

Just in case.

SILK ROAD

Loss Prevention Measures

Definition New Silk Road



Belt and Road Initiative

From Wikipedia, the free encyclopedia

This article is about Chinese infrastructure projects in Asia, Europe, and Africa. For the U.S. Initiative, see [New Silk Road Initiative](#).

The **Belt and Road Initiative** (**BRI**, or **B&R**^[1]), formerly known as **One Belt One Road** (**Chinese**: 一带一路) or **OBOR** for short, is a global **infrastructure development** strategy adopted by the Chinese government in 2013 to invest in nearly 70 countries and international organizations.^{[2][3]} It is considered a centerpiece of Communist Party of China general secretary Xi Jinping's foreign policy.^[4]

Xi Jinping originally announced the strategy during official visits to **Indonesia** and **Kazakhstan** in 2013.^{[5][6][7][8]} "Belt" refers to the **overland routes** for **road** and rail transportation, called "the *Silk Road Economic Belt*"; whereas "road" refers to the **sea routes**, or the **21st Century Maritime Silk Road**.^[9] It was incorporated into the **Constitution of the People's Republic of China** in 2017.^[4]

The Chinese government calls the initiative "a bid to enhance regional connectivity and embrace a brighter future".^[10] Some observers, mostly American, interpret it as a plan for Chinese world domination through a China-centered global **trading network**.^{[11][12]} The project has a target completion date of 2049,^[13] which coincides with the 100th anniversary of the **People's Republic of China**.

.....global infrastructure
development strategy adopted by
the Chinese government in 2013

.....

Definition New Silk Road

Different routes according to requirements, availabilities and contractual arrangements, participating countries, general cargo volume,

General distinction between northern corridor, middle corridor and southern corridor with many cross connections, junctions and special routes.

Different licensees for certain routes and destinations in China

License type and duration of the license and the related subsidies are negotiated between the various carriers, platform operators and system providers and the Chinese companies at the various receiving stations in China.

Definition New Silk Road

Simplified overview of the various railway routes



Definition New Silk Road

Simplified overview of the three main corridors



Definition New Silk Road

Simplified representation of the northern corridor



Definition New Silk Road

Simplified representation of the northern corridor



Northern rail corridor of the new silk road

Facts and Figures

- Approx. 18 – 20 days transit time from Europe to China
- Approx. 11.000 - 12.900 kilometers from Europe to China
- Up to 11 different countries
- Up to 12 different climate zones*
- 41 x 40' container rail platform wagons per train in Central Europe
- 82 x 40' container rail platform wagons per train in Russia
- Approx. 2.800 trains in 2020 (End of August) from Central Europe to China

Information personally gathered from several freight railway operators, forwarders and multimodal 3PL

Northern rail corridor of the new silk road

Political risks



Sweden



European Union



Russia



Denmark



Germany



Kasachstan



Finland



Poland



Mongolia



Norway



Belarus



China

- Different Countries
- Different Political Systems
- Different Jurisdiction Standards
- Different Security Standards
- Different Affiliations To State Associations

Risks on northern rail corridor of the new silk road

Political risks

- Bilateral tensions between transit countries
- Sanctions
- General trade disputes & conflicts
- Political influence on undisturbed trade flows

Risks on northern rail corridor of the new silk road

Organizational Risks

Each country along the corridor is individually responsible for the passage of the trains through its territories as well as providing appropriate locomotives and trained personnel

- Different rail network operators
- Different railway companies
- Different forwarders or freight platform provider
- Different organizational associations
- Different state and private companies

Risks on northern rail corridor of the new silk road

Technical Risks

- High acceleration values during transport due to shunting, breaking & sudden emergency stops, accidents
- Permanent vibrations
- Different track widths with necessary re-gauging activities
- Doubling the train length from 41 to 82 x 40 'container platform wagons on the long-distance trail
- Different care & maintenance status of rails, switches and bridges
- Last mile – transshipment to other means of transport

Risks on northern rail corridor of the new silk road

Technical Risks

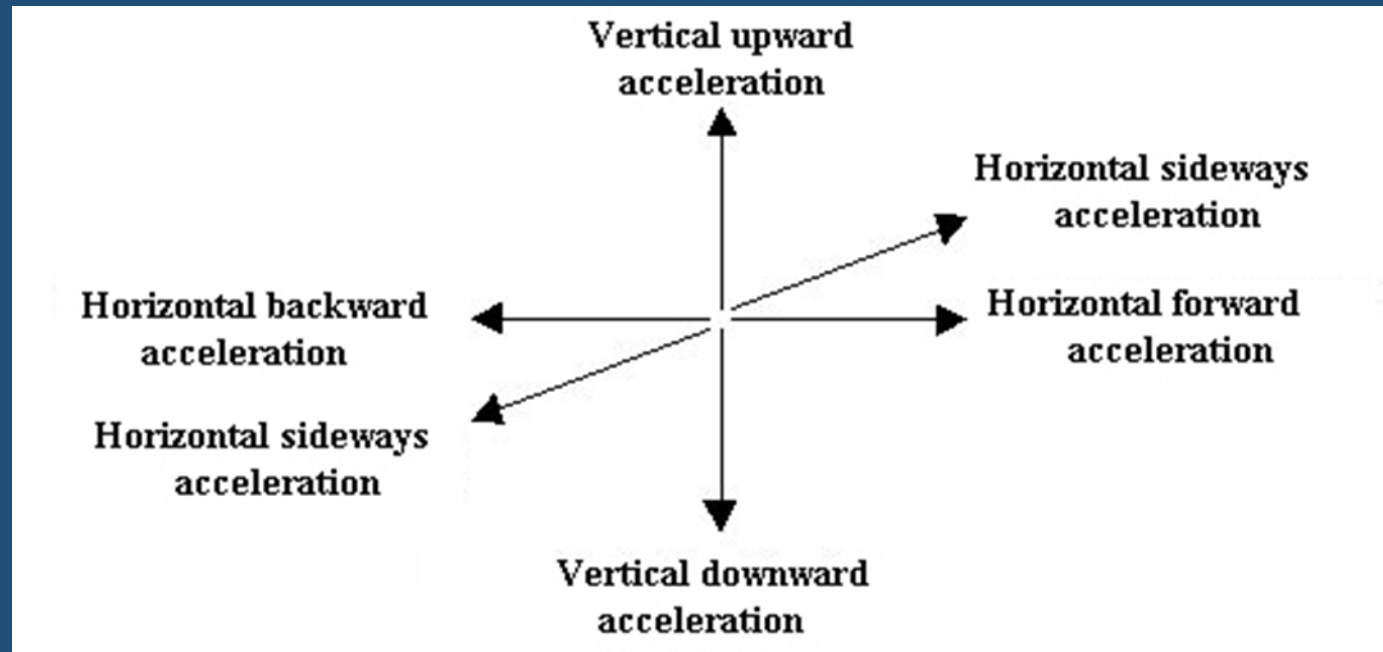
Mechanical stresses or loads

- Dynamic shock loads
- Dynamic vibration loads
- Further dynamic loads due unwanted squeezing, pinching, chafing
- Compressive stresses from stacking the cargo

Risks on northern rail corridor of the new silk road

Technical Risks

Types of acceleration



graphic taken of https://www.tis-gdv.de/tis_e/misc/mechanisch.htm/

Risks on northern rail corridor of the new silk road

Technical Risks

Acceleration values on railway transports given by regulations and standards of
IMO / ILO / UNECE - CTU Code and UIC International Union of Railways
(given for shunting with normal buffers)

4,0 g forward

4,0 g backwards

0,5g sideways

0,3 g vertical

own measured individual values

(single shot - not representative)

5,2 g forward

3,5 g backwards

1,2 g sideways

$g = 9.81\text{m/s}^2$

Risks on northern rail corridor of the new silk road

Technical Risks

Maximum acceleration values of different transport modes

Transport Mode	horizontal acceleration			vertical acceleration	
	forward	backwards	sideways	upwards	downwards
Road Transport	1,0 g	1,0 g	1,0 g	1,0 g	1,0 g
Maritime Transport	0,8 g	0,8 g	1,0 g	1,0 g	1,0 g
Air Transport	1,5 g	1,5 g		3,0 g	3,0 g
Rail Transport	4,0 g	4,0 g	0,5 g	0,3 g	0,3 g

$$g = 9.81\text{m/s}^2$$

The acceleration values shown here are assumptions of maximum values and were taken from a wide variety of specifications, regulations and standards such as the CTU Code, the UIC regulations and further national and international standards

Risks on northern rail corridor of the new silk road

Technical Risks

High acceleration values due to shunting, breaking & sudden emergency stops and accidents might lead to:

- Extreme shifting of goods in the container
- Damage to the outer export packaging
- Damage to the inner packaging
- Damage to the goods
- Damage to the container
- In the worst case, breaking through the container walls

Risks on northern rail corridor of the new silk road

Technical Risks

Permanent vibrations along the transportation route, that change due to differences in the maintenance status of the railway tracks in strength and extent, might lead to:

- Shifts and collapse of stowage security measures in the container such as wooden stiffeners, airbags, stoppers etc.
- Displacements of the products stowed in the container
- Sagging and collapsing of insufficient external packaging
- Uncontrolled movement and weight shifting of the goods within in packaging

Risks on northern rail corridor of the new silk road

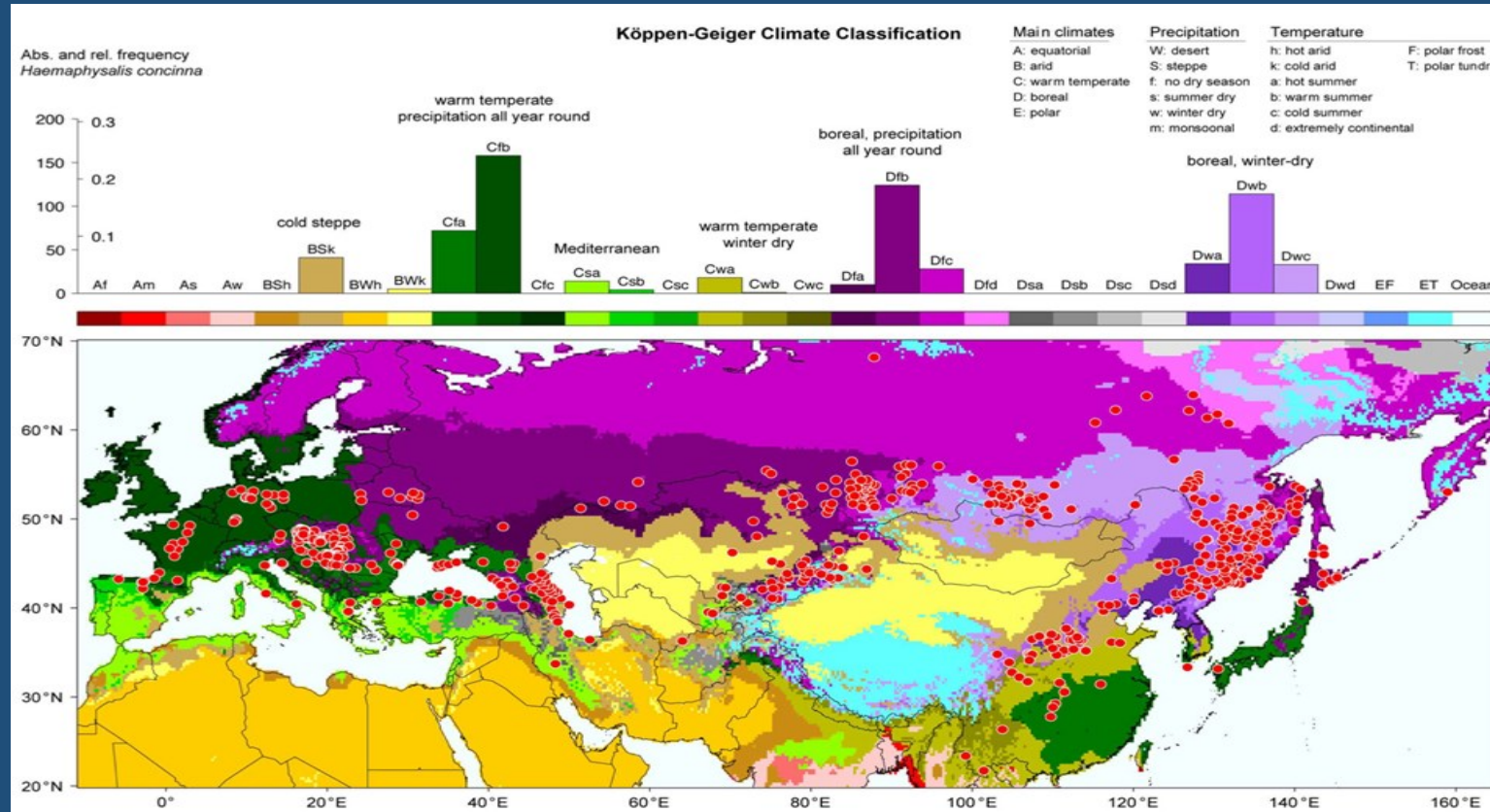
Climatic Risks

Different climate zones
Extreme weather
Strong winds
Iced railway switches
Heavy rain / flooding's
Washouts under railway tracks
Snow drifts
Sandstorms

Risks on northern rail corridor of the new silk road

Climatic Risks

Up to 12 different climatic zones during transport



Risks on northern rail corridor of the new silk road

Climatic Risks

Extreme weather conditions

Temperature records for Russia along the northern route 2000 - 2019												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Record high °C	23,4	27.0	31.0	36.8	38.7	43.7	45.4	45.0	45.4	36.3	29,1	27,2
Record low °C	-71.2	-67.8	-60.6	-57.2	-35.8	-22.2	-9.3	-17.1	-27.6	-48.7	-58.5	-64.5

The climate data was obtained by the German Weather Service & Meteomanz.com

Risks on northern rail corridor of the new silk road

Climatic Risks

Development of temperatures, rel. humidity's and general conditions on an example railway routing from Duisburg / Germany to Chongqing / China in January 2019

Day	Date	Station	Country	av. temperature	rel. humidity	gen. con
Day 1	18.01.2019	Duisburg	Germany	-0,4	81%	soft rain
Day 2	19.01.2019	Berlin	Germany	-4,5	96%	clear
Day 3	20.01.2019	Warzawa	Poland	-7,9	84%	light snow
Day 4	21.01.2019	Brest-Litovsk	Belarus	-6,7	94%	snow
Day 5	22.01.2019					
Day 6	23.01.2019	Moscow	Russia	-19,4	86%	heavy snow
Day 7	24.01.2019					
Day 8	25.01.2019	Jekaterinburg	Russia	-13,3	81%	heavy snow
Day 9	26.01.2019	Omsk	Russia	-20,7	74%	heavy snow
Day 10	27.01.2019					
Day 11	28.01.2019	Novosibirsk	Russia	-21,0	70%	heavy snow
Day 12	29.01.2019	Irkutsk	Russia	-19,1	68%	heavy snow
Day 13	30.01.2019					
Day 14	31.01.2019	Ulan Bator	Mongolia	-5,5	21%	clear
Day 15	01.02.2019					
Day 16	02.02.2019	Zamyn-Üüd	Mongolia	0,1	12%	clear
Day 17	03.02.2019					
Day 18	04.02.2019	Beijing	China	3,6	58%	rain
Day 19	05.02.2019					
Day 20	06.02.2019	Chongqin	China	24,1	42%	rain

Risks on northern rail corridor of the new silk road

Climatic Risks

- Temperature - rel. humidity - dew point
- Container is transported through permanent changing climates
- Humidity and saturation in the container change constantly and with a time delay
- Goods and packaging take on the external temperatures with a time delay
- Rapid changes in the outside climate can cause condensation of moisture on the goods and packaging
- Hygroscopic packaging can become unstable when moisture is absorbed
- The risk of mold and corrosion increases

Risks on northern rail corridor of the new silk road

Other Risks

Theft
Vandalism
Human Errors
Terrorism

Loss Prevention Measures

Technical & climatic Risks

The following topics could be implemented as political and international loss prevention measures*:

- Promotion and support of the technical development and improvement of railway wagons
- Equipping all railway wagons with high performance shock absorbers and other pre-existing improvements
- Review and adaptation of the internationally applicable minimum standards for the condition and maintenance of rail networks and sanctions for non-compliance

*These statements are just a very simple summary of possible loss prevention measures.
The author is aware of the complexity of the topic in the overall context.

Loss Prevention Measures

Technical & climatic Risks

Loss prevention measures to be implemented by shippers with support of national and international associations of the insurance, forwarder and packaging industry:

- Communication with shippers / producers about the risks concerning his special products on the chose transport route.
- Individualized appropriate outer export packaging
- Individualized appropriate inner packaging
- Adequate container stowage

Loss Prevention Measures

Technical & climatic Risks

For the sake of completeness, this presentation should contain extensive information about advantages and disadvantages of:

- Corrosion protection & vacuumization of inner packing
- Airbags & wooden stowage stiffeners
- Achievement of force- and form closure
- Wood and wood-based and cardboard packaging materials
- Basic packaging recommendations for rail transport
- Shock absorbers & indicators
- and further detailed and innovative loss prevention measures or methods

However, in order to discuss all these topics in detail, a much larger time frame is required

Loss Prevention Measures

Conclusion

Technical and climatic risks must not be assessed independently, as they can, under certain circumstances, negatively influence each other.

For this reason, the following principle should be "natural" for all those involved in the transport chain and should also be implemented:

Appropriate packaging of the products and stowage in containers under consideration and evaluation of the planned transport route, transport time and the risks to be expected under normal circumstances.

The decision of what "normal circumstances" are and what not, unfortunately or fortunately, changes permanently.

Loss Prevention Measures

Conclusion

In addition to the technical improvements and recommendations, the most important point to avoid damage on every transport route and means of transport is still Information and Communication

A real effectiveness of loss prevention measures can only be seen and measured if all recommendations, regulations and plans are received, understood and implemented by everyone* involved in the transport chain.

*Everyone in this context means that this information does not get stuck at the border between white- and blue-collar staff.

Thank you for your attention