

CHINESE ROAD TRANSPORT MASS AND DIMENSIONS REGULATIONS – AN ANALYSIS OF THE CHALLENGES AHEAD



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Abstract

This paper analyses the dynamics behind the failure to fully implement the old length- and weight regulations and the challenges in drafting and enforcing new ones. China is a complex society at the early stages of economic development. Low levels of management and educational levels in the transport sector together with a weak institutional framework pose extra challenges for Chinese legislators and enforcement authorities.

The main considerations in the revised regulation will be explained and the impact of success/failure in enforcing these will be analyzed.

Keywords: China, Road Regulations, Length and Weight

Mats Harborn was the first Scania representative in China and set up its first representative office in 1985. In 1992 he left Scania to work for Svenska Handelsbanken and later the Swedish Embassy and Swedish Trade Council in China.

In 2003 Mr. Harborn re-joined Scania and took up the position as Chief Representative for Scania in China. In 2007 Scania was the second foreign automotive manufacturer to be granted status as wholly owned brand importer of automotives into China. Mr. Harborn was the first General Manager of Scania Sales (China) Co., Ltd. In 2010, he took up the position as Executive Director of the Scania China Strategic Centre, which works with long term business development in China. In 2013 he was also part of the team that set up the first wholly owned foreign truck dealership in China – the Scania Guangzhou Dealer.

Between 2005-2013, Mats Harborn was Chairman of the Swedish Chamber of Commerce in China, and after having been active in the European Chamber of Commerce as Vice Chairman of the Commercial Vehicles working Group, he was elected Vice President of the EUCCC in 2103. He is also the Chairman of the ACEA CV board in China. Mr. Harborn has been a very active participant in the Chinese public debate on the improvement of the transport and logistics industry.

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1. Background

In China the Mass and Dimensions of heavy duty trucks are regulated in a national standard called the GB1589-2004. As the name indicates this is the (second) revision which came into force in 2004. The first standard was written in 1989. Normally standards are revised every five years in China, but this standard came up for revision only three years ago and the work is still in progress. In order to understand the challenges in revising the GB1589 we need a little historic background.

1.1 China Opens Up

At the third plenum of the 11th Party Congress of the Chinese Communist Party in December 1978, Deng Xiaoping launched the Open Door policy and a round of comprehensive reforms to lift China out of the backwardness and chaos caused by erratic political campaigns under Mao Zedong.

The ultimate purpose was to reinstate China to its deserved standing in the world in terms of economic and political influence. To achieve this, a broad program of reforms was put into place. To put it very simply, China rebuilt and built the factors necessary for the creation of a modern economy such as: infrastructure, industry, education, institutions and a middle class.

Deng Xiaoping and the rest of the leadership were brought up in the planned economy system. They were political engineers, who used state finances to plan for development and progress. Although free markets were allowed to flourish again the main bulk of the economy was dependent on central allocation of resources. The main goal during this period of rebuilding China was to simply focus on growth and not about efficiency and return on assets. It was also important for the leaders that China again became big in international terms; the largest steel producer, the largest ship producer, the largest cement producer etc.

A similar race took place in the area of regulation. New laws, regulations and standards needed to be written and enforced. Again, in this area the focus was not so much on quality, but rather more on quantity.

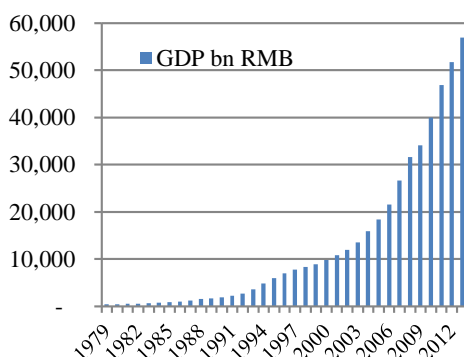


Figure 1. China GDP Growth
source: China Statistic Burea

The forces unleashed by the Deng reforms and later by China's accession into the WTO created an unprecedented economic growth and GDP went from 406 bn RMB in 1979 to 56,884 bn RMB in 2013ⁱ, lifting China from a mere less than 2% share of global GDP to 10%! All things equal the Chinese GDP should have a 20% share of global GDP considering the size of its population.

This enormous growth of the economy and the focus on quantity, rather than quality made it very challenging for legislators and law enforcing institutions to keep pace with development.

1.2 Expansion of Road Network

Another important background information is that China today has 104,400 km express highways 79,500 km national grade highways and 340,500 km second grade highwaysⁱⁱ. The

roads are built to good international standard. The express highways follow the European standard of 3.5-3.75 m width. Also the urban road network is well developed with wide roads and spacious crossings.



Figure 2. Source: National express way network plan

1.3 Explosion in Vehicle Population

The graph below illustrates the extreme growth in vehicle population that has taken place in the last three decades. In 2008 China surpassed the United States as the largest automotive market in the worldⁱⁱⁱ by number of vehicles sold. Today road congestion, air pollution and road accidents are commonplace and among the highest in the world. The Chinese leaders now recognize that it is about time to make China’s automotive market not only the largest, but also the best. Road safety and efficiency is moving to the top of the agenda. Better legislation and better enforcement will be pursued. It is in these contexts that we need to understand the GB1589 and its revisions.

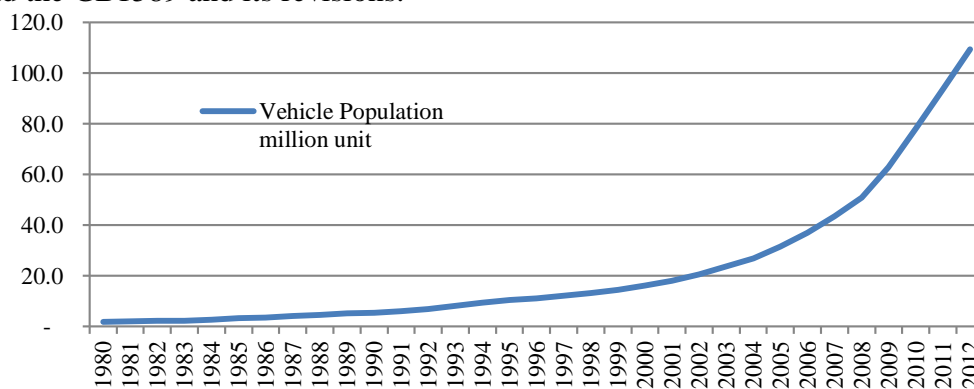


Figure 3. China Vehicle Population Growth
source: China Statistic Bureau

1.4 Technical Standards in China

Standards exist on different levels:

- Compulsory National Technical Standards are given the prefix GB, *guobiao* in Chinese, which means national standard.
- Recommended National Technical Standards are given the prefix GB/T where the T stands for *tuijian*, which means recommended.
- Each ministry has also had the right to issue industry standards. Then the prefix has been an abbreviation of the name of the relevant ministry. For example Ministry of Transportation related technical standards have been given the prefix JT, *jiaotong*,

which means communications. These could be both compulsory and recommended, E.g. JT or JT/T.

Today China is trying to unify its standardization regime and only centrally approved GB can be compulsory. All previous ministry- or industry standards will be renamed and the suffix: “/T” will be added to show that they are not binding standards. The only exception is the HJ standard (*huanjing* environmental technical standards), which will remain.

It is now well recognized in China that standards need pre-work and a clear purpose and a clear context. After the past 35 years of extreme economic growth this is what China’s standard makers are aiming for. The standards of the past have often been too detailed, written out of context. They have furthermore come to hold back the creativity of whole industries that have been waiting for detailed standards of products before they invest in and engage in production.

2. The history of the GB1589

2.1 First Version: GB1589-89

The first version was a very simple one page document basically just stating maximum dimensions of motor vehicles. This document was drafted by the Changchun Automotive Research Institute, reviewed by CATARC and issued by China Automotive Industry Association.^{iv}

2.2 Terms and definitions

When working with standards the clarification of terms and definitions is a central issue. In the case of road vehicles there exists an ISO standard called the ISO612 “Road vehicles – Dimensions of motor vehicles and towed vehicles – Terms and definitions”^v. That standard was translated and copied into a Chinese technical standard GB3730.3 which was later revised into GB/T 3730.3-92^{vi}. It was with very few exceptions a blue copy of the ISO612.

2.3 GB1589-2004 - Mass

As described in 1.2 above, growth exploded in China and legislators had problems keeping pace with legislation and above all enforcement. This problem was further aggravated in the area of road transports due to the fact that the BG1589-89 did not define any weight limits. This resulted in unacceptable overloading of commercial vehicles causing serious damage to roads and bridges and a surge in commercial vehicle related road accidents.

Therefore, with the purpose to rein in overloading the GB1589-89 was revised in 2004 to include mass limits and to make it into a more comprehensive standard. This was a massive task and the only manageable way was to largely copy of the European Directive 96/53/EC. Doing that without access to the historic development and with a vague connection to the ultimate purpose makes the work and above all the implementation difficult.

In the case of 96/53/EC one of the over all aims was very clearly formulated:

“Whereas the abovementioned standards reflect a balance between the rational and economical use of commercial road vehicles and the requirements of infrastructure maintenance, road safety and the protection of the environment and the fabric of life”^{vii}

Later in the DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 96/53/EC^{viii} the EU Commission stated as a further reason for a revision:

“ of ...the maximum dimensions and weight for road transport vehicles, with the aim of allowing more energy efficient, aerodynamic vehicles to be put on the market”

Not only did the Chinese legislators lack the background context of the European directive it also faced a system with lowly educated participants in the transport sector and a weak enforcement system. Gross vehicle weights of tractor semi-trailer combinations were often 60-70 tons and sometimes even more.

A step-by-step approach

In an attempt to step-by-step come to grips with the overloading the maximum GVW/GTW set by the GB1589-2004 standards were kept at levels higher than seen in any other country, but lower than the prevailing overloading at the time. This revision was made by CATARC, but implemented by MOT and MPS. On April 30, 2004 a document was jointly issued by seven ministries to combat overloading. A simple rule of the thumb was created to simplify the calculation of GVW and GTW for the law enforcing authorities. In essence the rule of thumb allowed for ten ton gross weight in each axle, less five ton for the front axle. The formula was simple [(No of axle * 10 ton) – 5 ton = GTW] A six axles combination was the largest allowed vehicle combination, which meant maximum 55 ton GTW. This was, and is still today, in conflict with the gross weights stipulated by the GB1589-2004, which allowed for maximum 49 ton GTW, which can only be allowed with an air suspended 6X4 tractor and a three axle trailer.

However, with the rule of thumb applied by the enforcing authorities Chinese truck manufacturers began to produce and supply the market with fake 6X2 trucks, which was a 4X2 trucks with an extra front steering axle. Such models could be sold at very low prices and “legally” allow the operator to reach 55 ton GTW in combination with a three axle trailer. However, the ensuing axle weight of the tractor drive axle hence risks vastly exceeding the 11.5 ton maximum axle load in a double tire drive axle. Actually, it was a mistake to limit the number of axles to only six as that limits the weight distribution over potentially more axles.

2.4 Vehicle Dimensions - Length

Another issue that has caused confusion is a loophole in the GB1589-2004 through an unfortunate definition of trailers as being motor vehicles^{ix}. That opened the door for truck operators to obtain license plates for trailers of the same length as the regulated maximum train length. The result is that on roads in China there are tractors pulling trailers with a 16.5 m length, which was the previous maximum combination length, allowed under the GB1589-

2004. In an attempt to control and legalize this situation, the legislators compromised and introduced a new rule from 1 January 2008:

“for the semi-trailer in wholly closed van style used on high grade highway, the maximum limit of vehicle length is 14600mm; ...for the articulated auto train combined by semi trailer in wholly closed van style used on high grade highway, the maximum limit of vehicle length is 18100mm without any auxiliary steering in the tail.”^x

The notion of a frame regulation

The European approach, which also was the approach of the original GB1589-89, is for the legislators to set the maximum values. Such maximum values constitute a frame within the industry can design and develop vehicles. Unfortunately, in 2001 China issued a new standard called GB/T 3730.1-2001 in which the regulators went one step further: *“In this standard...we give each kind of vehicle specific terminology and definition and provide corresponding drawings”*. This was a misdirected ambition which lead the legislators and the industry to think that different transport usages needed different standards. For example, in the GB/T 3730.1-2001, 2.2.2.2 general purpose goods semi-trailer is differentiated from 2.2.2.3 special semi-trailer and here the drawing shows a car transport semi-trailer. From now on the field was open for different rules for different transport applications. China hence moved away from one frame regulation.

The Latest GB1589 revision triggered by too long car transporters

As we saw above GDP growth in China averages some 15% p.a. from 1980 to 2013. The sales of passenger cars grew almost exponentially between 2004 and 2012.

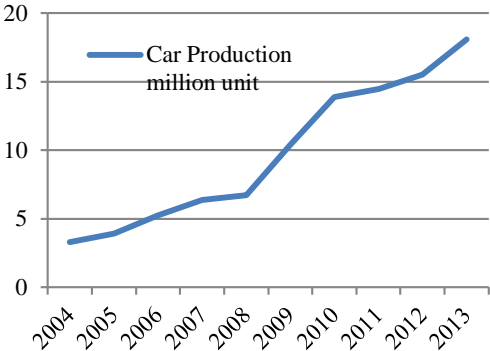


Figure 4. China Cars Production
Source: CAAM

Car distribution became a very lucrative segment within the transport industry. As car OEM manufacturers demanded ever lower freight rates the transport companies began to further explore the loose enforcement of the GB1589 and the possibility of registering extra-long semi-trailers. Since the GB/T 3730.1-2001 had already conceptually made it possible to think in terms of different standards for different transport needs the car transportation industry has developed totally new (not legalized standards) for car transport vehicle combinations. Today a common sight on China’s highways is 30 m long car

transport semi-trailers even with two rows of cars either on the second level or on both levels. These too long and too wide semi-trailers pose a serious threat to road safety on China’s roads.



Figure 5. Car Carrier in China, Photo: Mats Harborn

2.5 Vehicle Dimensions - Width

In the GB1589-89 vehicle width was limited to 2.5 meters. In the 2004 revised standard an exception was introduced, which followed the idea of different standards for different types of vehicles:

“For the van truck with its cargo body wholly closed (and is separated by cab), the semi trailer on wholly closed van style, the automobile train in wholly closed van style, and the bus with length of more than 11000mm, the maximum limit of vehicle width is 2550mm”^{xi}

This definition excludes for example curtain side bodies and does not take into account the extra insulation needed by refrigerator bodies.

The 96/53/EC takes a more pragmatic approach to the width so as to allow for efficient loading and unloading of pallets.

(14) Whereas the maximum authorized width of 2,50 m for vehicles intended for the carriage of goods can leave insufficient internal space for the efficient loading of pallets, which has given rise to the application of different tolerances beyond that level in the legislation of the Member States concerning domestic traffic; whereas a general adaptation to the current situation is therefore necessary in order to provide for clarity in technical requirements, bearing in mind the road safety aspects of these characteristics;

(15) Whereas if the maximum width of vehicles intended for the carriage of goods is increased to 2,55 m, that standard should also be applied to buses; whereas, in respect of buses, it is however necessary to provide for a transitional period to allow the manufacturers concerned to adapt industrial plant;^{xii}

A demonstration made by Scania at the Wuhan Special Vehicles Exhibition in November 2013, showed that because curtain side trailers can have a maximum width of only 2,5 m in China, the loading time using euro pallets (China has two pallet standards: 1100X1100mm and 1000X1200mm) takes twice as long as in Europe due to the lack of sufficient internal space.



Figure 6. China Trailer maximum 2.5m width, Photo: Tommy Xu

3. A dissemination of the major goals with the GB1589-2004 current revision

As is clear from the above China now needs to take the next steps in modernizing the standard for dimensions, axle loads and masses for road vehicles. The GB1589 has been mainly modeled after the ECE and the European legislative system, and since Chinese roads also follow European standards it is reasonable that the revised GB1589 gets even closer to the 96/53/EC.

Furthermore as the Chinese economy matures the need to transport heavy raw materials decrease and instead lighter, more valuable goods come into circulation the timing is good for further reductions of GTW.

3.1 Major challenges

Jieneng – jianpai

In its 12th Five Year Plan China committed to a 14% CO₂ reduction per GDP unit from 2011 to 2016^{xiii}. Consequently also the transport industry was asked to focus on reduced fuel consumption and lowered emissions – in Chinese *jieneng – jianpai*. The revised GB1589-2004 needs to be conducive to such a development.

Efficiency and safety accentuated by “Drop-and-Pull”

Better utilization of vehicles will lead to lower fuel consumption and reduced emissions per ton km. With the ambition to stimulate transport efficiency improvements in the transport industry the MOT has since 2009 introduced a scheme where designated companies can receive state support if they start using the “drop-and-pull”^{xiv} method, i.e. one tractor with many trailers.

The drop-and-pull system revealed the lack of unified and enforced standards for the dimensions and design of tractors and trailers. Problems matching trailers and tractors, mismatching brake systems and poor weight distribution put further focus on the need to improve the GB1589 and its implementation.

GTW

The present GB1589 allows for rather high GTW. The legislators have totally focused on the axle weight of individual axles without considering the GTW or the weight distribution of the vehicle. The result is that even if the total GTW is not exceeded the individual axle weight may be far above the legal limits. The traffic inspectors do not check the individual axle weights and that has led to the present situation. By reducing GTW it will also be possible to make extra provisions for uneven weight distribution.

The new GB1589 will try to rein in the GTW to levels closer to global standards. The latest suggestion on the table is maximum 46-47 ton GTW^{xv}. This will be a big reduction from the 55 ton that the rule of thumb today allows. There may be two consequences of a 46-47 ton maximum GTW limit:

- 1) Trailers will be made lighter through the use of light box materials and of curtain trailers, so as to maintain high legal payloads.
- 2) Higher legal GTW may be allowed through rationally designed road trains e.g. B-double combinations to be used on designated routes.

European Modular System – Chinese Modular System?

As we saw in 1.7 above there are very long vehicle combinations on the Chinese roads with only one, articulation point between the tractor unit and the semi-trailer. The maneuverability of such vehicles is very poor. The new GB1589 has to allow for safe long vehicle

combinations with ample and well placed articulations points. Such vehicle combinations were already defined in the GB/T 3730.1-2001^{xvi}

As a result of the lobbying work conducted by ACEA and by Scania in China there is now a recognition that dedicated Chinese highways could allow for such long vehicle combinations and that the GB1589 revision need to make this possible. In Europe the definition of three clear modules in the 96/53/EC: motor vehicles, trailer and loading platforms is called the European Modular System. Such a concept needs to depart from the smallest common denominator, i.e. the load pallet. The dimensions of the load pallet set the dimensions of the vehicle load carrier (see 1.3 above). A Chinese Modular System is now the aim of the MOT. However, in China the use of load pallets are still insignificant and two standards exist in parallel – the Euro pallet and the Japanese standard. Instead the CMS may be designed around 20 and 40 foot even 45 foot containers.

This concept is indirectly promoted by the car transport industry, who increasingly recognizes that the super-long, super-wide car transport semitrailers need to be controlled for reasons of safety and to secure a level playing field. The car transport lobby is trying to push for rigid + centre axle trailer and/or tractor + semi trailer + centre axle trailer combinations of 24 meters.

This discussion is one step in the direction toward standardized transport units. The next step will be to disconnect specific types and transport tasks from the discussion and only talk about a frame regulation.

City Distribution

Despite Chinese cities having road infrastructure that is the envy of many western cities, it still has a separate standard for city distribution (and municipal trucks) that only allow for up to 12 ton GVW. The present revision of GB1589 does not seem to address this issue in particular. The timing is good for enforcing a limit of the total length of motor vehicles to 12 meters and at the same time allowing for up to 17,5 ton GVW city vehicles. With the ambitious urbanization plan that China launched in March 2014^{xvii} it can easily be foreseen that larger and fewer city distribution and municipal vehicles will be demanded. Today such vehicles are regulated by the GB/T 29912-2013^{xviii} standard. However, an application of the GB1589 mass and dimensions limits also for city transport would have been an easy and rational avenue to go, but the GB/T 3730.1-2001 still induces legislators to rather think in terms of usage, not frame regulations.

Export

As Chinese cross border trade grows so does cross border road transport. For a long time Trucks from Hong Kong have been allowed to enter China, but Chinese trucks have not been allowed to enter Hong Kong. The reason is that Chinese trucks have been too heavy. An alignment of vehicles dimensions and masses with bordering countries and regions will allow Chinese trucks to cross more borders.

Furthermore, it is gradually being recognized by stakeholders that mass and dimensions standards that are converging with global standards help Chinese manufacturers develop vehicles that can be sold to countries that apply such standards. If not Chinese commercial vehicles may in the long run have a limited market offshore.

4. Conclusions

The Chinese road transport mass and dimensions regulation has developed in stages from a very simple standard limiting the outside dimensions of motor vehicles to a more comprehensive standard largely copied from the European 96/53/EC directive. The implementation of the standard has been complicated by poor enforcement and a lack of understanding of its larger purpose and benefits. The third revision, which is now under way is facing clear challenges and will play an important role to create a safer and more efficient transport system where market actors compete on a level playing field. On key issue will be for the legislators to move back to a framework standard where maximum limits are set irrespective of type of vehicle or of its transport task.

Abbreviations

AQSIQ	Administration of Quality Supervision, Inspection and Quarantine
CAAM	China Association of Automobile Manufactures
CATARC	China Automotive Technology & Research Center
MEP	Ministry of Environmental Protection
MPS	Ministry of Public Security
MIIT	Ministry of Industry and Information Technology
MOT	Ministry of Transport
NDRC	National Development and Reform Commission

ⁱ Source: China Statistic Bureau

ⁱⁱ Source: China Statistic Bureau

ⁱⁱⁱ China Passes U.S. As Largest New-Car Market in January...Or Does It?, February 04, 2009, Financial Times

^{iv} Outside dimension limits of motor vehicles, GB1589-89

^v Road vehicles – Dimension of Motor vehicles and towed vehicles – Terms and definitions, First edition – 1978-03-15, International Standard ISO 612.

^{vi} Motor vehicles and towed vehicles, Dimensions of vehicles, - Terms and definitions, GB/T 3730.3-92

^{vii} 31996L0053, Council Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic, *Official Journal L 235* , 17/09/1996 P. 0059 – 0075, *Clause 1*.

^{viii} Brussels, 15.4.2013, COM(2013) 195 final, 2013/0105 (COD), Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, amending Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic

^{ix} Safety specifications for power-driven vehicles operating on roads, GB 7258-2012 (replacing GB7258-2004)

^x National Standard of the People’s Republic of China, Limits of dimensions, axle load and masses for road vehicles, GB1589-2004, Table 1, footnote m.

^{xi} National Standard of the People’s Republic of China, Limits of dimensions, axle load and masses for road vehicles, GB1589-2004, Table 1, footnote h.

^{xii} 31996L0053 Council Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic, *Official Journal L 235* , 17/09/1996 P. 0059 - 0075

^{xiii} China 12th Five Year Plan

^{xiv} Technical Specifications of “drop-and-pull” vehicle on road transport, issued 2011-3-1

^{xv} ACEA Translation For Reference Purpose Only, Limits of dimensions, axle loads and masses for road vehicles (in China), July/2013

^{xvi} 2.3 combination vehicles

^{xvii} National New-type Urbanization Plan 2014-2020

^{xviii} GB/T 29912-2013 Technical Requirement of City Distribution Vehicles , Issued 2013-11-27