipal busses. Thus we imagine busses that sidle-up to a special 30 cm bus curb. Thus wheelchairs and droids can enter the bus.

122cm wide single wide cars?

I think we should do some research on tipping and head clearance and figure out exactly how wide we want our single wide vehicles to be. Let's engineer this right, so that the vehicles are as safe, economical and comfortable as practical.

Romet 6E — \$7,800

This is a great example of a single wide car. It is about 1.1m wide. It has a 50km range and costs \$7,800. This is in contrast to the double-wide Chevrolet Volt, which costs \$33,520. So once the network marker chips for the driving grid and control system are in place in a city, the switch to single wide vehicles is a thing that will reduce vehicle costs by about 80%. So we imagine the richer and more forward looking congested towns building out the system over two years, and by the time the deadline comes, everyone will have the cheaper vehicles parked somewhere. I bet the sale of the old double-wide will mostly always pay for the downpayment on a new singlewide, and perhaps the whole darn purchase.

Autobianchi Bianchina

These are 1.34m wide, and 1.32m high. I call for cars that are 1.22m wide and 1.22m tall. And because the vehicle is self driving, and totally safe, there are two facing bench seats that are about 1m wide each. So two parents and two small kids can take a two row car or a 3-row car.

CityQ ebike

Here is a buggy prototype. It is 87cm wide, 155cm tall, 222cm long and weighs 68kg. It can take a 300kg load and costs \$9,000.

1987 Ford(Kia) Festiva

I drove one of these cars for a while. It got 48 mpg on the highway. It weighed 700kg.

CLUNKER = an old style human operated vehicles

ECAR = a network operated mostly single-wide vehicles.

There still will be motorcycles

Apparently it is easy to do self driving bikes like with the LIT motorcycle

Why are transit buses is so noisy?

Why are they so expensive? Why do their engines make so much noise? Why did the airbrakes make a loud pshhht sound? Why do they beep so loudly when they back up? Have they all been sabotaged?

Metal skin cars no more

When our driving system is totally safe, our cars can be made of plastic panels on a steel frame, like toys.

Delivery

Township hawker food delivery

Maybe at each quarter hour during meal time, there is a delivery car/bot that goes out from the food hawker center to each of the township ring roads, out to all delivery points on the ring road.

Droid cost per delivery

15 trips a day, 365 days/year, 12 year life. That's 66,000. So that's 8 cents per delivery for a \$5,000 droid.

No more delivery work

The new system is is all trains and mostly pallet-scale driverless local delivery bots, delivering all the shipments. So no more working drivers really.

Ride sharing slashes parking needs

Ride-sharing may increase traffic slightly over people using transit, but it does truly great things for reducing parking, which is an almost equally bad problem in many places. Also, if we eliminated the roadside parking made unnecessary by ride-sharing, and replaced it with extra traffic lanes, that would reduce traffic.

Car parts & ink cartridges

Certainly, the world would run more efficiently if government imposed say 9 different ink cartridge designs that work in all consumer printers/copiers. Let's do the same thing with our vehicles. Let's try to reduce the number of redundant designs we can do replacement components more efficiently.

Automobile seats

Maybe there are 20 standard designs that fit in all single wides. All must have connections for adding mini Velcro belts for holding a seat cover down.

loop roads

Lots of little buses

As long as there are no drivers, we are going to find that we want to have multiple small buses instead of one big bus servicing our loop roads.

Driverless busses

We can easily run our metro trains one right after the other, and without drivers. Like driverless buss loops on rails. But we should synchronize them to make interchanging efficient.

400 personal cars or 8 shared minivans?

Let's assume the 8 vans can carry 15 passengers each. That is 120 passengers at once for 2% of the number of vehicles.

The shared bus system is run for free by the township. It synchronizes with the zip trains. If these run every 8 minutes, and there is 60 seconds for station stops, and 60 seconds for stops, that is 6 minutes at say 80kph, or 8km size for the loop road to the station. 1km of ring and station, and 3km for each side of the ring road.

<Drawing of this>

Suburban loop road design

Think of a long country road where the road has been split into two one-way lanes that are say 300m apart. And imagine that every 100m to 500m there is a road connecting the two halves of the road. And in between the rung roads, there are trestle roads projecting outwards from the loop for some distance. There are no driveways that open directly onto the ring road. Also, there are no crossing intersections, only mergers and turn-offs.

The free driverless busses do the entire one-way loop, and they can stop at each rung called out by number from an app. They tend to drop off passengers as they head out, on one side of the ring. And on the other side of the ring, they tend to pick passengers up.

The offset pedestrian system

The inner rungs of the loop roads will have an inside hallway that is rather like those aircraft boarding ramps running between the middle of the two halves of the loop road. This will run at 2nd floor level above the roads for some blocks It will connect with a transverse hallways that everyone's row house backs up to. These run to the ring road.

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Train to bus, then individual cabs

At each arriving train in each township, there are perhaps 8 or 16 mini-busses in the bot livery below. People who bee-line down 15 steps to the bus level might have about 40 extra seconds before the busses leave, one or two to each of the say 8 radial roads. So the busses are quickest for getting home. After them come the individual driverless buggy cabs, which shuld not pass the busses even if they catch up. So people favor using the free loop busses to go home unless they have lots of groceries or small kids. The stop-at any rung busses are thus more convenient, but not private. They are also free of per-use fees. So when leaving home, you look at the countdown timer on your phone, and it says when you should go to the curb and wait. Then the bus comes and you go in to the station. These busses should be free, while the individual buggies should be uber expensive (pun intended).

Inter Township Road system

The train system will have infinite weight capacity, the road system will not. The road system will be a bit like the roads in Bali. The roads are more of a back up.

Long straight township outer-roads.

If you're following a topography, sure, follow the contour line. But if the township is in a really flat place, the road should probably be straight. This is better for visibility, safer, faster vehicles, and energy conservation. Also making the roads in gridiron or pattern helps with conceptualization of the city certainly, and it helps with design, but those things don't really seem so necessary anymore due to GPS and e-maps. So the outer roads of the townships are going to be straight except in hilly places where they will tend to follow a level path more or less.

Township loop roads

1/ These might not even connect outside that township.
2/ Maybe the bus loops only go out so far, but the loop roads continue, perhaps through 10 miles of intercity area.

Wide road traffic

Maybe triple-wide vehicles (4.8m or 16-ft wide) can only be operated between 9pm and 6:00am. Or maybe it is 11pm and 5am for some roads and 1am and 4am for other roads. It is better we cram all the traffic into the night than we have permit applications. So all the mobile homes move at night and they get illuminated so drivers can see them from far.

Shared vehicles

One benefit of sharing our vehicles is that we can have many more different classes of vehicle. So we imagine people calling a single bench (single-wide) most of the

time, although some will want a double bench (single-wide). Some families will call triple bench (single-wide), some people will want a single van with a sealed compartment that is about 110cm wide and stooping height. Some will call "truck with a 4' x 8' open area for cargo that gets compressed and secured by the corner over-rails. Some will call double-wide vehicles. And most vehicles will have limited range. All the short range vehicles will probably be electric or compressed air. Then probably after a 20-km range, we will start to see single wide cars that run on diesel fuel. And I bet the single wide, single bench diesels will get well over 300 MPG.

Carlot

When you sell your vehicle, the county has this appraisal department like Carmax has. These guys look at the inertial logs of the car, backed up in real time, they look at the maintenance recorded into the system, they look at the exterior and cabin of the vehicle, and they give a recommended price, as well as listing damage or maintenance needs. They also give one week's parking on one of the central viewing lots, as well as listing on the county for sale website. This service costs two day's pay. People bid on the vehicles both locally and nationally. If the seller doesn't accept a bid by the end of the week, then he must try again and pay a second fee. Upon the seller clicking acceptance of a buyer's offer, the buyer is notified to transfer the funds to the county vehicle exchange. Once the buyer transfers the money, it takes about 2 minutes for him to get a confirmation code. Then the buyer goes to the lot attendant and give the confirmation code and he gets the keys. So buying or selling a vehicle is inexpensive and fast. ... Not that we need this if we will be using municipal vehicle fleets.

Used vehicles

- 1/ All ride-on vehicles including lawn mowers farm equipment, and earth movers shall have a unique VIN number.
- 2/ The VIN shall be etched into all window glass, stamped into the latch side of all doors, body panels, hatches, engine block, and numerous other parts in standard locations.
- 3/ Replacement parts have no VIN and instead say "REPLACEMENT PART"
- 4/ During government vehicle inspections, the system calls for verifying a few VIN number locations from each vehicle. Those in possession of stolen replacement parts are subject to prosecution.
- 5/ Salvaged parts may be safely used, but only if the buyer has a receipt from a registered scrap vehicle dismantler.
- 6/ No vehicle may be listed for sale by anyone without listing the VIN record number.
- 7/ All vehicle websites must display the recorder's vehicle info.

Township trailer parks

What if townships all had a trailer park for visitors and workers and for emergency housing. It is just pipes.

The LAX bus system

The right way to handle LAX traffic for example is to have dedicated bus lines going down all major freeways of the Southland. I only use LAX as an example because of my familiarity. It is only an example and a fast/crude one at that. Here is how I would run the LAX bus system. And again, the busses will be free to use for anyone with an air ticket. And the cost of the bus system will be paid by a \$6 or \$30 LAX vehicle entry fee charged on all vehicles. Here are my busses"

1/ North on the 405 to San Bernardino.

1/ North on the 405 to Santa Barbara.

2/ South on the 405 to Downtown San Diego.

3/ North on 110 to 101 to Bob Hope airport.

4/ North on 110 to Pasadena.

5/ East on 105 and north on the 605.

6/ East on the 10 to Palm springs.

7/ East on 91 & south on the 15 to Chula Vista.

The busses pick up and drop off from shelters/ bus stops that are located within the freeway interchanges every ~10-15 miles. For the route to San Diego, there is a stop near say LGB airport, John Wayne airport, San Clemente, Carlsbad, Del Mar, Hwy 8, and Downtown San Diego only.

Air vehicles inside where it is hot

These will work best where it is always hot, and especially indoors where we are cooling the space. What we do is compress the air outside and let the buggies equalize temperature over some hours, like a car does when you turn it off. Then when the vehicle has cooled, it goes discharges and the tank cools. If the buggy is being used inside a township's a/c area, then it doesn't produce heat, but absorb heat. And if the vehicle is being used outside, then a fan circulates interior air around the tank to cool the vehicle compartment. If you want heating, then you go out immediately after the tank was pumped up. Then the fan will emit hot air. After some time, this the air will grow colder and the heater fan will turn off.

Low buggies and roads

I might emulate the Alfa Romeo spider for seating height and back inclination. So the bottom of the seat is mounted to the sheetmetal that is only maybe 7cm above the ground. The ring-road drainage culvert is inside the ring road, so there are no abrupt changes in grade. So the low ground clearance will work.

Flat roads

Keep the loop roads as flat as possible, This helps make the distances smaller for both walking and for vehicles.

Raised car docks

What is and ideal height for energy use is not ideal for getting in and out of a car. So what we will do is have these ramps that the buggies will use for embarkation. It will be like getting out of an Alfa Romeo Spyder that is parked on a same-width median. The tires will shoe-into grooves. And people with private cars will buy these stamped metal ramps to make it easier to get in and out of their car. The car will automatically park on the standard dock.

No cloth bottom surfaces in vehicles

1/ All seats must be vinyl or leather or some other material that will shed water. If people want, they can put cloth covers over their resilient seats. Thus our vehicle fleets will last longer.

2/ All automobile floors must be black rubber. If people want they can put carpet mats on the floors. Thus our vehicle fleets will last longer.

3/ The ceiling may be cloth.

4/ The seats must drain and they can have no edge lips.

5/ The floors can't have surface features narrower than 1cm. This is so people won't get dog shit mashed into their car's floor mat the way they get it mashed into their track shoe soles.

6/ There is a single floor mat/ bake-pan that ends at the front of the front seat. There is another single mat that starts immediately behind the front seat.

Packetized vehicle traffic

The traffic management system will clump cars and especially delivery droids into packets every minute or so. There won't be any stop signs or traffic lights. You just go straight from where you're coming from to where you're going with some slowing here and there.

Road noise

1/ The trains have noise baffles and the cars/buggies will have a top speed of about 60kph (35mph).

2/ If the new vehicles have engines, they will be muffled.

3/ There will not be as many roads.

4/ There will be much less traffic, because it is easier and cheaper for all the inside people to walk to the station.

5/ Because of the sync with the bus from the train, most people on the outside will take a bus to their ring road house over waiting a minute for an individual car. So instead of many individual cars in a line, there will be a single driverless bus.

Loop bus pairs and triples

Let's assume a train station operating on a 10-minute schedule. If we have one bus, we have 10 minutes to get people from the station out to their stop and back. But they can only go so far if the bus must be back empty and ready for new people 10 minutes later. And they are probably spending say 8-minutes out of the station and 6 minutes on the ring road. So they only have 6-minutes

plus stops and they are only going may 1km/minute. So they might only get 1.5 or 2km out from the ring road.

Now if we have 2 buses then we have 20 minutes for a round trip minutes on the loop road. With two busses, each bus is spending another 10 minutes on the ring road. So that is 16 minutes, or 8 minutes out and 8 back. And at 60kph+ plus stops, the ring road distance might be 6km.

The post war glamor of the US and especially California

The way I see it, this was this mostly due to Ishtar's mechanisms glamorizing The Los Angeles oil hungry lifestyle

Townships

How township units will be like flat screen monitors

Remember how everyone just junked their old monitors for a flat screen. That is going to happen with our current cities and current automobile transportation system. They are just not going to be worth maintaining.

Urban ages

- 1/ Stone and animals.
- 2/ Brick & railroads.
- 3/ Wood suburbs, glass offices, and personal automobiles.
- 4/ Precast units and smart trains.

We can create whatever urban reality we want

Why are we remodeling the current highly sub-optimal urban reality based on personal cars and airplanes?

Tsunami zones

Volcano zones

Super tall high rises

All three are people living where they should not.

Building townships

High PSI concrete

I bet our house castings are made of around 10,000 PSI concrete so they can be thinner and lighter and easier to move around. This is about 5 to 6x normal strength. And it doesn't take that much more cement in the mix.

Building surfacing

The entire building outside can be glass, not just the windows. This will allow us to simulate any opaque, reflective, or transparent material. And the material literally lasts forever.

Housetreads

1/ There are 80-ton army tanks, surely we can put 120-ton concrete castings on a tank tread system for construction site transport.

2/ The castings will arrive at some point on a rail line.

Then a gantry Crane with gantry outrigger supports puts the casting on a "housetred". This is a flatbed with standard keying holes, like an upscale pegboard for tools, only it is steel and holds a house castings. So when the casting is set on the flatbed, it keys to it and will not slide around. The bottom of these contraptions is two long tank treads. These might have a top speed of only 3-15-mph. The housetreads ferry the block to its proper gantry crane for placement and then returns to the train for another block.

Block placement tech

There is going to be this whole tech industry for cranes to precisely place heavy concrete building blocks. And again, the final adjustments might be via these large Allen wrench bolts in the corners of each building block. Then the units are grouted in place.

Mobile factories

A number of township ingredients will be made by mobile factories on trains:

1/ The thick sheets of EPS foam (styrofoam) insulation will certainly be puffed up and molded onsite.

2/ The grouting and foundation concrete will probably be made with a concrete mixing plant on a train. This is so gravel and sand can be sourced locally and transported less.

3/ The steel foundation spools will be a spring of rebar coiled out by a wire-bending machine sitting on a train car. This robotic machine will also weld cross members to keep the coil in place until it is embedded.

Township unit alignment

The dimension down the hall in the vertical positioning are all that really matter. This is accomplished by two sets of positioning screws. Perhaps the units will all get positioned in and low, Then the positioning bolts on the floor and wall corners are turned driving the unit a bit higher and a bit further away from the previous unit. Then the concrete wall grout is injected.

The new cities

All will spring up in the middle of nowhere. Many will be far from any existing city, but many of the new interchanges will be perhaps as far out as Swindon, Oxford, Luton and Cambridge are from London. These form a new arc city around the old low-lying city, allowing the residences and functions of the city to shift inland to these now middle of nowhere locations in the countryside, high above the risk of tsunamis. At 300kph, Oxford is only about 15 minutes out. These will form an regional arc of interchanges and townships to replace low-lying London.

Let's lay out all our township locations

Lets plan for say 5x as many non-hillside townships locations as we will need given the current world population. This way, everyone will know the development areas pre-zoned for townships. Then we can declare the other land for transport, agriculture and wildlife — unless the applicants go through the approvals process for a new township.

Township ridge

So we take this ridge and flatten it a bit for a monorail line, and a bit more for where we want towns. But we must dump the cut soils down the hill somewhere, like with the mine tailings as you approach Jerome AZ. I would do this in one place where it will be least unsightly. Then I would replant it and irrigate it to hide the dirt.

The VLG (Village), Redondo beach

Here is a herringbone development as an example of the privacy afforded by herringbone outlooks

1/ The 30° view angle on the studios and 1-bedrooms isn't enough herringbone. The 60° wall is better for windows. But I might go for 45°.

2/ If there are balconies like in the VLG, the wall should extend for privacy.

3/ Multi pane lightly tinted glass affords privacy with the Window coverings open.

4/ There should be vines on trellises much of the way up.

I see urban landscaping as a vertical thing, of vines and walls.

Chinook-8 helicopters

The existing two rotor Chinook helicopters can lift 13 tons. I might make a version with 8 rotors that can lift 50 tons.

The 8-rotors make them safe. If one rotor fails, the device will not likely crash. We will use the drone stability controls so that they sort of fly by themselves. And the cab will be in the center of the octagon on a sort of spring bridge, for softening hard landings. It would be really nice if we could just fly SIP homes into remote areas. And this sort of copter might cover the last few miles to place factory built homes that have adjustable steel feet that either bolt to rock, or have large basins for filling with dirt and rock. These would also be useful for building mountain bridges, and for getting hoisting equipment up and down slopes. And for getting steel bridge truss cages into place.

Township levels at the center

L-1 = Livery and bot delivery

L-2 = Passenger trains and cargo, platform coffee and walk-away foods.

L-3 = Ground level at center, the central commercial and socializing area, the main food center.

L-4 & up = other commercial activities, restaurants, hotels, gyms, schools, offices, etc.

The corridors outside the ring road

In the most extreme environments there will probably be pedestrian corridors that extends out beyond the ring road for a long distance. I see these as being rather like those Space-1999 Eagle landers, but a bit longer, maybe a T-top foundation spool every say 15m. On this goes a prefab TT beam fully enclosed in styrofoam under and on the sides. On top of this goes another tube. In section it is rather like a butter server, only waterproof and insulated. And again, this is only for pedestrians.

Hallways as decks

Maybe having hallway blocks are not needed. Maybe floor sections are placed afterwards and grouted together with the walls and the blocks below. A second lightweight crane follows putting the hallway paving sections in place like caps over the hallways. There is no need for utilities. Everything is inserted from above in the form of open steel frame cartridges.

Super long township fingers

Maybe in hot and cold places, people will have townships with 1,000 3,000m long hallway fingers, so they can get around without going outside.

Township roofs

1/ Torrential rains do come. The roof must pitch it out.

2/ Never use roof drains. Scuppers are safer and leak less, however sloping roofs with eaves are best

Fire escapes roofs

The roofs will be designed so they are an emergency escape path that uses multiple fire alarm doors. This way people can flee over the roof and also the security issues are minimized.

Township Arm cranes

There is a rail on the roof edge and another rail projecting out maybe 30cm from the building's face, between the 1st and 2nd story. There might be window washing robots on call, or the outside might get pressure washed and buffed 5x/ year. There might also be service trucks that can extend a truss upward to the upper rail and grasp it. They might also put down outrigger pads. Thus very heavy loads can be conveyed to the ground if needed.

Township utilities

Wavy pipes in slightly undersized utility cartridges

The utility line cartridges will bolt in place. And the pipes will have a bit of a bow to them for thermal expansion.

Vertical utility cartridges in townships

I see a 1m x 1m vertical chase with full height access doors and a floor grill at every floor. There are these

multi-story cartridges that are inserted into the utility chases, rather like the clip in an automatic pistol. The house side of the connections will be rather flexible and this will be pulled-in by maybe 2 cm or 3 cm for the connection. So there's cold water, hot water, HVAC fluid, refrigerant, freezer refrigerant, vacuum, electrical, sewer, pressurized air, and ventilation air. And a full utility hookup might take a tech an hour to do, including bleeding lines, testing and cleaning up).

Township CO2 as utility

This can be harvested from exhaust and dribbled out in tiny amounts along the base of the insect screen. There might also be some UV bug lights here to draw all the insects into the poison or electric net. We might also have bug netting every say 100m in the green fingers inside the ring road. The area above the walkway is open to whatever height is needed for service vehicles, but 95% of the air channel's air flow (and bugs) hit the poison screen

Township utilities

A normal base consumption level for all utilities is included in the property taxes. This includes internet, cellular, normal to slightly generous electric usage, water, hot water, refrigerants, heat, A/C, and fresh filtered air. If you have excessive use, then you must pay extra.

Township freezers

It costs very little energy to keep food frozen in large well-insulated freezers. Maybe to encourage everyone to keep lots of food, we will have these great township frozen food warehouses. Then people have lockers inside, where everyone can see the amount of food, and the local sub-sensors make sure everyone has the required stores.

How to get ash out of air

We should probably figure this out real well in advance and have working devices.

Township air intake

- 1/ The air can be filtered and the humidity managed.
- 2/ While we might not want air heating in our homes, it is probably more sanitary for our enclosed township hallways.
- 3/ During epidemics, we might not alter the temperature of the air flow, so as to maximize flow and sanitation.
- 4/ What if every unit every room had a CO2 sensor in the system without fresh air to bring CO2 levels back down to healthful levels.

Now everyone gets pure air

In so many polluted cities, the only way to get pure air is to buy an apartment on a high floor where the air is pure. In my townships, everyone gets pure air, just like everyone gets pure water. And this combined with fake sunlight has important implications for the way our communities are designed.

The township tower

This might have both intake function and exhaust/hot air chimney function to it. The chimney is perhaps 2 stories above the air intake. Also, most of the exhaust is coming from the utility planet some miles away from the township. It is just mostly heat that is getting vented.

Perhaps they will be + shaped and the two fins will keep the tower upright better. The units of the + will be herringboned so there will be nothing in the OVERLOOK.

Pollution stats please

How much cleaner is the air 30 stories up in various places versus on the ground at the same building? This is the question of our air intake towers during volcanic Ice Ages. Do we need to go up 30 stories? Is 15 enough? At what height do particulates go long tail in clean and polluted places? That is how high our air intake towers need to be.

Virtual bubble cities

The way to do bubble city's is to make them the shape of a Battlestar/Brittlestar (ophiuroid). Thus, the entire city is not covered a bubble, But the unit stack up and make bubble walkways on the inside of the township.

Township construction dust

The townships will not have construction dust really. They're going to be built out all at once. Then after some decades, the entire township goes for renovation or demo.

Bodele test facility

This place in Chad is supposedly the dustiest place on earth. We should find some locations like this to do research into Township air intakes and air filtration. We should get a firm understanding of how much dust there is at various elevations, topographic and wind conditions. This dust level modeling should be something put in public-friendly graphs so that everyone can understand how much clearer the air is with elevation on average and with faster winds. It's an important public policy thing for an informed democracy.

Central vacuum

- 1/ The community exhaust tube system is used for the vacuum's air output.
- 2/ The standard-sized box for inserting a replaceable standard-sized vacuum motor cartridge.
- 3/ The tube system inside each unit.
- 4/ The tube the owner attaches to the wall.
- 5/ There are no filters to replace. Only tubes to be augured and vacuum cleaner cartridges to be replaced.
- 6/ The same exhaust system is used for dryer exhaust.

Is AC really better than DC?

- 1) I have seem mention that power transmission loss is actually less with DC than with AC. Also, the record transmission distance is also lower with AC.
- 2) If there is less transmission loss with DC, then we should use it because it is much safer

No exhaust communities

The burning of fuel will probably be prohibited within many townships. In these, the peripheral homes will have to use long range electric vehicles for commutes, vehicles that can handle the daily 5 or 10 km in/out daily.

Air pollution

From an air pollution standpoint, I bet that having central vacuum/ exhaust is more important than getting rid of cars.

Gyms by the train station

To encourage people to do even a few minutes of exercise, now and then, we should put free public cardio equipment near our train platforms and on the various levels of our townships.

Township zones

ID areas

You need an ID to enter the area, one person at a time goes in the 2-door booth.

Township private vs. common area

The homeowner owns the apartment, a structural box that the structural frame is cast into.

Township city zone vs. community zone

Near the zip-train stop, there will be this "city zone" that is open to the public. In some townships this public area will be big, and in others it will be small.

But there will be a sort of doorman check to get into the community zone. And kids in the community zone will not be allowed to enter the city zone unaccompanied. We might also have township linear common yards between the township tentacles that have a gate (like we use for swimming pools) at each entry point. This for stopping small kids. So people can let their kids go free-range in the neighborhood. Also, I think this shared community space should be designed primarily for 7 and under kids to play in. It should have all sorts of notches, recesses, shelves, and other places for kids to explore and inhabit. And these areas are of course all under 24-hour community video surveillance.

Where we want Big Brother

Where we don't want Big Brother

- 1/ The area around the subway platform and inside the trains.
- 2/ The places where people gather.

- 3/ The schools and kid places.
- 4/ Where drinkers and druggies gather
- 5/ The police building.
- 6/ The secure lockers
- 7/ The entry doors
- 8/ The stores.

We don't want big brother in our homes and private property, or in the outer areas. We want these areas kept free of big brother. Also, there must always be a safe way to pass around data without being monitored.

Township police

- 1/ There are police at all the interchanges and township rail platforms.
- 2/ If someone calls the police, the app automatically knows the car number and position on that car. So the police can be at the destination waiting.
- 3/ Trains don't get delayed for arrests unless there are guns being fired or people being stabbed. The officers take the train with the arrested person.
- 4/ Police might also manage the entry systems at the townships — to enter the residents-only area. This will generally run on face recognition for residents and registered guests. The police will help people to register with the face recognition system.
- 5/ The interchanges and urban areas of the townships all have cops as doormen and security 24/7, but inside the suburban parts of the townships, the police from the center are mostly on call, like today, but perhaps with faster response time.

Fire safe township buildings

- 1/ The buildings will be non-combustable.
- 2/ They will have de-ox sprinklers.
- 3/ There are centrally monitored smoke and heat detectors. And maybe IR thermal surveillance that only reads temperatures over 320°C in the kitchens.
- 4/ The wiring is factory made, and all electric lines are in conduits.
- 5/ There are no furnaces or water heaters, or gas
- 6/ The cooking appliances are encased in concrete, not wood cabinets
- 7/ The cooktop has an auto shut-off. It starts beeping after it has been on for more than 25 minutes, then it shuts off after 30 minutes unless you hit the monitor button.
- 8/ There are balconies and egress cables. And there is the township window washing robot's arms that can be called.

European city parks

I imagine the outer green fingers should be more like Berlin parks that those in America.

Public toilets

- 1/ They must be free to use and nice, so that people don't use the city as a toilet, which is a priceless problem.

2/ You need to scan your ID to use the toilet, and people who come later can complain. If you get too many complaints from others that come after you, you may be “de-platformed”.

3/ If you stay too long in the toilet by for example having sex, or take drugs in the toilet, you will be discovered and may be “de-platformed”.

4/ If you use the public toilets too much and are an unregistered homeless person, you will be discovered and forced to register as homeless.

5/ If we have lots of public toilets, we can have stricter punishments for people for public urination.

Grocery market

What if each township store had 1,000 pallet sized bays that it rented to 200 or 500 national companies that could only run only say 2 bays in a store. This is how to do competition and capitalism. Thus our townships all create these oversized marketplaces. Then they rent space to cover costs and to prevent nuisance users.

Travel and baggage

People will be able to call a self driving buggy, put their bag inside and then they pick up their bag from another buggy at the door of their destination. That is the ideal interface.

Townships are more nuclear war resistant

1/ 20,000 township of avg. 15,000 people that are all miles apart are much harder to nuke than our current urban design.

2/ Radioactive fallout dust hugs the ground, so Township air intake towers help here, even without a system of central filtration.

3/ There are indoor protected hallways for people to walk around in.

4/ The trains are up off the ground and are going to have much better air filtration than automobiles.

5/ Our townships can be designed to support higher indoor pressure when we want. This can be used to create a slightly higher pressure indoors than outdoors.

Township commercial

The grocery store platform is combined with a drug store and hardware store. It is all owned by the township and used for both the commissary and the group ordering service. There are also perhaps dozens of stalls that are rented to competing services. Competing with each other and with the commissary.

No tax on en-bloc renovations of entire townships

When the whole township gets uniformly renovated or updated in some way, that does not subject to remodeling tax, but should be treated like new construction.

Shower and lavatory water can be reused to wash dust from the viaducts and nearby areas.

Township sound

Maybe they should have fake sounds like teslas. Wind on trees, or rain hitting leaves, or gurgling water. So the residents can be freer with making noise.

Super dense Italian hill towns connected by rail via a township exchange of some sort.

Bigger townships?

Maybe people need more exercise. Maybe the ring road should be further out so people can get more exercise.

No-kitchen townships

Maybe there are townships with only mini kitchens... because everyone eats at the hawker center. This is probably the way a college township should work.

Roads and air quality

Driving on a road opposite and especially behind other cars kicks up lots of dust that makes it through into our cars. On trains, there is no vehicle ahead and there is less dust on the raised rails.

Gravity is not an issue

Moving water up and down hills (if it is a closed loop system) the water going up one side balances with the water going down the other side. Thus there's only pipe friction to overcome.

4,000 alpine townships

That's 1,000 each for France, Italy, Austria and Germany (in its new alpine territory). If that's 15,000 units avg., and 2.3 people per unit, that's room for 140-million people. And why not have 140 million people living in the gorgeous Alps and their foothills, where it's always cool and the air always clean. Then again, maybe it will be 10,000 new townships here.

Italian scale

The townships will all be scaled like the old parts of Italy directly accessing a metro platform.

Hills suffer less from mosquitoes

1/ The wind is stronger and this tends to blow flying insects away.

2/ Due to the slope, it is easier to eliminate standing water.

Township work zoning

In Europe in the New York, we often see office buildings right next to centrally located apartment buildings. Great. However, the uses that will invite visitors must be on the insecure zone with the train platform. If the office is the sort that only has regular workers, it can go in the secure zone.

New York, Los Angeles, and San Francisco

If we replace our 3 most expensive cities, it will do wonders for national competitiveness

Food service

Whatever Singapore's hawker to citizen ratio, that seems like a pretty good starting point for our townships, although, I might increase the stall numbers so the stalls remain cheap. But they should be droids delivering things out past the ring road and their cost is going to be practically nothing.

Financing Township units

They'll be quite standardized, so the appraisal will be sort of an instantaneous thing, especially with the new units.

Mountain height as a resource

Not only does the height squeeze rain out of the air better, but the water is up high. So its energy can be used to send the water a long distance away.

Himalayan stream water

This is actually a very valuable resource. Not only can it itself deliver itself perhaps hundreds of miles away, but if the pipe is insulated, the water will come cold, in the middle of the Indian summer. All we have to do is build a pipe that's strong enough, and the water can be delivered without any energy input or evaporation loss at all. This should be a model for the High Sierra in California, as well as many other places around the world.

Indian summer

This is actually a long summer that is very hot, like in India.

Mexican summer

This is a long and super mild summer, like in the high tropical cities of central Mexico... places with just the nicest weather. Using the High ground of the tropics will make the world a much more of a Mexican summer sort of place, as opposed to an Indian summer sort of place.

ORBAK = the center, within around 100m of the train platform, or at the central ventilation tower.

The **CONORB** = inside the ring road.

The **SUBORBS** = The zone just outside the ring road.

The **EXORBS** = Where the loop roads go off on their own path.

Group property and averse possession

You can't acquire or extinguish public, community, or group property rights such as common area, and common areas easements by averse possession or grant unless the sale is court approved. Also, the assessor must say that the property is fairly valued. Also, all proceeds are distributed by the county recorder to all owners of the group and not to the association.

Beggars

They can't:

- 1) Cry or moan to provoke pity.
- 2) Speak loudly or shout.
- 3) Shake or rattle their coins.
- 4) Beat the ground with a stick.
- 5) Block people's way on foot or in a vehicle.
- 6/ Even potentially hold up traffic with their activities.

The true price of styrofoam

The shipping is hugely costly in comparison to the cost of the materials. We really should be puffing and forming the insulation parts on-site.

Plant elevation

Perhaps the heating plant goes down below the township in elevation if possible, and the cooling plant goes up above the township if possible. The township goes where the climate is ideal, at say 1,000m. Of course the heat exchange fluids are on a closed system so there is no net raising of fluids.

The end of land scarcity

I saw this before in Berlin in 1983 and Phoenix in 1991. The better parts of were full, and rents and home prices were all very reasonable. But if you went to the older apartment buildings, especially the ones far out, or poorly conceived would often be shut down and empty.

I see this happening now in our current cities with rising vacancy ever rising vacancy until today's cities are completely drained of people, And this is going to happen all over the world. And if we leave the old debts in place, the economy will be crushed against them.

Double door apartments

If people are using two doors one after the other to control hallway noise, then maybe there is a breezeway space between them.

Too much historical property

Outside of Europe, there is way too much historic property in the world.

A partitioned water reservoir

- 1) Less possibility of contamination.
- 2) Whatever our seasonal need is for heat and cooling, that should be the minimum of how much water should store. Also, we will have double the capacity we need, because one half of the system will be heated in summer and used in winter, while the other half of the system is cooled in winter and used in summer.

The real new economy

What did people do with their old CRT monitors? What did they do with the computers they ran Windows-'98 on? What did they do with their old printers and floppy discs?

What will people do with their old stick-built, expensive to maintain, inconvenient, automobile based homes, cities and airports once new ones that are 4 times more efficient come online?

The first townships

There is going to be a lot of learning going on with our first townships. Maybe we should promise to make sure that these are valued for their historical value.

Public kids area

I would imagine that most townships have these Orwell playgrounds and workshops for kids to go unsupervised and check in. I don't think there is any problem to have video cameras in play area.

Pre-war Europe construction

They are just these heaps of bricks and mortar with some old pipes and old electric, and old flammable wood in them. You know what I think? I think that even Europe would be better living in townships. Keep the best cities, emulate them, surpass them.

Breeding districts

Maybe we should have these breeding districts where everyone is tracked and most kids have backup audio on. And then with this in place people can talk to each other more freely.

Rome supplied by 9 roads

I recall reading how Rome was supplied by something like 9 roads. It might be interesting to model how much of the food needed by 5-million people can be provided by drovers and ox carts operating 24hours on 9 such two-lane roads with a reasonable number of intersections. Perhaps we can simulate this in India somewhere using wood-wheeled ox carts with intersections. I bet over 80% of Rome's trade had to come by sea for the reason of there being not enough roads such as we see in Indonesia and Thailand today.

Obsolete old cities

Many of the centers in the old cities will change once we make the switch to single wide cars and mini busses... because the roads are too wide. This will only add to the obsolescence of the existing city centers.

No hard shoes if you live above others

You have to either wear slippers or socks, or go barefoot. If we all do this, it will be much easier to live together and live with a smaller environmental footprint. A few simple rules and it will be so much nicer living in big cities.

Singapore hawker media

I think the world should look at what Singapore has done with regard to low-cost high-quality food. Singapore's hawker economy is a thing for the entire world to emulate.

Also, every sale must use the government's little receipt generators like in Poland.

Homeless people and front yards

Los Angeles, with its homeless masses has become a great example of why Mediterranean homes had walls around them. You can't have open yards with homeless masses.

Armoires on wheels

They are a 160X90cm and 190 tall. They cost maybe half a day's pay to ship. But this might be the way people travel or slow-journ, all their stuff moved from one place to another. It is not quite living as minimalist as living out of a suitcase.

Vines on walls and screens

Urban landscaping in deserts might be vines on stainless wire nets hanging between buildings.

Looking backward

I ponder how 40 or 50 years in the future when all the old cities will be completely abandoned. I ponder kids going for hikes in the abandoned ghost-town cities of today all overgrown, roofs falling in. Just abandoned.

No more wall to wall carpet

All new carpet in buildings has to be self-adhesive tiles that are easy to replace when damaged.

Access clubs

This is so people can just ID and go right into many communities. These are people on their county list that get instant access to all locations because have never had a legitimate complaint about their behavior. Maybe some version of this is how we do AirBNBs. This way we can restrict rentals to people that are trouble-free, but ban others. This is how we make sure that guests are nice and considerate and obey the noise requirements.

Halls to covered & uncovered ways

1/ When you get to the uncovered ways. If the place ever has ice. There should be salt dispensers that fit on some general purpose bots that just spray fine table salt sieved salt behind them as they move along. So the run-off system should default to parkland recycle, but when it freezes, the water can be shunted in with the salty waste.
2/ Lots of people get hurt on thin ice, invisible ice. This is a very expensive thing that is not enough appreciated by society. Where there is ever ice predicted, the open ways should be salted, liberally salted. But the runoff gets collected.

House Casting

Snap-together injection moulded homes

Everything connects precisely just like with automotive manufacturing. The windows and doors and electric outlets covers and everything else fits so perfectly that they can be snapped into place. So one robotic arm comes from the outside with the window which snaps into place. Other arms apply a bead of foam between the window and its opening. Then the interior window frame is snapped into place compressing the foam.

House casting is clean construction

The form release spray will be robotically applied and we will quickly get its application 100% perfectly right. So there is not going to be any form cleaning. Although maybe there will be this "wire brush car wash sort of cycle. But it will not be a dusty place. In fact, pond curing and the subsequent wire-brushing and spray-off will make our castings anything but dusty. Thus we see the building blocks as these manufactured goods that sit on their leveling feet and are completely without dust. Everything gets bolted, or foam glued in place: The windows, the doors, the cabinets, the showers, the shelves, everything. And the process is no dirtier than working in a car factory.

Buildings by concrete volume

I bet that in less than 8 years that our building block castings, rebar, and build-ins are going to become totally commoditized and sold by the ton. One price for concrete, one price for steel, one price for built ins per ton.

Deep pond concrete curing

I bet if we we wheel out concrete castings into a deep lake, they cure faster and better

House casting and curing

When the mold comes out of the curing pond, it is picked up and turned over so that the floor is resting on the flatbed assembly cart. Then over a few days, the house winds down the second assembly line where electric, plumbing, doors, windows, cabinets, roofing etc. are installed until the house is finished.

A national house casting system

Townships might be built of units from 20 different factory areas, each sending a train every so often.

Heated house casting as an accelerant

Perhaps we can accelerate curing by heating the concrete to say 45°C just before it's injected into the mold. Then the factory railcar goes into a 45°C oven a couple hours. Then it is wheeled into a 45°C curing pond. Also, when the molds come off, the casting is not moved, but sent back to say a 35°C pond.

House mold actuation

They go into this station where a bunch of robotic screw guns arms come out and then turn the mold screws so the outside and inside molds can be removed from the casting. Once the molds are released, then the casting is removed from the mold and the mold re-closed and the in the next station it is inspected and then in the following station refilled.

The house casting line is two stories tall. The molds come apart and go together in some palindromes style. It's all robot actuated because it's too heavy for people to lift. There may be some people dressing the molds and inspecting them, or something like that, but eventually there will not be much of this.

Maybe the line works in 2 minute intervals, actuating 720 molds a day.

House casting factories will yield designs that are both mass produced and as idiosyncratic as the most far out as anyone from the Gaudi = "Gawdy" school of architecture. I see maybe 20,000 lightly-accelerated (but heated) concrete units being cast each year in each line. If North America needs 160-million residential and 80-million commercial, warehouse and public "units", that is 240-million/20,000 it points to 12,000 casting lines, and 12,000 menu choices. And remember the insulation and outer wall skins just bolt on, one square meter and one corner bolt at a time. So the 12,000 menu choices are purely interiors and structures, not building exteriors.

Construction & design

Factory construction

Comparing a custom home, unique construction environment to a factory, I bet the people installing windows and doors, and doing electric and plumbing work get 5-10 times as many units installed each day in a factory environment.

Factory roofing

Maybe the houses pass by a roof high dock where they apply single, seamless giant pieces of torch-down roofing to each side of each roof section. And the roofs come along at 90cm above the factory dock, so the edges are real easy to work on (unlike with non-factory roofs). There are also maybe 5 porch steps on the factory dock every so often so the workers can easily get on the roof. And when the houses stop, there are safety fences that are lowered for the workers. It is easy to imagine crews roofing one house per hour this way instead of one per day.

Why housing is so expensive

- 1/ Because the workers are not productive outside of a factory.
- 2/ Because more expensive workers are required outside of a factory.

Linear construction

I would have drone view simulations of every 1000m section of every linear asset. These can be presented as archi simulation, or line drawing. The H-trestles, or whatever oversized concrete form blocks we are using are presented in the simulation as individuals with numbers on their side H-7A43 for example. This is a 7m H trestle in A design, and 4 meters tall and 3 meters along the track.

It is important that everything is presented and all transactions take place in terms of square foot pricing and pricing for the various viaduct and rail components.

Stacked bathrooms

What if instead of pouring floors and then building bathrooms we had "light wells" or open columns that we lowered complete bathrooms into for bolting to the structure. Then the bathroom becomes this factory-built, waterproof capsules with every feature and a few unified utility connections that are each about as hard as connecting a garden hose that is already in place.

Narrow glass dual windows

This glass is about 1cm apart. Put your hand 1cm from a cold window. This is certainly in the cold zone.

5" thick plate windows

Why aren't people in cold places using 3 and 4 layer glass panels that are say 5" thick? Glass is cheap, and the windows are already 5" thick even without projecting from the surfaces of our 2X4 frame structures. And if we use 2X6" structures, the windows can be 7" thick.

Serviceable slab heating

It is nothing more than conduits for pipes. Into these are pulled plastic hot water pipes (using an electrician's fish tape). Thus the water heater doubles as space heater. And there are additional electric space heaters. Thermostats do not work well with under slab heating. So people will just turn on a timer valve to circulate the water for a few minutes.

Plumbing bolts, screws and nuts

All must be non-corrosive if in an area that might leak.

Plumbing

1/ No valve may be attached to a pipe via a direct compression fitting. There must be a threaded fitting between the pipe and the valve. Also this fitting must be firmly attached to a structural member and resist torque of over 50-foot pounds.

2/ All angle stops to all sinks and residential toilets as well as single toilet commercial toilet rooms must be ball valves that are 1/2" x 1/2" uniform thread. All other sizes shall be prohibited in future installations.

3/ Commercial fast flush toilets may 3/4" x 3/4" thread, or 1"x 1" thread.

4/ All fixtures that are 1/2" must be colored green, 3/4" valves must be yellow, 1" valves red and 1-1/2" valves purple. 3/8" pipe is blue.

5/ All toilets and sinks must use the present day standard toilet connector fitting size.

6/ All lavatory faucets must pour out water more than 12.5 cm from the back of the sink.

7/ All toilets shall use enough water to clear at least 99.99% of fecal material from their water in one flush.

This to reduce the harmful effects of splash back.

8/ There should be very little training to be a plumbing tech, a person who replaces angle stops, faucets, toilets, and shower valves, hose bibs and like.

Bathroom cartridges

What if people could unscrew 4 bolts, disconnect the water hoses and the drain hose, and unplug the electric... Then the bathroom is like a hot-tub on wheels. What if we could do the same thing with our kitchens?

Pallet bathrooms for garages

1/ It is on wheels and can be rolled onto a truck's lift gate and then into a garage.

2/ It has screw-down stove feet that can be turned until the thing is resting on solid feet with the wheels raised.

3/ There is an optional pump for when the waste water must be raised to get it to a sewer inlet. The Sewer tube is designed to screw into a standard sewer clean-out opening.

4/ Maybe there's a kitchenette on one side.

5/ Maybe some people will have their own and they'll rent rough garages and finish them themselves.

6/ If we are all using shared vehicles, why do we need garages.

Smart electric meters for smart brown-outs

The best way to ration scarce power is to have power meters that will limit consumption to pre-determined stage levels:

1/ Stage-1 rationing: Nobody gets to draw more than 120% of normal power consumption for severe weather.

2/ Stage-2 rationing: Nobody gets to draw more than 100% of normal power consumption for severe weather. However everyone gets at least 2kw.

3/ Stage-3 rationing: Nobody gets to draw more than 80% of normal power consumption for severe weather. However everyone gets at least 1kw.

4/ Stage-4 rationing: Nobody gets to draw more than half of normal power consumption for severe weather. However everyone gets at least 1kw.

The OSB panels in our sips don't have to be flat. We can have 5mm offsets for steel hold-down straps.

Water storage for every unit?

Maybe everyone should be required to have 5-or 20 5-gallon jugs of water. Maybe all new construction should be required to have 100-gallon or 400-litre water tanks. Also people should be able to reach into these and clean them with their arms.

No hollow doors between units, including doors that separate suites.

Multi-grain concrete

I bet if we used 3 sizes of sand and 3 sizes of gravel that our concrete would be stronger for nothing more than the cost of careful aggregate management.

No portion of any faucet or valve shall be located inside a wall.

Insect-proof doors & windows

There should be some standards here, especially for mosquitoes and scorpions.

Magnetic induction

Magnetic induction cooktops heat much less than half the mass of non-food material. The other sorts of cooktops should be phased out.

Outside iron

All the light hardware and all railings and handrails should be stainless steel. Even the hot dipped galvanized stuff will eventually rust.

Why foundations work

It is a combinations of two things. On one hand, we are digging down to where there is only long tail amount of soil heave. And on the other hand we are bridging and averaging the load. Together this works unless the soil is unstable, or water leaks into the foundations.

Alaska glass blocks

This is a maybe 40 x 40 x 30cm glass block with 2 interior sandwich panels. It is filled with dry air before it is sealed.

Iron toilet piping

All toilet piping must be in iron pipe if it is not embedded in concrete. It is ridiculous that to save a few dollars the occupants of those rooms will forever hear the toilet upstairs flush.

Copper piping

Given the extreme commonness of copper pipe failing due to electrolysis, copper is not a superior material for water piping. And the plastic pipes through the walls. They should all be fish-taped through a sleeve/conduit, so

they can be easily replaced. But the copper should be banned below ground and inside walls or floors. And this will really help reduce demand for copper.

Sky-lighting

1/ This is a good thing for large areas like train stations and public hallways. The day light is quite nice.
2/ It must be engineered from the feel of another similar skylit space. Skylights are like spice and they are very easy to overdo. Calculate floor area, and glass area of some space and copy it, taking into consideration colors.
3/ In many places there should be these heavy hinged covers for summer. Too heavy for the wind to lift and somewhat insulated.

Real sustainable building lasts like Roman concrete not like China solar panels

LED windows

They'll be like the ones on the Boeing aircraft, but two layers so there's total blackout.

Asphalt where?

1/ As a super smooth walking, biking and even single wide driving surface where all the township's double wide trucks have super soft suspensions for creeping along in slo-motion. They also have super soft balloon tires and creep along at 20kph.
2/ The rain apron at our viaducts.
3/ As a weight binder inside our viaducts.

Eves, gravity and paint

These really do keep nearly all the moisture from our walls, so we don't have to worry about soil heave and spalling.

Granite is for floors in public places

It should not be used for building exteriors, except as a wainscot.

Stainless clad rebar

I am certain that 5cm (2 inch) rebar will be worth cladding with stainless as opposed to using solid rebar. I wonder if 1" rebar will be the same.

Wood "trowel" stucco should be prohibited

The nearest I can reckon, stucco guys prefer to do this for 3 selfish reasons:

- 1) It hides cracks better
- 2) It gets dirty faster
- 3) It requires much more paint, so painting is much more expensive. So it tends to get re-stuccoed instead of repainted.

I would add that wood "floated" or "troweled" stucco it is a nasty rough surface that can scrape people up. This is why I would have it that all stucco be steel troweled

smooth. Even roughhousing boys should not get scraped by the side of a building. I also think that all outside corners outside buildings should have a radius of at least 1-cm.

EPS foam panels

I don't think it will be possible to beat air-tight, interlocking panels of this stuff for insulation.

Flammability for furnishings

Non-flammable = Will not burn

Negative flammability = Will only burn with outside energy.

Positive flammability = Will burn without outside energy once started.

Weakly flammable = slow burning and producing little excess energy

Strongly flammable = fast burning and producing lots of excess energy.

Open floor plans and kids

These don't go together

Kitchen-living and obesity

These do go together. Live in your kitchen and get fat.

Kitchen alerts

1/ Wherever practical, the devices shall all have a volume control. This is so the volume can be set for either a crowded noisy company cantina, or an early riser in a home full of people. This might have an automatic function where it has 3 daily levels, Sleep, early morning, day.

2/ All food heating equipment should go under a fire detection grid, either under cabinet, or ceiling mounted. These are a bit like the IR burglary detectors, except that they have a high thermal threshold. These devices feed yellow and orange alert information to an app on personal carry around communication devices, so your kitchen ceiling can alert your phone with a popup and a voice alert. "Boiling overflow in 40 seconds" or "Cook-top temperature alert".

Bouldering a slope

This is when people roll all the loose material they can down a slope so that less of this rolls through the town below.

Landscaping

We need to curtail the sort of high maintenance, lawn mower/ leaf blower fake landscaping except in public places.

Rental repairs

All property management should have annual repair email for people to send back with fix requests.

Gentle slope homes

This needs to be a more common design consideration.

Gated communities

The security function isn't only the restricted entry, it's also the delayed departure. A two minute delay on a gate can be an eternity.

One hour windows on property lines should be required to use opaque glass

Stimulation real estate

Property may be sold based on plans, however the county recorder's escrow department must hold all deposit funds until a strict certificate of occupancy is issued. When property is sold based on plans, and the builder is unable to commence or complete its plans within the time frame stipulated, the buyers may form their own entity to replace the builder.

High-rises and nuclear war

I wonder if the high-rise cooking racks exist to make the nuclear war more deadly.

\$50-\$100/hour

Between the laughter curve and the taxes, this is how much building repairs and yard work workers will soon cost. So much of suburban America, will start becoming overgrown, and run down, because people don't want to fix the properties, or the roads.

Top city tax

Maybe the top 3 and 30 most prosperous cities in the US should pay higher taxes than the rest... and their prosperity is a thing of the nation, so the money for this tax accrues to the nation.

Definitions of construction completion

Strict certificate of occupancy (SCOC) = This is the type of completion that is to be used when people want everything done by a third party builder. This includes all reasonable punch-list items, and the county government stands as strict third party arbiter for completion of all who agree to strict completion. It should be the policy of government to be extremely strict here, so as to drive people into labor saving factory made housing.

Loose certificate of occupancy (LCOC) = what most owner-builders, and owner organizers will opt for. This is akin to today's certificate of occupancy.

UNFURNISHED = no refrigerator

1/8 FURNISHED = includes Refrigerator

1/4 FURNISHED = includes sofa, coffee table, eating table and chairs.

1/2 FURNISHED = Includes beds in all sleeping rooms without sheets.

3/4 FURNISHED = includes dishes pots pans, silver, kitchen utensils and appliances, less than daily maid service. Sheets and towels cooking oil, and dish soap are provided, Guest makes bed on arrival. Guest puts used sheets and towels in a bag after, guest does not leave dirty dishes.

FULLY FURNISHED = Beds made prior to arrival, no guest cleaning prior to departure. Daily maid service.

Furnished rentals

For sanitary reasons, carpet and rugs in furnished rentals and hotels should be prohibited. People are expected to wear slippers in hotel rooms and when they have neighbors below.

PRET-A-VIVRE = fully furnished homes ready to live in.

Building approvals

Building rules

- 1/ Any of hundreds of national plan approval and plan insurance companies may approve building permits in any community in the nation. No community may enact special rules to discriminate against any federally approved national PAPI company.
- 2/ If a community offers any plan checking prior to issuing building permits, it must be free of charge.
- 3/ Government shall not mandate glass tinting or coatings.
- 4/ Government may mandate that homes with excessive glazing have mostly air-tight insulated shuttering.

Plan checking is easy, designing is hard

1/ It takes quite a long time to put together a side of building plans. But on the other hand evaluating those plans takes only 2% or 8% as much time. And not only that it's done by somebody who is not as skilled as the person designing the structure. So this person very often has wages that are a fraction of the cost of the designer. So therefore, when the public makes sure that new buildings are safe, and properly made, we should do that at the easy stage, the plan check stage, where it is easiest and cheapest. So From here, the professional certification of architects looks like the redundant side.

Structural plan check

There isn't much need for a structural plan check, because buildings even in the poorest nations seldom collapse and there is absolutely no government oversight at all. The quadruple checking of architect, engineer, plan submittal, and licensed contractor certainly isn't needed. Only one is really necessary in rich countries where government publishes minimum standard details for the various types of construction.

The 8' or 14' strips

This is the side yards in most of suburban America. There is a 4' setback on your lot and likewise on your neighbors. Unless of course you dare to build "high density" and build a 3rd floor. Then this typically goes to around 7' that is setback on each side of your 50' wide lot. So instead of having 42' to build, you only have 36', and you can only then build a smooth block. You also must have a 2nd stairway down if you have 3rd story.

One reason why housing is so expensive

The people who build apartments, are legally required to provide parking in most US cities. This runs something like 1.7 spaces per 1 bedroom, 2 spaces for a 2.0 bedroom, and 2.3 spaces for a 3 bedroom. As well, we see parking spaces having to be 8.5' x 20' = 170-sqft. And then there's half of the adjacent 20' road 85-sqft., and ramps=20, and structural columns =10%. So that is $275+10\% = 302.5$ square feet of paving per car. And a 1-bedroom needs 1.7/ 2.0/2.3 of these, so that is 514/ 605/ 695 square feet for the car depending on the size of the unit.

Architects and liability

In the AIA contract there is language about architects taking responsibility for design problems:

- 1/ This is very hard to establish in court.
- 2/ Most of them are judgement proof and are not worth suing in court.
- 3/ The law should prohibit designers from assuming financial liability without either declaring that their assets exceed the amount guaranteed amount or insuring the claim via insurance.

CoMission decorators

These and cost-plus contractors should be subject to luxury tax for surely they are a luxury service.

No builders attached

In order to further the cause of open markets and hamper real estate fraud, no land may be sold with any right or obligation of seller-provided post-closing building or repair or maintenance services attached.

When real property is sold under the condition that the seller provide design or construction services after the transaction is complete, the buyer shall be free to cancel such agreement/contract at any time and owe no more money than what was already paid to the seller.

Open room architecture

I don't believe in it. I think room should be separated so people can live together better as house mates and as neighbors. It's so much easier to live with other people when you can go somewhere else and close the door on them, and not hear them or hear them. It's something that really helps families to get along.

The cost of American car culture

The crazy thing about American car culture isn't just that everybody has to have a car. It's also that most Americans also go for a garage, a thing which is hugely costly because it generally includes a driveway AND on street parking, along with a setback because (of course) nobody wants to live right along side a road.

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So today, we tend to see suburban streets that are maybe four 10' lanes wide, or 20 feet per side. Then there is 5' of sidewalk. Then there is normally 15 to 50' for setback, call it 25'. Then there is normally 25 to 50' for a house call it 35'. Then 15 to 50 feet for a back yard, call it 40'. So it is 35' for houses and 90' for roads and yards (not including side yards).

Scrap the old cities

They are just so energy wasteful and so time wasteful and they're so hard to repair. It's just not worth using them anymore. Over the next 20 years they will mostly be abandoned. Whatever charming old fixtures and whatever charming old features about the buildings that we value now we can replace it in our factory cast buildings.

If I ran Rome Italy

I would take everything west of Via Torino between Corso D'Italia and Via Cavour (and east of the Tiber) and close it to vehicles, except that delivery trucks can come in from 10 pm to 8 am. I would also run maybe 400 free busses along the following route with maybe 4 stops for the long route and 2 stops for the short one:

Colosseo

Via Dei Fori Imperiali
V. Botteghe Oscure
Corso Vittorio Emanuele
Corso Del Rinascimento
Via Della Vite
Spagna
Via Sistina
Via Francesco Crispi
Via del Tritone
Via del corso
Via Dei Fori Imperiali

Colosseo

Interchangeable building parts

What if all wood doors of a given size used interchangeable hinges? What if all faucets were interchangeable and designed so they are easy to swap out? Why do we all waste so much with these idiosyncratic and hence difficult buildings we live in?

Finger jointed cedar

Does this work well. It should last forever.

Maybe we are using the wrong wood. Maybe cedar is better than pine. Also maybe we should cultivate the best

cedars and eliminate branches periodically from our groves. Will this work? Maybe we use droids for this. There is a related rate between how much wood we need and how much we grow. Using pine, which is easier on bugs and funguses must significantly increase demand for soft wood.

Wood strength rating 1-10

Whatever the strongest natural wood is, that is a 10. How much force does it take to break the average perfect clear dressed 2x4 that has 90 cm between the bending clamps. All other woods natural and artificial substitutes are rated for relative hardness based on this benchmark. So when you buy furniture, you can see how strong the pine is, and how strong the particle board is.

Standard refrigerator packaging

If they were all 4cm, 8cm, 12cm, 16cm and higher, the stuff would stack better.

No concealed retrofit utilities

In retrofitted buildings, pipes and electricity may not be concealed, except in existing pathways. In factory units, all lines must be in conduits so the lines can be easily replaced.

Slippery yet waterproof

What about acrylic form release gel that impregnates the concrete and waterproofs its exterior.