



Can you have it, without having it?

A case-study of a *Critical Chain* application in a set of huge city-wide construction and renovation projects for the *Euro 2012™* games in Wrocław, Poland

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Alex Klarman - As the CEO of the **Goldratt Institute (Israel)**, Dr. Klarman is leading the effort to introduce TOC to, and establish it as the standard management approach in Israel, as well as worldwide.

His background - Ph.D. in biophysics, as well as his industrial and educational background, including long years of hands-on experience in industry, makes him exceptionally fitting to this demanding undertaking.

As the commanding officer of Dr. Eli Goldratt during decades' long service the Israeli army, Dr. Klarman became familiar with the early concepts of **OPT** and **TOC** almost three decades ago. Since 1985 he took a major part in the drive to develop, disseminate and apply **TOC**.

Dr. Klarman's work included developing the educational materials and simulators used in various areas of **TOC** education, as well as the implementation work with some of the leading world-class corporations including the likes of **Ford, Phillips, Intel, Teva** and **Microsoft**, as well as many, many others.



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What we did, and why it may be interesting:

We'd like to present how and why a major city in **Poland**, fearing possible delays in its preparations to host the **EURO 2012™** games decided to apply **TOC** in its project management.

Then, what it got in return.



What are the UEFA EURO 2012™ games anyhow?



for the

Union of European Football Association

The ***EURO 2012™*** games are the European Football Championship tournament, to be played in Poland and Ukraine

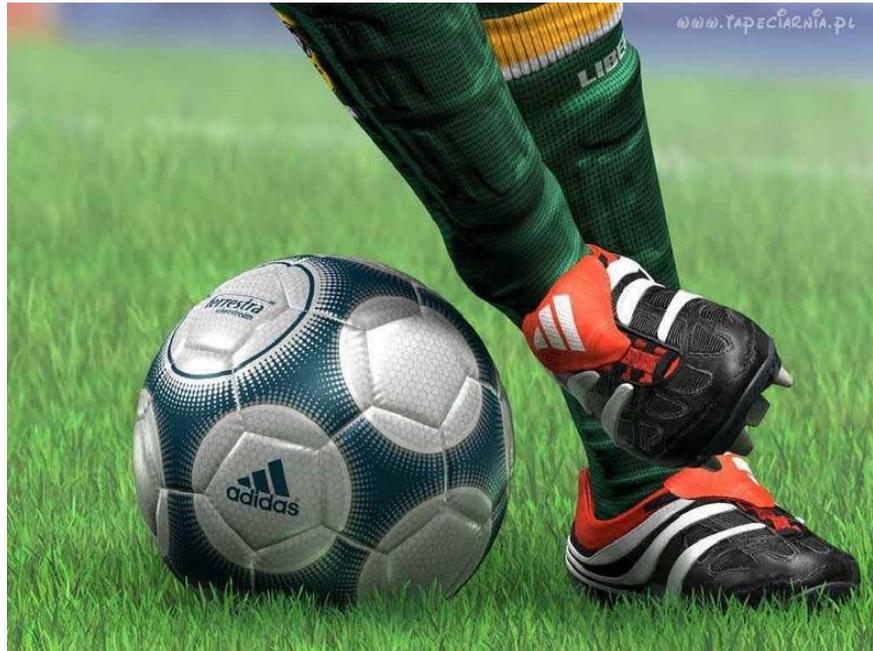




What's football?

The thing you call **football (or soccer)** is the most popular sport on the planet:

<u>Rank</u>	<u>Sport</u>
1	Soccer / Association Football
2	Cricket
3	Basketball
4	Baseball
5	Volleyball
6	Tennis
7	Field Hockey
8	American Football
9	Table Tennis
10	Ice Hockey





...and what are its most popular events?

World Cup, formally **FIFA World Cup** (or **Mundial**) in football, is the quadrennial tournament that determines the sport's world champion. It is likely the most popular sporting event in the world, drawing billions of television viewers every tournament. Even more than the **Olympic Games!**



UEFA European Football Championship™ is the largest football event in Europe. It began in 1960 in France and it too is held every four years in tournament format.

The figures from **UEFA European 2008™** show the scale of the event: it was broadcast on television in more than 200 countries, and each of the 31 matches was followed live by at least 155 million TV viewers.

The final was viewed by @ 800 million viewers.



What's Wroclaw, and where is it?



annexed by
Soviet Union in 1945
Theory Of Constraints Practitioners Alliance • TOCPA



Now to **Wroclaw** (pronounced **Vrots-Love**)



*A very short lesson of **Wroclaw** (and some Central European) history:*

It was created around **800-850 A.D.** by **Slavic** people, and its original name was **Wrotizla**. It got its charter from the **Pope** in **1000 A.D.**

The **Mongols** conquered it in **13 century**, and since then the **German** influence was growing due to mass enslavement of the **Polish** population.

It was ruled by **Piasts** (the first royal dynasty of **Poland**) till **1335** when **Casimir the Great** traded **Silesia** to **Czechs** for their rights to **Polish** crown.





Now to **Wroclaw** (pronounced **Vrots-Love**)

It was a part of **Czech** crown till **1526** when it was taken by **Habsburgs**. The official name was then **Vreclav**.

Under **Habsburgs** it became **Presslau** and was a part of **Holy Roman Empire** till **1741** when after Silesian Wars **Frederic the Great of Prussia** captured the city and renamed it **Breslau**. From then on it was a **Prussian-German** town.

It was the last **German** town to surrender in **WW II** (3 days after Berlin).

After **1945**, it was decided by **Churchill**, **Roosevelt** and **Stalin** that **Polish** borders were going to be shifted westwards, altogether with their **German** and **Polish** populations.

The town is now called Wroclaw





The challenge:

After a most competitive process, involving first many of the European countries, and then most of the major Polish cities, in 2008 **Wroclaw** was selected by **UEFA** to be one of the only four Polish cities to host the games. The other three were **Warsaw**, **Poznan** and **Gdansk**.

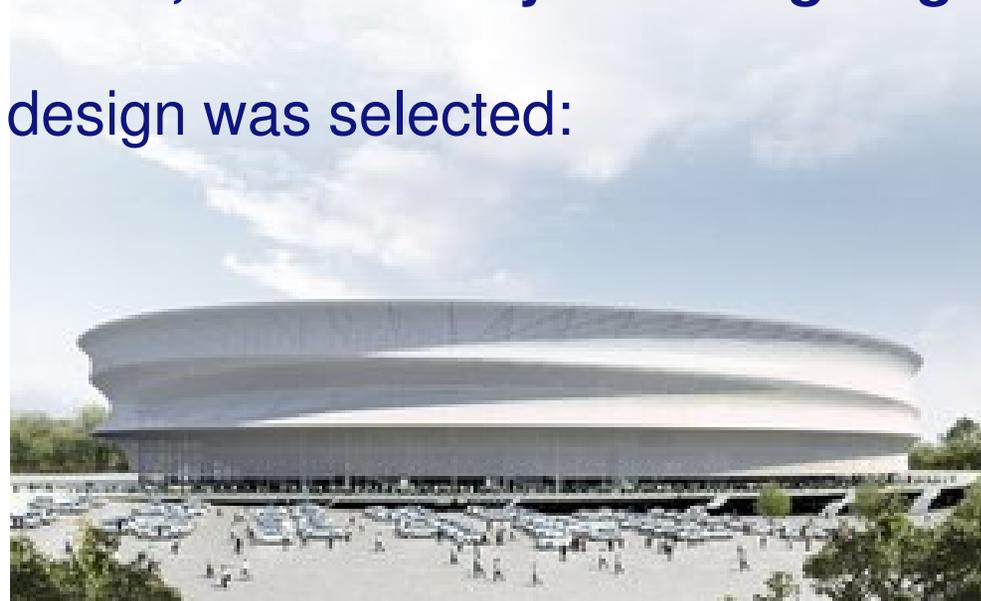
The town has immediately started a process of design, planning and then constructing the stadium and a host of other projects, in order to enable the tens of thousands of expected visitors to safely arrive and view the games.



The challenge:

It was also an once-in-a-lifetime opportunity to upgrade the municipal infrastructure, and the City wasn't going to miss it.

A bold architectural design was selected:



A contractor – a Polish-Greek consortium (having an experience at the 2004 Olympic Games at Athens) won the bid, promising to have it ready by **June 30, 2011**. The construction work itself was to start in **April 2009** and to finish in **January 2011**.



What were the projects we are talking about?

The list of projects includes:

- ❖ A 43,000 seats **stadium** of the *Elite* class.
- ❖ An integrated **rail-tram-bus connector station**
- ❖ A **connection** to the main European superhighway A4 to Berlin and Ukraine
- ❖ An downtown **ring-road**
- ❖ The **doubling of the main route** leading to the airport
- ❖ A new **tram route** connecting the stadium to the city
- ❖ Roads, streets, bridges, and many walking and cycling routes
- ❖ Etc...



So far so good - what's the problem?

On **December 30, 2009**, eight months after the start of the construction works, the city had **revoked** its contract with the contractor.

The reason, acc. to the press: “...*large and growing delays, which will certainly prevent Wroclaw from hosting the games as planned*” .



So far so good - what's the problem?

Immediately, within a day, the bidder #2 was approached, and a new contract was signed immediately. He has **promised to finish the work on time, for the same amount of money** as the original winner of the bid.

Isn't that exactly what the first one has promised?

You easily can see the problem the city had:



What they were afraid of?





So what the **City of Wroclaw** did?

Well, they did the smart thing, they have invited us, ***Goldratt Institute (Israel)TM***, to act as their representative – their eyes, ears and mouth - in **assisting, planning, monitoring and controlling** the entire multi-project environment.

We, in turn, have planned to apply the ***Critical Chain Project Management*** mechanisms in these projects.



So what the **City of Wroclaw** did? cntd.

The first questions we've faced were very basic:

- What exactly does the **City** expect of us?
- What kind of project environment do we face here? Is it a true **Multi-Project** environment, or rather its a set of **Multi-Single** independent projects?



What does exactly the City expects of us?

Our goal was to assure the completion of the stadium's project, as well as all the other projects surrounding it, on time.

*It was the largest set of construction projects in the entire country – a multi-billion expenditure the **City of Wroclaw** had never witnessed before in its thousand years of history.*

But only finishing the entire set of the projects on-time will enable the stadium to become operative.





What type of projects are we dealing with?

Multi-project or multi-single?

The answer: **Both!**

Some of the projects turned out to be a part of truly **multi-project environment**. In these the **CCPM multi-project methodology** was fully applied.



What type of projects are we dealing with? cntd.

Then, there was also another set of projects, which were **truly independent** among themselves.

In these **CCPM for single projects** was applied.

Still other projects were, however, in such an advanced state, that it was too late to fully introduce mechanisms of planning and control acc. to **CCPM**. In these we made only partial use of it, as well as other **TOC tools**.

And then there was the **stadium**.



So, we've divided all the projects into following groups:

The **southern trio**:

Lotnicza Rd.,

Connector rail-tram-bus station

Kosmonauts Rd.

} proper CCPM,
multi-project
environment.

The **northern duo**:

Krolewiecka Rd

Kozanowska tram route

} CCPM,
multi-single.

The **singletons**:

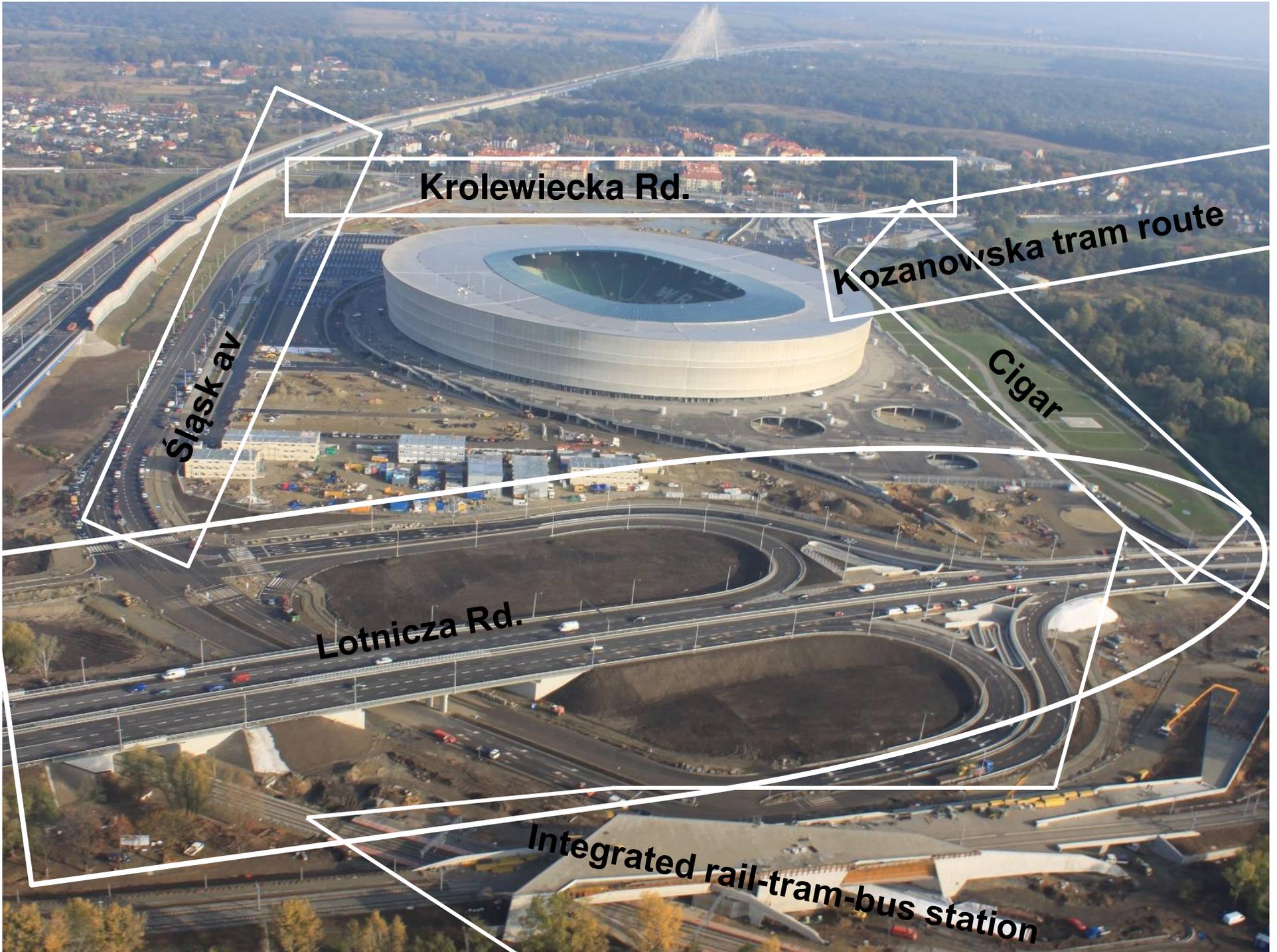
Strzegomska Street,

Mid-City ring-road,

the **Cigar** area

} CCPM,
multi-single.

The Stadium



Krolewiecka Rd.

Kozanowska tram route

Cigar

Lotnicza Rd.

Integrated rail-tram-bus station

Śląsk av



A4 Highway

Station

Lotnicza

Kosmonautów

Cigar



The execution process:

We've decided to assist the project teams in the following way:

- ❖ Creating **one interconnected functional super-project** out of the three separate projects of the *southern trio*. In that way we've managed the project cluster as one, with a **single Project Buffer** for the entire projects set.
- ❖ We've introduced a **single-project CC Buffer Management** in the *northern duo of projects*.
- ❖ We've introduced a **single-project CC Buffer Management** in the *single projects*.



The execution process ctnd.:

- ❖ However, we were barred (at the insistence of the constructing company) from intervening in the project management of the **stadium**, as this was a project executed by the “*best stadiums builder in Europe, maybe even in the world*”, so what can we possibly contribute there?
- ❖ All that was left for us there was to manage, mitigate and resolve the multitude of collisions, conflicts and other interactions between the **stadium and surrounding it projects**.



The southern trio – CCPM, multi-project



Intercdependencies (potential collisions) between *Trio's* projects

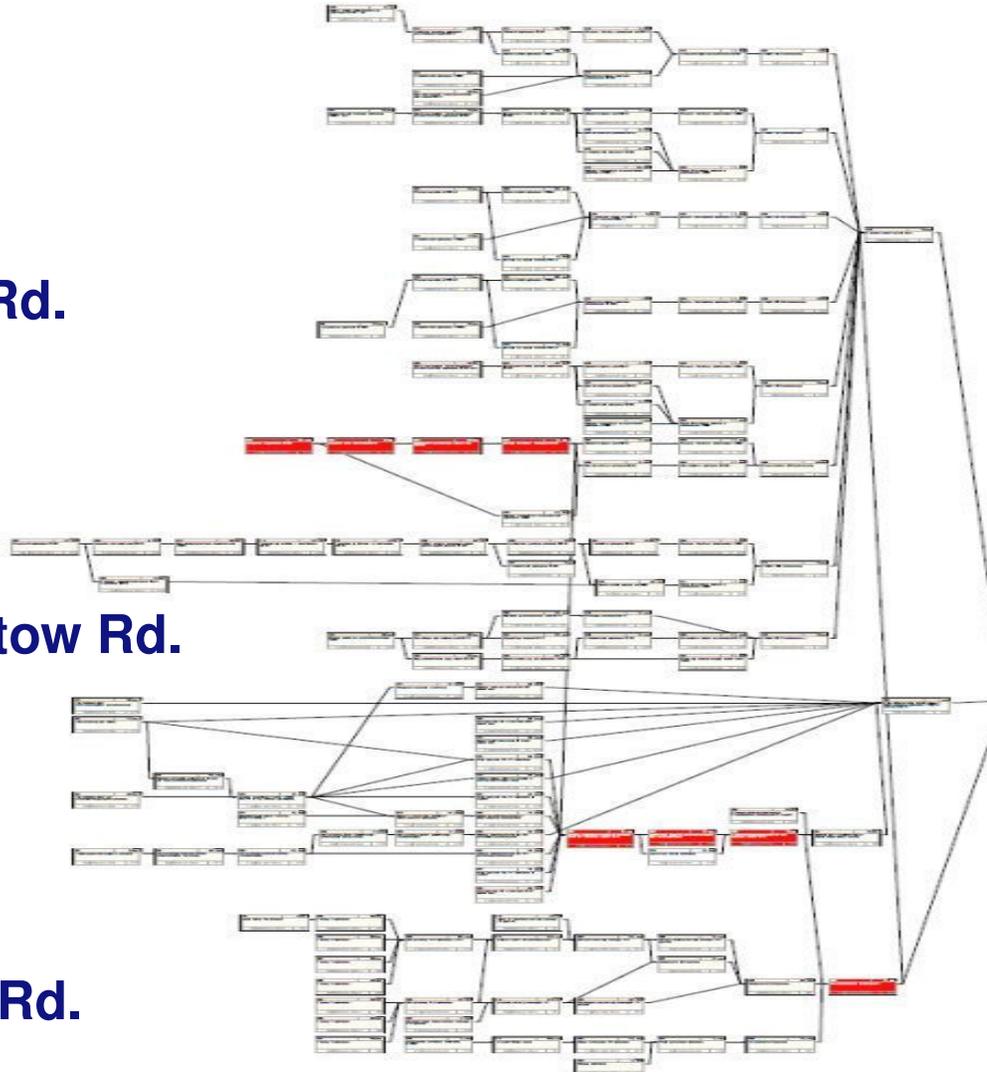


The southern trio - execution

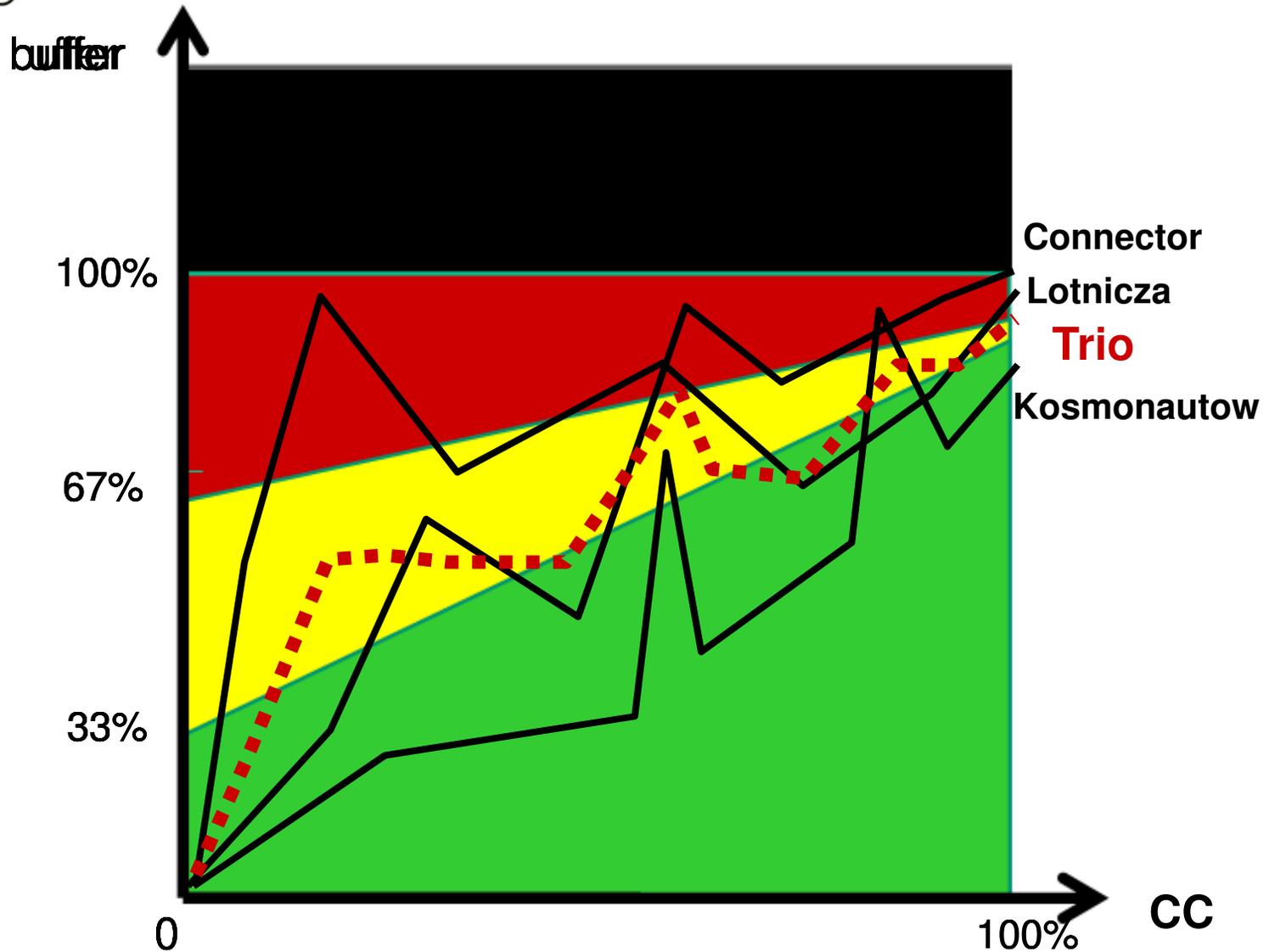
Lotnicza Rd.

Kosmonautow Rd.

Connector Rd.



The southern trio – fever chart





From the press:

The reconstructed Kosmonautow Rd. Is ready before time

24.08.2011 aktualizacja: 2011-08-24 17:06

According to the schedule, the work should be completed only in October, but already in this Saturday we'll be able to drive through the new overpass with its new double lanes.

obowiązywać docelowa organizacja ruchu. Tymczasowo zamknięte pozostaną jedynie wjazdy na Autostradową Obwodnicę Wrocławia, bo z tej części nowej trasy nie można jeszcze korzystać. Gdy otwarty zostanie fragment AOW od lotniska do ul. Zmigrodzkiej, wjazdy na węzle Stadion też zostaną udostępnione. Prawdopodobnie nastąpi to w ostatnich dniach sierpnia.

Zakończenie prac na ul. Kosmonautów oznacza, że można przywrócić ruch na tamtejszym torowisku. Pasażerowie z Leśnicy wreszcie odetchną od przesiadek. Do tamtejszej pętli kursować będą linie 10 i 20. Uruchomione zostaną jednak dopiero w niedzielę 4 września. Do tego czasu z Leśnicy w kierunku centrum jeździć będzie autobus zastępczy 710. Zastąpi tramwaje wahadłowe w najbliższą sobotę i dowozić będzie pasażerów do Pilczyc, a tam będzie się już można przesiąść na tramwaje 3, 10, 20, 33plus oraz nową linię 32plus, która pojedzie do mostów Mieszkańskich.

Więcej... http://wroclaw.gazeta.pl/wroclaw/1.35751.10168402.Przebudowana_ulica_Kosmonautow_gotowa_przed_czasem.html#ixzz1VyZjXaJJ



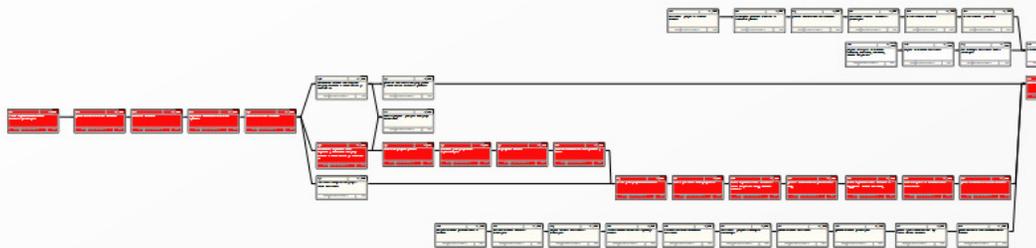
The northern duo - execution

Krolewiecka St.



Zdj. 6. Wizualizacja przebudowy ul. Królewieckiej.

Kozanowska tram route

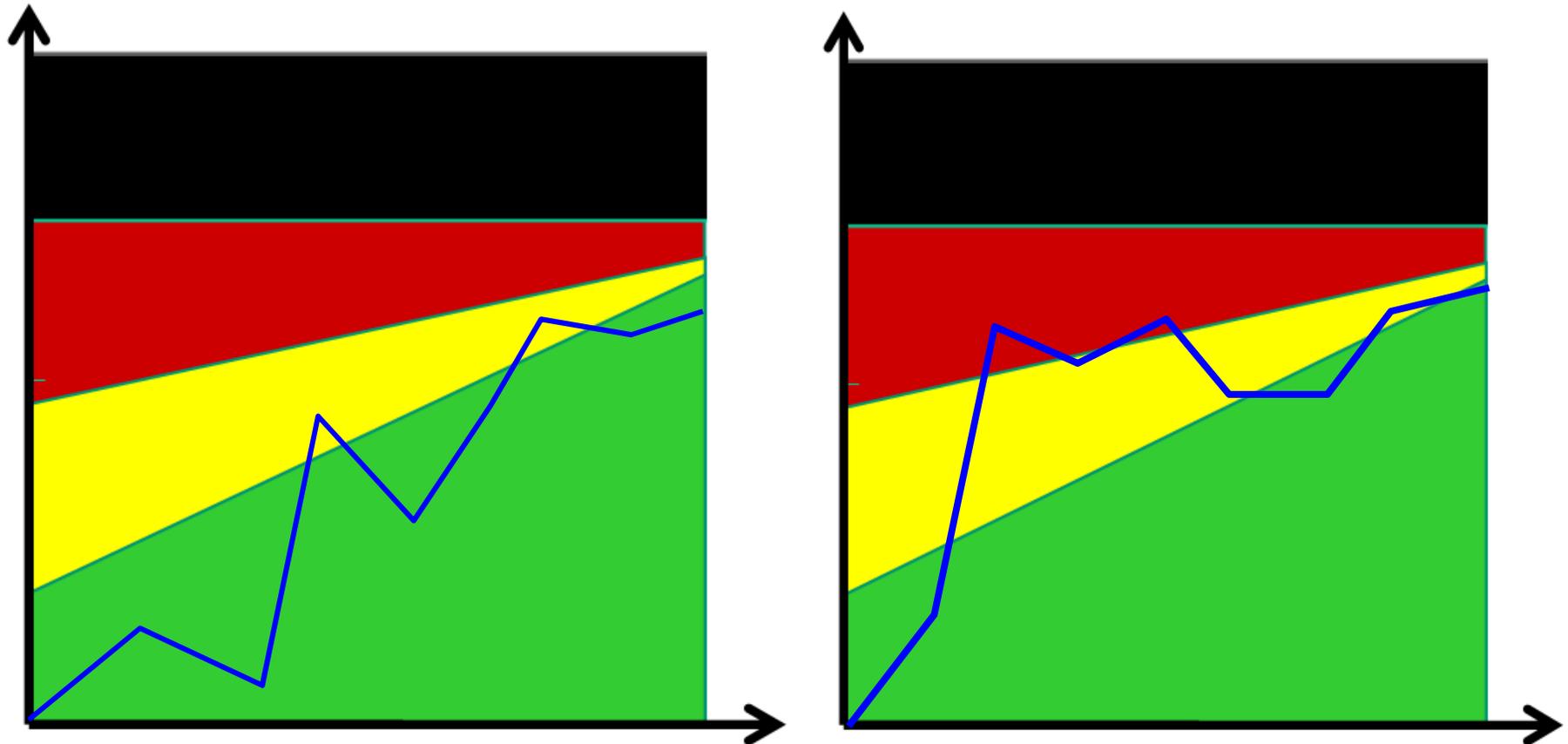




The northern duo – Fever Chart

Krolewiecka Rd.

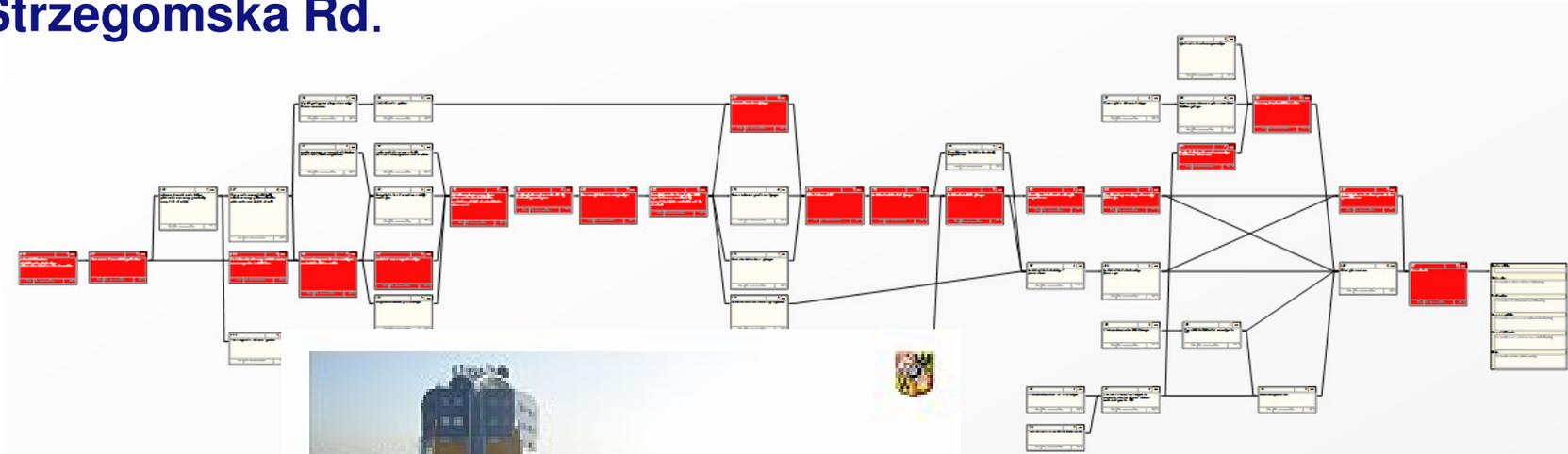
Kozanowska tram route



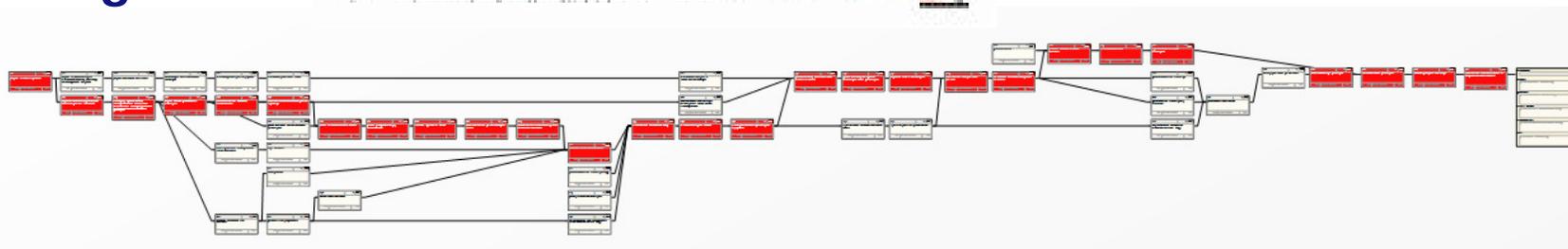


Singletons - execution

Strzegomska Rd.



“Cigar”

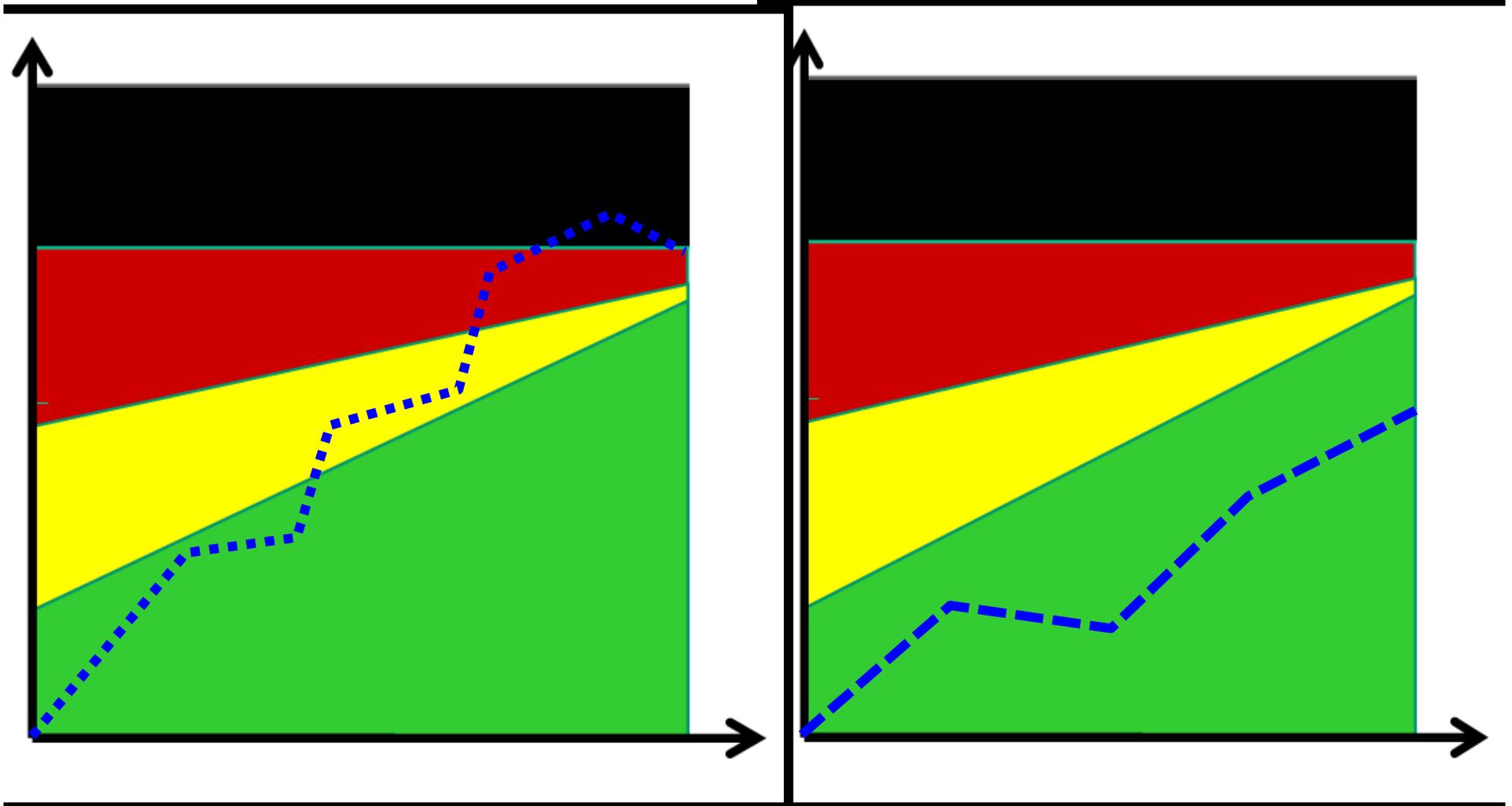


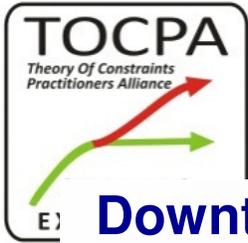


Singletons – Fever Chart

Strzegomska Rd.

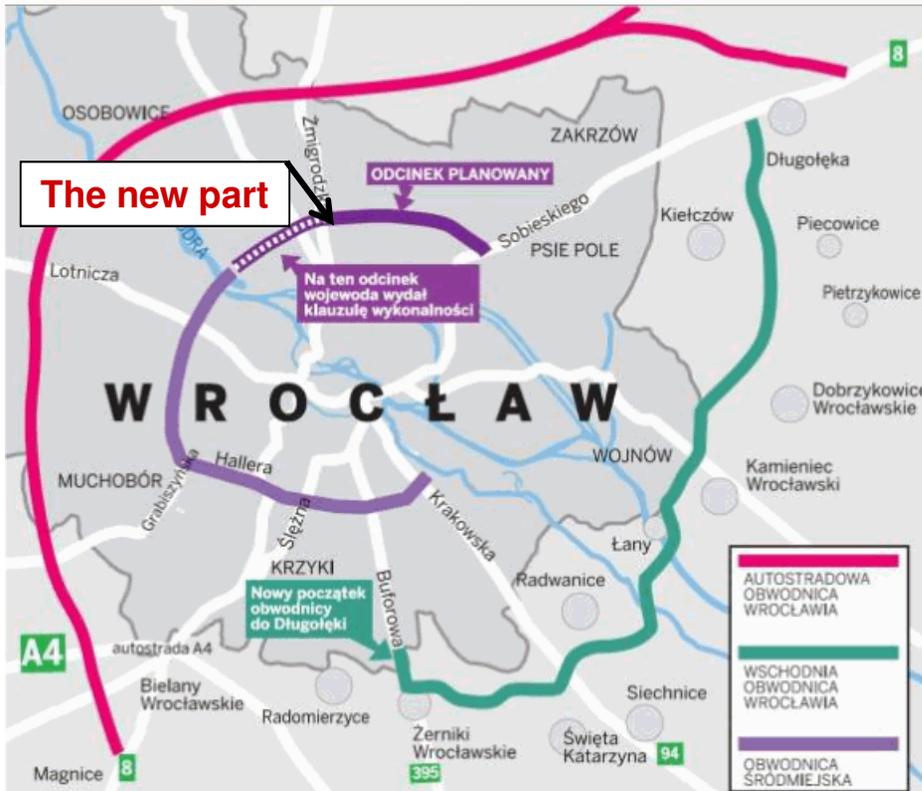
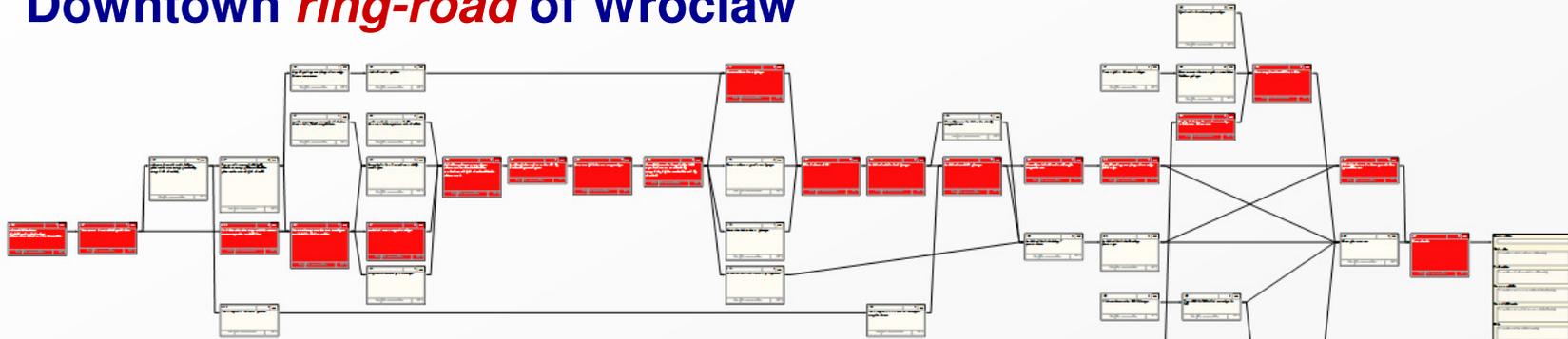
“Cigar”





Singletons - execution

E.) Downtown *ring-road* of Wroclaw

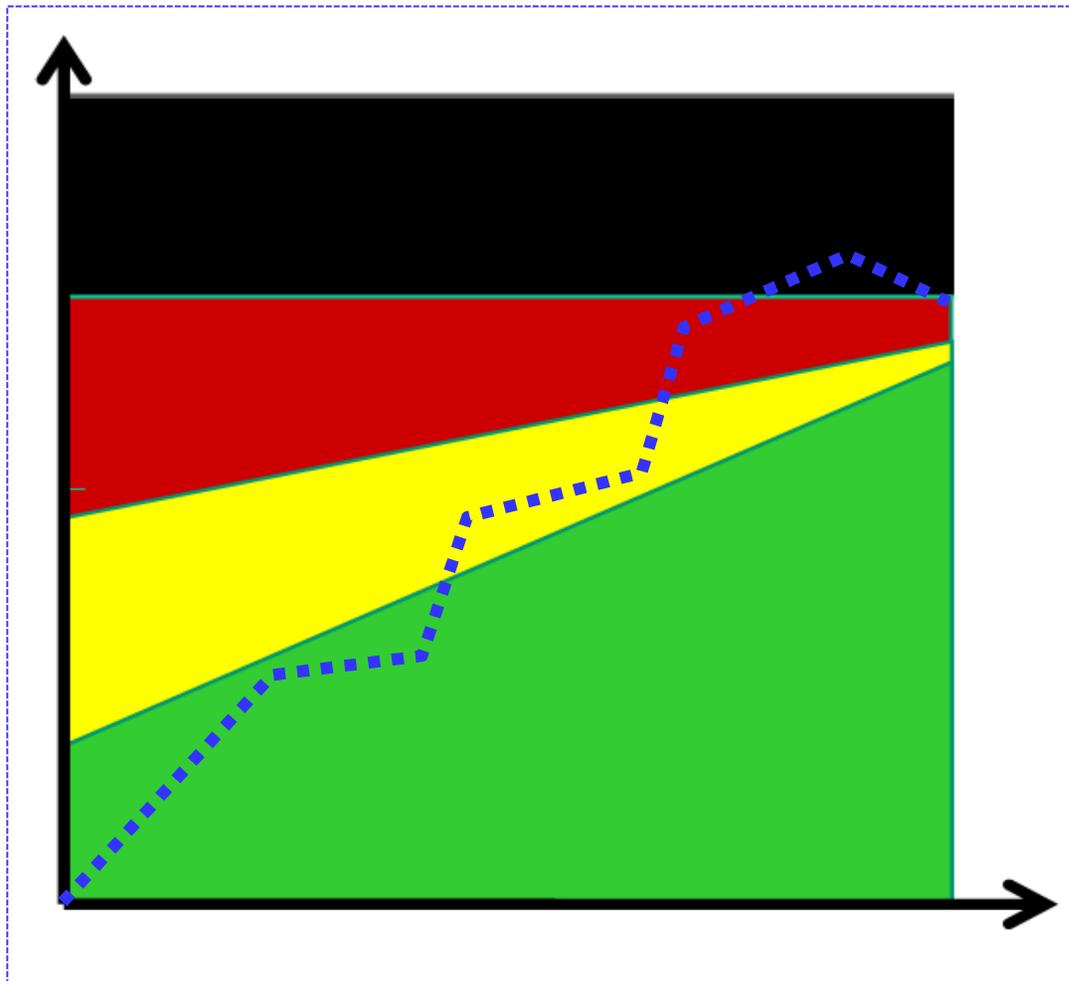


E. 01. Projektowany odcinek Obwodnicy Śródmiejskiej w rejonie Mostu Milenijnego. Widok od południa.

Singletons – fever chart



Down-town ring-road of Wroclaw





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The results

1. The *southern trio*: **Before or on time.**
2. The *northern duo*: **Before or on time.**
3. The *singlets*: **On time**
4. The *Stadium*: **Well, here is the story.**



But before we get to the stadium, lets try to answer the question posed at the title of our presentation.
So - *Can you have it (CCPM) without having it?*

YES!

How?

...well, you have to apply some tricks

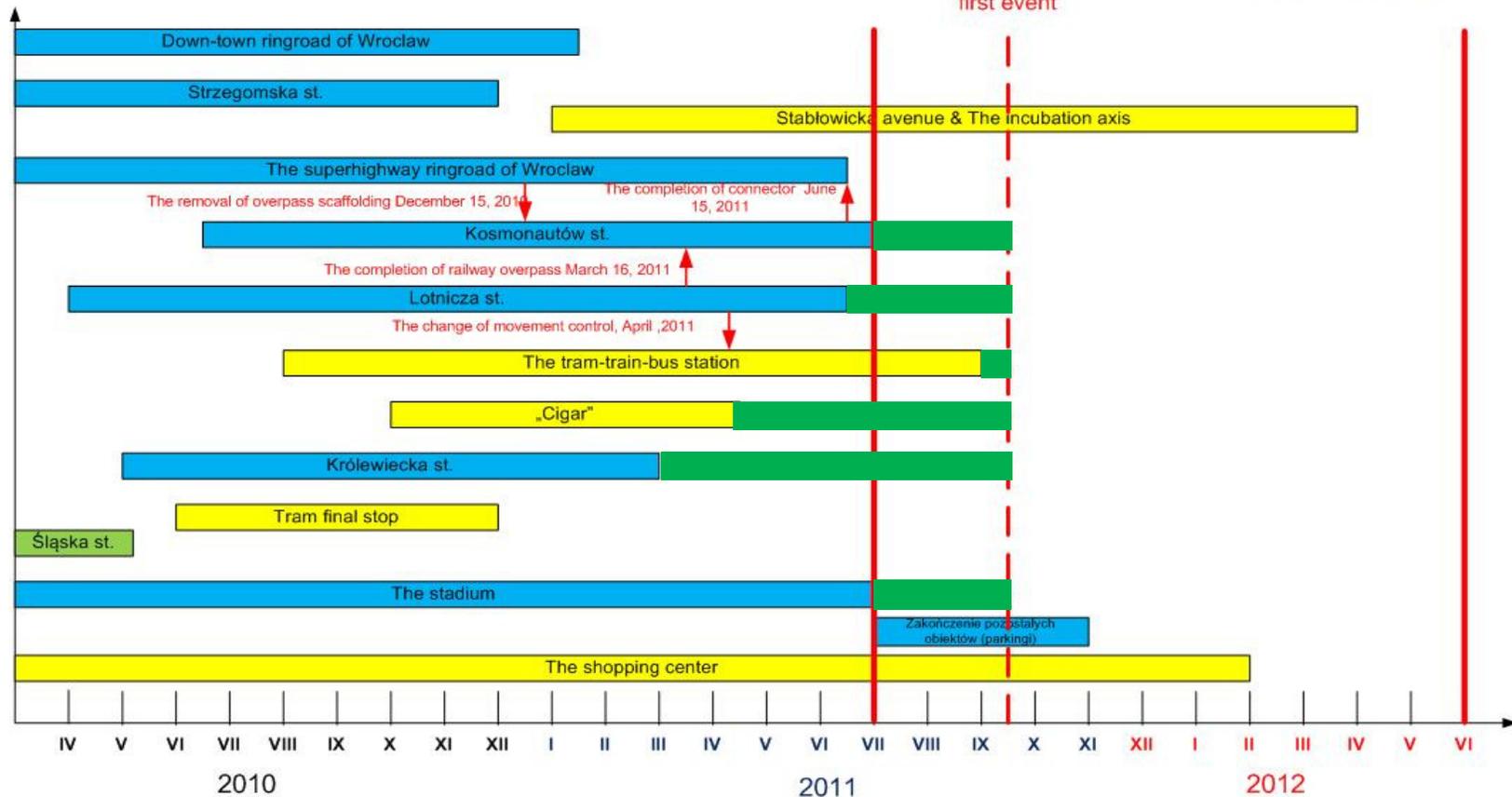


Trick #1 – Look globally - *Virtual Buffer*

The timetable of EURO 2012™ projects

July 1, 2010

The planned date of the first event



A project in the stage of preparation
 A project being carried out
 A completed project

→ The interconnection between projects



Explanation of Trick #1

Looking **globally**: Comparing the date **when a project is actually required** vs **when is it planned to complete**, some projects turned out to have available more time than it seemed.

Because what really was important for the City— to be ready on time for the planned events. It has allowed us to:

1. To build project plans with ample ***Project Buffers***.
2. Then, properly prioritize among the members of the ***southern trio*** of projects, as a true **multi-project environment**.
3. The single ***Project Buffers of its projects*** became ***Feeding Buffers*** of the ***Critical Chain*** of the entire set.
4. In projects which were in an advanced stage of realization (**the *singletons***), it enabled creation of ***Project Buffers***, even if their size was lesser than desired.

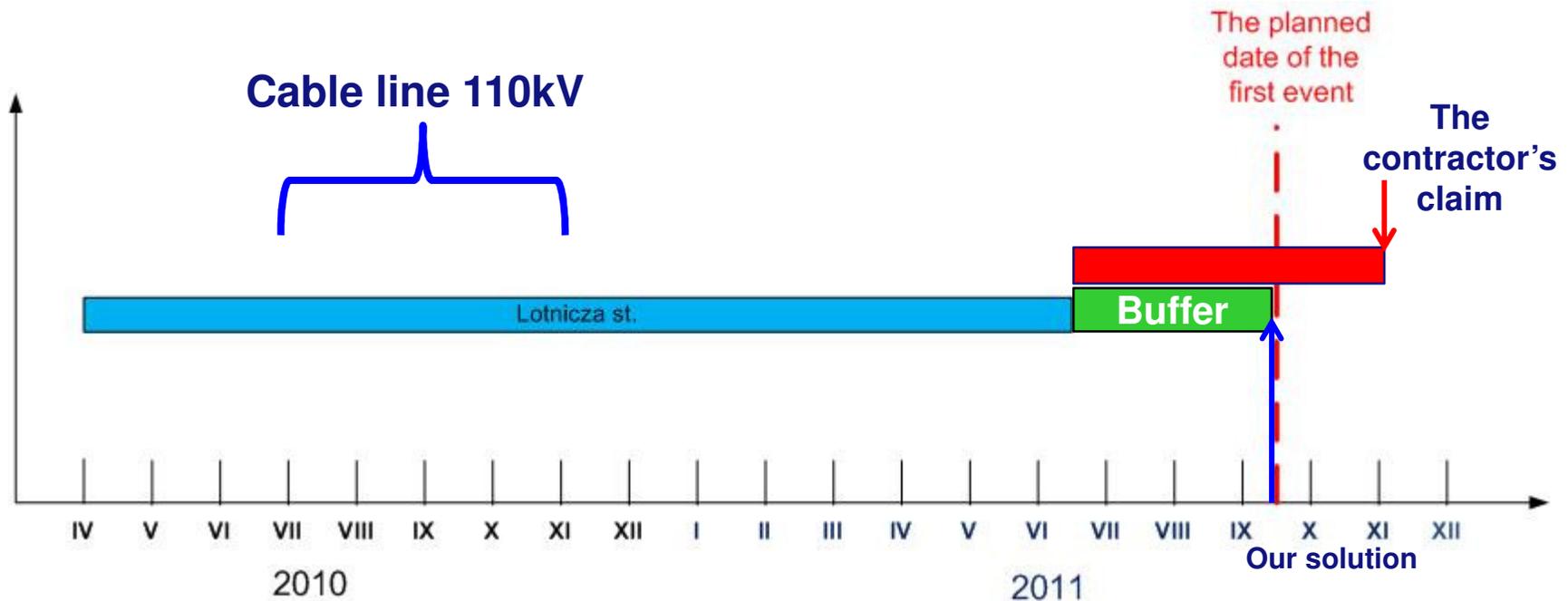


Trick #2 – TOC added value – on top of CCPM

Lotnicza Rd. experience:

The main contractor here was the hardest to cooperate with.

And he had some very good reasons to it...





Trick #2

We've applied **TOC tools** and convinced the main contractor to get rid of time-reserves in the tasks (move to **ABP times**), thus enabling the creation of the much needed buffers.

Surprisingly – he has agreed.

They got a new contractual finish-date, but on the basis of the spare time revealed in the process, we have created the necessary buffer.

The result: the main road leading to the stadium was completed one month **before** the first event there.



But what has happened at the **Stadium** project?

As we've mentioned before, we were practically barred from the **Stadium** project.

For how long?

Until the situation became critical, and the danger of missing **UEFA** and **City** set milestones became very, very real.



But what happened at the **Stadium** project?

Only then, two months before these events, the City asked us to do “*whatever it takes*” to bring this project to a successful end.

What they have meant was simple – the already sold tickets for the planned events must be valid as they are. Including date and

Their delay would be a PR disaster for the City.

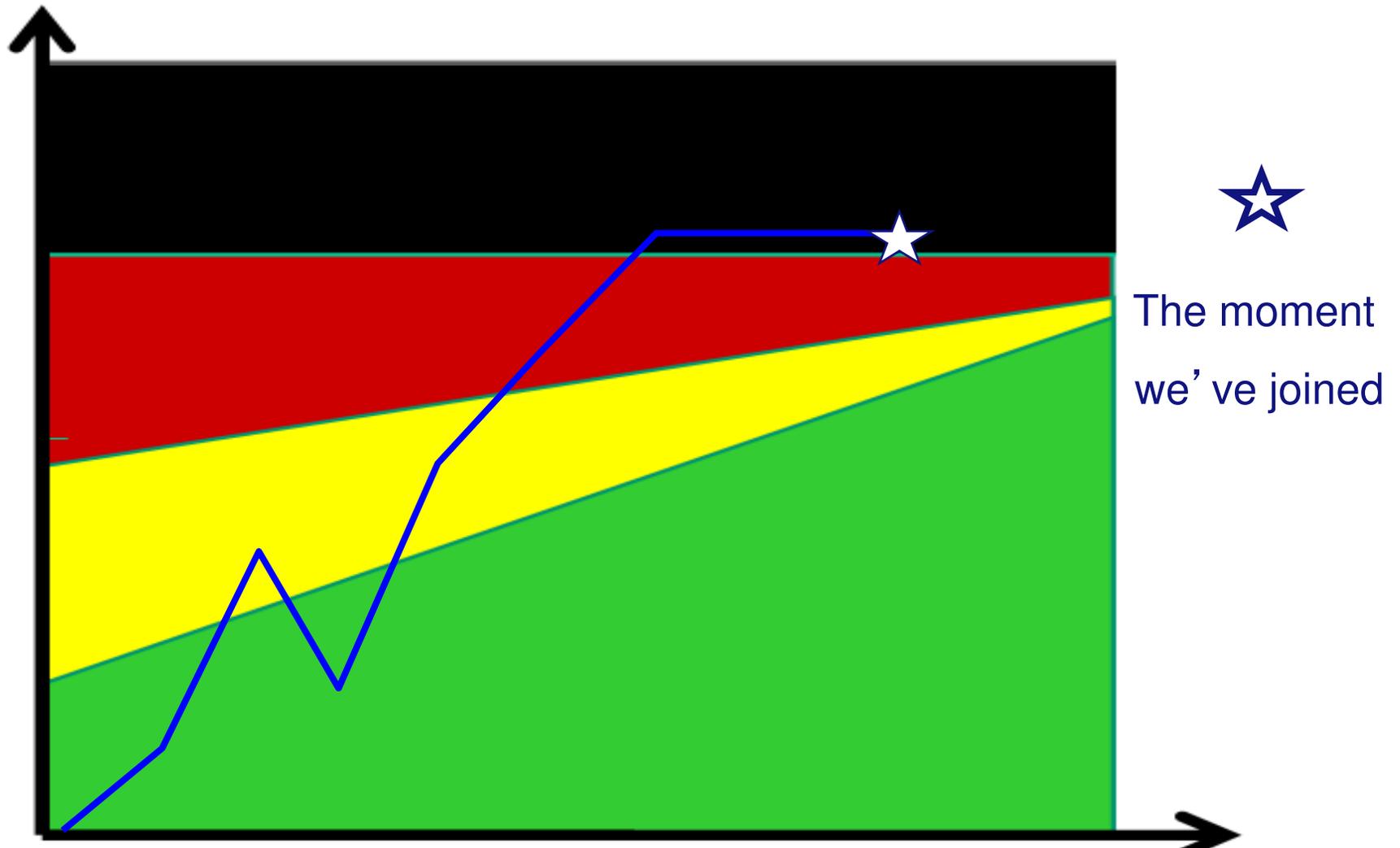
What were the planned events?

- ❖ ***Boxing Heavyweight World Championship fight,***
- ❖ ***George Michael concert***
- ❖ ***Monster Truck show***



Wasn't it too late to do anything?

Reconstruction of the Fever Chart of the Stadium





Wasn't it too late to do anything?

Although everybody else thought it's a lost case, we begged to differ - we didn't think it's too late.

Maybe it was too late to fully implement the **CCPM** mechanism, but **TOC** has more to it than just that.



What did we do, which TOC principles did we apply?

We' ve turned to the three well known principles of TOC:

- I. *Inherent simplicity***
- II. *There are no conflicts in nature.***
- III. *People are not stupid.***



How all this can lead us to finish on time?

We've used all three principles, but it was the second and the third that we've applied most; **both the *investor* as well as the *contractor* will win** if the project is completed on time – and they are not stupid.

It was our main task **to find**, at every step, the **common win**.

Then we had **to present** it in such a way that doing **the right thing for the project** was also **the right (and worthwhile) move** for each of the parties.



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What we did?

As we all know, applying the **5 steps of TOC** starts with **identification**.

Only knowing what's the constraint can lead to a meaningful actions.

However, the constraint has moved several times during our activity in the **Stadium** project.



What we did?

Stadium Constraints:

- ❖ At the beginning it was the lack of trust and reliable communication along *the Investor – Contractor* axis. We've helped to establish a system of exchange of communication both sides could trust.
- ❖ Once that was resolved, the constraint moved to the *lack of credible planning*; no PERT or *Gantt* whatsoever you can trust. So we assisted in building one.
- ❖ Then it moved to the *financial problems* of the subcontractors. We tried to point out the most critical subcontractors and then help resolve their problems.
- ❖ Etc...

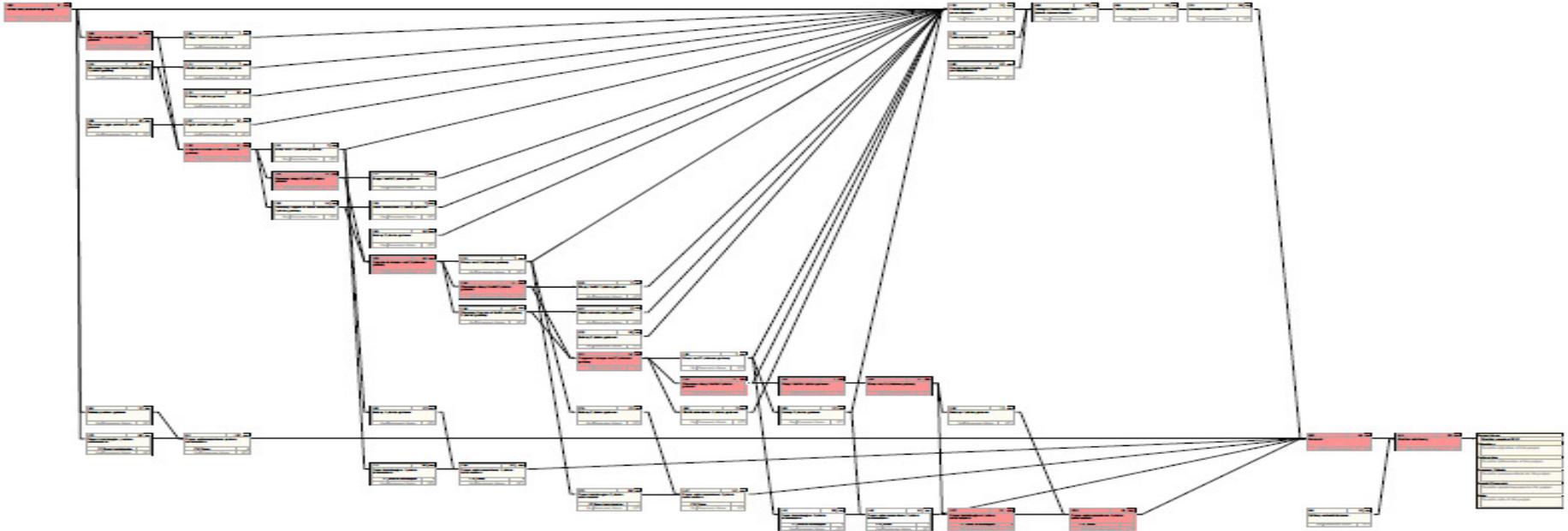


What we did?

Successfully using the *TOC tools of conflict resolution* (mainly the *cloud* and *NBR*) to resolve problems arising between the various parties along the *critical chain* has brought us within two weeks to position of trust and authority.

From this point on, we were able to impact (or even direct) the construction effort in a manner that has prioritized any activity according to its impact on the completion of the project on time.

Stadium - execution







The result

Wroclaw turned out to be the only city in Poland to complete all its **UEFA** projects on time.

Later on our team has won another public bid in Wroclaw, to assist building **EIT+** - the **European Institute of Technology** in Wroclaw.

But there was one condition in the bid regarding the way the projects consisting it should be managed:

It must be done according to the methodology of
Critical Chain.

The bottom line of the *City*

„In its activity Question Mark Ltd. has applied its „secret weapon” to manage projects – the Critical Chain methodology as the base for the processes of planning, monitoring and controlling”.

przy skomplikowanej sieci zależności między nimi oraz krótkim i nieprzekraczalnym czasie zakończenia wynikającym z ograniczeń technologicznych, a także wymagań zewnętrznych. W swojej pracy firma Question Mark Ltd. wykorzystywała metodę łańcucha krytycznego jako podstawę procesu planowania, monitorowania i kontroli projektu.

Działania Question Mark Ltd. miały charakter w pełni profesjonalny, nie wzbudzający zastrzeżeń pod względem merytorycznym. Firma zawsze skupiała się tylko na elementach krytycznych dla sukcesu projektów oraz ciągle poszukiwała rozwiązań przyspieszających wykonanie każdego z nich. Zespół tworzyły osoby z profesjonalną wiedzą, absolutnie zaangażowane i gotowe do inwestowania nieograniczonej ilości czasu według wymagań projektów. Dodatkowo osoby te stworzyły doskonale i bezpośrednio stosunki z wszystkimi stronami zaangażowanymi przy realizacji zadań. Zespół był zawsze otwarty na sugestie Miasta oraz dogłębnie rozumiał istotę każdego projektu oraz zależności występujące pomiędzy nimi.

Na podstawie dotychczasowych doświadczeń Miasto Wrocław z pełną odpowiedzialnością może stwierdzić, iż Question Mark Ltd. jest solidnym i godnym zarekomendowania partnerem, świadczącym swoje usługi w sposób rzetelny i kompleksowy.


Maciej Bluj

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Questions?

Thank you!

Dziękujemy!

תודה רבה!