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Slow temps of metro construction in Saint-Petersburg

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Summary

This policy paper is dedicated to the topic of the slow pace of metro construction in Saint-Petersburg. This is a multilevel issue that requires a comprehensive review. The paper presents an examination of the legal, institutional and stakeholders frameworks around metro construction to put readers in the context, the expertise of an independent specialist on metro projecting, and introduces several solutions to the existing problem at different levels of intervention and further evaluation of the solutions. Our solutions include the issue of coordination, resources and technical methods of dealing with problematic solids. As part of the search for optimal solutions, we used the most successful experience of other metro systems in the world. The evaluation was conducted with the help of the table with stakeholders' attitudes towards the solutions and the table with modified PEST analysis. Finally, we conclude that the problematic nature of the subway construction process lies not in resource problems but in structural deficiencies. The proposed technical solutions should accelerate the pace of construction with proper coordination. It is also important to pay attention to public opinion and independent expertise for transparency of the processes.

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Introduction

The issue of slow metro construction in Saint-Petersburg became sort of a cultural code for this place. The public and expert's perception regarding the pace of construction is generally monolithic and negative. While the former outlines the lack of metro infrastructure in distant residential areas, in turn, contributing to surface transport overload (Ya zhivu v Sankt-Peterburge, i mne…', 2023; 'Ya zhivu v Sankt-Peterburge i hochu…', 2023), as well as general distrust to public authorities promises due to constant postponements of the opening dates of new stations (Vasil'ev, 2022; 'Nereal'nyj proekt…', 2022), the expert's position emphasizes existence of deeper structural issues within the metro construction process. For example, the reason of erodible soils is considered as the most discussed problem of 'why metro is not built in SPb in terms' (Marinina, 2018). In case of ignoring the issue, the increasing congestion of underground transport will lead to a complication of its accessibility, as well as an acceleration of equipment wear due to an extreme load. In addition, failure to achieve plans set by the City Government will negatively affect the level of support for the latter, in particular, the Governor of Saint-Petersburg right before the upcoming elections.

Expertise

As a part of research, the interview with Ilya Reznikov, expert on metro projecting from the Urban Planning Lab, was conducted. The expert defined three major aspects of slow metro construction' causes. The first one - scarcity of political will in the City. Providing the Moscow example, the significance of consistent efforts of public authorities put into the process was emphasized. Thus, miscommunication between several Committees and Contractors consequently arose from their prioritization of private interests over the general one, as well as disinterest of the executive branch to influence the status quo. This way, partially the problem solving depends on political context and specifically governmental commitment. Additionally, the complexity of the metro construction system itself was highlighted: hands' shortage or inappropriate technical equipment are commonly accompanied with a huge amount of bureaucratic procedures. Thus, a process divided into different stages between different actors is yet a purely "regime project". Finally, reasoning the factors for the City Government's disinterest in active metro construction, the expert highlighted the prevalence of thinking that transport should pay off. Therefore, perceiving the subway not as a state's social function, but primarily as an economically profitable enterprise, the City Government is not ready to accumulate a lot of resources in the field of construction

simultaneously. As a key way to solve the problem of delayed metro construction, Ilya Reznikov identified the formation of a new team responsible for the metro development in the city.

Relevance of the problem

Since the establishment of a new metro contractor in Saint-Petersburg, the city Government has made several attempts to influence the speed of work: by the autumn of 2023, the position of general director of Metrostroy was changed twice - the last appointment was directly related to the desire to increase the pace of metro construction (Grishkov, 2023). In addition, according to the vice-governor, Smolny is also ready to increase the share of budget financing for construction, provided that the contractor increases the pace of work (ibid.) The Government's desire to influence the problem in a structural way is also confirmed by the news about the transfer of the CTID's powers for Metro Construction to the Construction Committee (CC) from the new year ('Smol'nyj peredaet polnomochiya…', 2023). From such a perspective, we can conclude that the problem of slow metro construction in Saint-Petersburg is reflected in the Government's agenda, therefore, the program we propose will be relevant for the decision-maker.

Context

Legal framework

Considering the institutional framework of metro construction in St.Petersburg, it is necessary to take into account two legal acts upon the topic: General Plan of the City (GenPlan)[1] and the Sectoral scheme of metro development (SSMD)[2] - both are based on the state program "Development of the Saint-Petersburg transport system"[3]. While the first one is operationalised by the Committee on Construction and Architecture (CCA), SSMD, in accordance with which the metro is built in the city, has been managed by the Committee for Transport and Infrastructure Development (CTID). They also define the procedure and methods of financing from two budgets: Federal and Saint-Petersburg one. All subsequent legal changes are introduced directly into these documents by resolutions of the City Government. In accordance with the Russian Government's decree, only the joint-stock

[1] Закон Санкт-Петербурга «О Генеральном плане Санкт-Петербурга», Pub. L. No. 728–99 (2019).
[2] Постановление Правительства Санкт-Петербурга «Об Отраслевой схеме развития метрополитена в Санкт-Петербурге», Pub. L. No. 836 (2018).
[3] Постановление «О государственной программе Санкт-Петербурга 'Развитие транспортной системы Санкт-Петербурга'», Pub. L. No. 552 (2020).

company “Metrostroy Severnaya Stolitsa” can perform the functions of metro design and construction. Thus, clause 2 part 1 of Art. 1 of Art. 93 para. 1 of the Federal Law №44[4], according to which the procurement is carried out only from this single contractor. It is important to understand that Metrostroy has the right to engage third-party organizations as subcontractors in accordance with the law and Federal Law № 223[5]. These federal laws do not set clear deadlines for the fulfillment of the order. At the same time, the Code of Administrative Offences established liability under Articles 7.30[6] and 7.32.3[7] for violation of the procurement of goods, works and services’ procedure for state and municipal needs, as well as by certain types of legal entities. But since both the customer and the contractor are the state (the second one by 65% (‘VTB peredal Peterburgu 65%...’, 2020)), they simply conclude additional agreements to the contracts that the Committee concludes with “Metrostroy Severnaya Stolitsa” with clear terms and amounts of financing. For the same reason, the Government of Saint-Petersburg is not interested in holding Metrostroy liable, as this would entail costs for the Government itself. In addition, it is worth noting that when performing design and construction works, the contractor must be guided by the Town Planning Code of the Russian Federation[8], which provides the procedure for performing the works; other federal and regional legal regulations, such as Saint-Petersburg Government Resolution No. 524[9], which significantly limit activities of contractors and force them to lengthen the construction in order to take into account all the legislative requirements.

Informal institutions

It seems crucial to note that each of the work stages, in addition to the legal framework, is also imbued with various informal practices and mechanisms. The organization of the process assumes the constant participation of Smolny at each stage of the work. Thus, the state customer is responsible for the coordination of the project between different authorities. At the same time, in practice, many informal factors arise, which, in turn, may play an important

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[4] Федеральный закон ‘О контрактной системе в сфере закупок товаров, работ, услуг для обеспечения государственных и муниципальных нужд’, Pub. L. No. 44-ФЗ (2013).
[5] Федеральный закон ‘О закупках товаров, работ, услуг отдельными видами юридических лиц’, Pub. L. No. 223-ФЗ (2011).
[6] Нарушение порядка осуществления закупок товаров, работ, услуг для обеспечения государственных и муниципальных нужд, Pub. L. No. 396-ФЗ, § 7.30, Кодекс Российской Федерации об административных правонарушениях (2013).
[7] Нарушение порядка заключения, изменения контракта, Pub. L. No. 396-ФЗ, § 7.32.3, Кодекс Российской Федерации об административных правонарушениях (2013).
[8] Pub. L. No. 190-ФЗ, Градостроительный кодекс Российской Федерации (2023).
[9] Постановление Правительства Санкт-Петербурга «О Правилах землепользования и застройки Санкт-Петербурга», Pub. L. No. 524 (2016).

role in the problem of slow metro construction. To start, according to the designers, Smolny has repeatedly retarded the process of preparing a territory design plan, which did not allow moving to the examination stage on time or even returned the work to the previous stage due to the updating of regulatory requirements (Dubrovskaya, 2023). In addition, the city Government was accused of late payment of the contractor's work, which also undermined the established agreements and forced the latter to fulfill the order free of charge ([b]Kudin, 2021). It was also mentioned about the customer's hesitation to apply new technologies, which, in turn, slows down the speed and increases the cost of construction work (Dubrovskaya, 2020). Combined with Smolny's frequent postponement of the dates of metro stations' transfer into exploitation (Rogozin, 2021) such practices indicate the existence of various miscommunications within the system.

Stakeholders

The most important stakeholders are Smolny, Metrostroy and VTB. The ultimate goal of Smolny and Metrostroy is to construct a metro in fixed terms. Smolny is interested in such a goal due to its strive to get public support. Thus, slow temps of construction making citizens of Saint-Petersburg wait for metro stations for years negatively affects the Government legitimacy. A. Beglov personally needs to open new metro stations in order to get the popularity before the upcoming governor elections in 2024. Following this, the main interest of Smolny is to show at least some result. Nowadays on behalf of Smolny the CTID and the CCA are operating. Despite the fact that the incentives of Smolny have not changed, committees have their own interests. According to our expert interview, while GenPlan has been developed solely by CCA, concluding agreements with Metrostroy CTID relied on its own SSMD disregarding the general city project. To add, according to the Deputy General Director for the metro design "Lenmetrogiprotrans", the CTID was interested in road construction rather than in metro one (Dubrovskaya, 2021).

As for the resources of Smolny, it has money and power over Metrostroy. Metro construction is financed by Smolny and VTB and they can refuse to pay to Metrostroy as it happened previously ('«Libo Posadyat, Libo…', 2019). Also, the initial Metrostroy was bankrupted after pressing from the side of Smolny (Popova, 2023; [a]Kudin, 2021). It is said that Smolny paid all the debts on Metrostroy loans in order to control the procedure of bankruptcy (Kizyma, 2022).

Metrostroy is interested in ongoing government funding. In order to get it, in theory there is a need for good performance expressed in commissioning of stations. However, as Metrostroy is the only entity which is responsible for metro construction in Saint-Petersburg, it can postpone the terms of commissioning stations by discovering different problems faced in the process of metro construction. Following this, the main resource of Metrostoy is its unique position expressed in monopoly. Not to be forgotten, at least the administration and high officials of the bankrupt Metrostroy were full of accusations of corruption. There was a trial and several officials of Metrostoy were imprisoned and their property was arrested (Vorob'eva, 2021). In the new Metrostroy even an engineer was accused of corruption, expressed as receiving the salary for a non-existent employee (‘Obvinyaemomu Vo Vzyatkah Inzheneru…’, 2022).

Initially VTB created the new Metrostroy and after that gave controlling stake to Smolny (Kudin, 2020). The main resource of VTB is money which it can give to Metrostroy. At the same time, there are no visible interests of VTB in metro construction observed in open sources. Possibly because of this VTB is thinking about termination of their stake in Metrostroy as it is unprofitable for them (Kudin, 2022).

Currently, it is hard to say that there are some coalitions in the metro construction in Saint-Petersburg. Rather there are specific entities within Smolny which cannot agree on their plans. Generally, Smolny and VTB fully control the Metrostroy. Following this, as the Contractor belongs to Smolny, there is no conflict between the City Government and Metrostroy.

Context summary

Based on our analysis of the context of metro construction in Saint-Petersburg, we have identified the following existing problems that lengthen the construction process:

1. Lack of coordination between different committees of the Saint-Petersburg Government responsible for metro construction.
2. Cluttered documentation regulating the procedure of expertise and execution of works on metro construction.
3. Lack of resources in the city: equipment, workers, specialists, which are necessary for rapid construction of the subway in the geological conditions of Saint-Petersburg, due to which inefficient methods of subway construction are sometimes used.

Solutions

We propose to implement solutions in the order they are presented further.

1. **Coordinating body establishment**

Establishment of a governing body bringing together all Committees involved in metro construction would adjust coordination between them and resolve disputes from different interests. This policy can be transferred from Moscow where the Complex of Urban Planning Policy and Construction, which is responsible for Capital metro construction, exists (‘Kompleks gradostroitel'noj politiki i stroitel'stva goroda Moskvy’, 2023). Thus, by combining entities and distributing responsibilities between them, the Government ensures the workflow’s consistency and productivity.

2. **Introduction of new building standards**

The significant experience can be transferred from Moscow as well. For example, Moscow has its own expertise, which is completed in three months. Saint-Petersburg stretches it out for a year due to the complicated procedure in the documents (Grockaya, 2023). That is because the Moscow government concluded an agreement with the national associations of builders, designers and surveyors was signed at the end of 2012 (‘Skol'ko stoit stroitel'stvo metro’, 2023). According to NOSTROY calculations, the introduction of new codes of rules will give 10% savings, which will allow to build additional 15 km of metro lines per year and increase the pace of construction. These measures include updating the regulatory and legislative framework, including SNIPs and codes of rules in construction, certification and retraining of specialists, as well as improving the investment climate and fighting administrative barriers (‘Stroitel'stvo v Moskve podesheveet na 10%’, 2012).

On the basis of round tables with NOSTROY, NOP and NOIZ the government of Saint-Petersburg could discuss the actualization of the regulatory and legal framework of the city, which has not been updated for a long time (for example, a number of SNIPs on building engineering systems have not been changed for more than 50 years, for example, asbestos-cement ducts are still not banned in Russia, although in the world such ducts were banned 50 years ago (ibid.)), which would make it possible to reduce the cost of metro construction and increase the pace of construction.

3. The shallow laying method

Shallow laying method supposes that stations are not built deep. It helps to reduce costs of construction and construction time. Usually it is said that it is not used in Saint-Petersburg because of hard geological conditions (Yushkovskij, 2020). However, it is still applicable in several city districts as in such cases there is a need for certain conditions: absence of wet grounds and no building above the metro line. Shallow laying method was used in Saint-Petersburg in Avtovo, Veterans Avenue, Leninsky Avenue, and “Novokrestovskaya” stations. As “Novokrestovskaya” was built on alluvial territory by shallow laying method, water leaks appeared there (Poslyanova, 2020). There are no buildings on the surface between Veterans Avenue and Leninsky Avenue, thus, a shallow laying method is used. However, for unexplained reasons, the shallow laying method is not spread. CTID responded that the expertise of soils is a state secret. The erodible soils could not explain the fact that some stations in Saint-Petersburg are constructed by shallow-laying method. We propose to use this method in residential areas, or at least to conduct a transparent examination which will clearly explain why such construction is not possible.

4. Introduction of double-track tunnels

Moscow's experience in implementing the “Madrid technology” (‘Skol'ko stoit stroitel'stvo metro’, 2023) can also be transferred to Saint-Petersburg, because the advantages of double-track tunnels are that one large shield, rather than two six-meter shields, is required for maintenance and operation, less equipment for soil removal is needed, and the amount of related infrastructure is also reduced: lighting, ventilation, and tubing delivery. This reduces the time and cost of the works. The work requires less urban area that would have to be excavated in a traditional construction method (Ternovaya, 2016). Lenmetrogiprotrans experts also note the possibility of introducing such technology (Romanova & Fajzullaeva, 2023) - and it has already been introduced in Saint-Petersburg for the first time in Russia. Such runs exist, for example, on the sections from the International station to the Shushary station (Oficial'nyj sajt Administracii Sankt-Peterburga, 2015), thus, this experience could continue to be implemented.

5. Attracting foreign specialists

This will help to solve the problem of shortage of specialists, personnel and equipment in metro construction. For example, in Moscow, specialists from China, China Railway Construction Corporation Rus, were engaged. The Chinese contractor performed the main

construction works, while the rest of the works were carried out by Russian contractors, which is explained by the security and regime system of the facility (‘Tekhnologii Podnebesnoj…’, 2017). In addition, the Chinese corporation also developed special equipment suitable for the Moscow geology (Borisova, 2019). This experience can also be used in the construction of the subway in Saint-Petersburg, taking into account the specifics of geology in the city.

6. Jet grouting

There is information that freezing was used during Zvenigorodskaya station construction (‘Metrostroj | Tekhnologii’). All in all, due to its time and funds expense (Vlasov et al., 1987), we recommend substitution of this method with jet grouting. The jet grouting method is about mixing soil with cement (‘Zamorozka Grunta Pri Stroitel'stve Metro’ 2018, 17). It is used in Saint-Petersburg, but it is not evident how widespread. Looking at world experience, in Beijing the soils are similar to ones in Saint-Petersburg, the jet grouting method was used in metro construction (Zhiguo et al., 2021). Finally, the result was considered safe. Thus, jet grouting could be used instead of freezing in some areas of Saint-Petersburg. However, there is also a need for the technical specialists’ involvement in order to reduce possible problems during implementation of this technique.

Evaluation

Evaluation is presented in tables done as a prototype of tables from the article of Luciana Herman (Herman 2013, 3-4). First of all, the table with stakeholders is presented, and after - the table with PEST analysis (see: Appendix 1 & Appendix 2). PEST analysis includes political, economic, social and technological criteria which reflect the feasibility of proposed policy (Herman 2013, 2). We have chosen the following criteria: political and administrative feasibility (legal obstacles, readiness of politicians and contractor to act etc), economic impact (how costly proposed solutions are and what effects they have on economics), technical feasibility (whether the solution could be technically implemented, whether geological conditions are considered), time-efficiency (whether the solutions help to reduce construction time). Particularly these criteria are chosen on the basis of all analysis presented in the work. We suppose that the main obstacles to quick metro construction are political, economic and technological. The column about time-efficiency is added to show whether our solutions really solve the problem.

Mostly our solutions are complementary. We suppose that they will be implemented in a top-down way. It is logical as the program implies technical solutions, establishment of coordinating bodies which can be done only from above. We propose to implement them gradually in the order they are listed above.

Conclusion

The issue of metro construction in Saint-Petersburg turned out to be mainly structural rather than resource gap. The general recommendation would certainly be the interaction adjustment among the Smolny Committees as a whole customer as well as in relation to Contractor. Besides, all the measures mentioned above will help to technically accelerate the construction process itself. Additionally, as the context examination revealed lack of public participation in decision-making related to the sphere of metro construction, we would recommend to take into account independent experts and activists' opinions regarding the topic, as it would let policy actors keep pace with modern techniques and professional competence.

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Appendix 1

<table>
<tr><th>Solutions/Stakeholders</th><th>Smolny</th><th>Metrostroy</th><th>VTB</th></tr>
<tr><td>Jet Grouting</td><td>Indifferent</td><td>Used such a technology and will be minded to implementation</td><td rowspan="4">Indifferent</td></tr>
<tr><td>Shallow laying</td><td>Should explain why they did not use earlier</td><td>There will be a need to change methods of construction</td></tr>
<tr><td>Double-track tunnels</td><td>Indifferent</td><td>There will be a need to change methods of construction</td></tr>
<tr><td>Foreign specialists</td><td colspan="2">Will look like as incapability of solving problems ourselves</td></tr>
<tr><td>Introduction of new building standards</td><td colspan="3">Could make the process of metro construction coordination easier</td></tr>
<tr><td>Coordinating body establishment</td><td>The Committees may not obey the power of another body. Yet easier for Governor to control the process</td><td colspan="2">Will be interested in establishment of new body as there will be coordination between committees and no disagreements which prolong the process of authorization</td></tr>
</table>

Appendix 2

Solution/Criteria	***Political and administrative feasibility***	***Economic Impact***	***Technological feasibility***	***Time-efficiency***
Jet Grouting	-	It is cheaper than freezing (‘Zamorozka Grunta Pri Stroitel'stve Metro’, 2018)	There should be no problems with jet-grouting as such a technology was already used in Saint-Petersburg	It will help to reduce the time of metro construction as jet grouting is easier to use than freezing (which takes more time) (‘Zamorozka Grunta Pri Stroitel'stve Metro’, 2018)
Shallow laying	-	The station construction by shallow laying method is approximately in two times cheaper in comparison with deep laying construction (Smirnov et al. 2022, 8)	Additional independent technological expertise should be conducted on whether it is possible to build shallow-laying stations in certain Saint-Petersburg districts	The time of station construction by shallow method is by two times faster than the time of construction by deep-laying method (Smirnov et al. 2022, 8)
Double-track tunnels	There will be a need to overcome the resistance from Smolny, which can	This reduces the cost of the work (Ternovaya, 2016).	There should be no problems with double-track tunnels as such a technology was already	It will reduce the time of metro construction as double-track tunnels are faster to build

	be not ready for implementing such technology (Romanova & Fajzullaeva, 2023)		used in Saint-Petersburg (Oficial'nyj sajt Administracii Sankt-Peterburga, 2015).	
Foreign specialists	Only image problems could occur such as it will look like as incapability of solving problems ourselves	It will be more expensive than attracting only Russian specialists	There will be need to teach foreign specialists considering the special conditions of Saint-Petersburg	Overall, it will reduce time of construction as foreign specialist could help in implementation of new technologies
Introduction of new building standards	There is a need in legislation change which could take time	It may make metro construction process cheaper (‘Stroitel'stvo v Moskve podesheveet na 10%’, 2012)	It would cause a necessity to acquire new construction equipment and instruments	It will reduce the time of construction as new technologies will make it possible

Coordinating body establishment	There will be a need to overcome the resistance from Smolny committees, legal changes will be necessary	There will be a need in financial maintenance of one more body	It would be necessary to establish a new structure with its own institutions, as well as recruit personnel	It will reduce the time of conciliation as it will be less bureaucracy, and committees will follow one line and will not disagree with each other