## FAZA I / STAGE I

FAZA I: LUCRARI PREGATITOARE
Linia I: circulatie cu viteza normala;
Linia II: circulatie cu viteza normala;

1. Se amenajeaza drumul de acces si platforma tehnologica.
2. Se realizeaza organizarea de santier.
3. Se identifica, se picheteaza si se pun in siguranta cablurile SCB, TTR de pe zona lucrarilor.
4. Se executa lucrari de protectie si/sau deviere instalatii de semnalizare si telecomunicatii.
5. Se executa un dig in amonte si se asigura tranzitarea apei cand este cazul printr-o conducta sau prin pompare;

STAGE I: PRELIMINARY WORKS
Line I: traffic with normal speed;
Line II: traffic with normal speed.

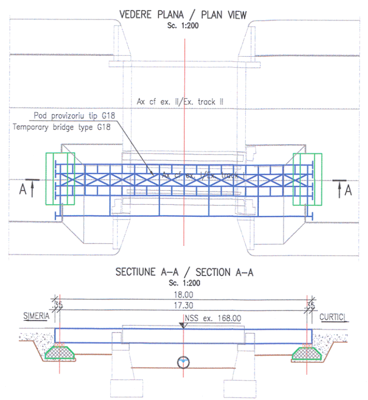
1. Arranging the access road and the technological platform.
2. Making the site organization.
3. Identifying, pegging-out and securing the SCB, TTR cables on the works' area.
4. Making works for protecting and/or deflecting the signalling and telecommunication installations.
5. Executing a dam upstream and ensuring the water passage when the case by a pipe or by pumping;

Prezentul plan s-a intocmit in baza urmatoarelor date:
- ridicarea topografica,
- studiu hidrologic,
- date culese pe teren.

This plan has been drawn up on the basis of the following data:
- topo layout;
- the hydrology study,
- acquisition of data to area.

1 Ordinea de atacare a lucrarilor pe linia I sau II ramane la latitudinea constructorului.
2. Lucrarile la podet vor fi executate obligatoriu inainte de lucrarile la linie.
3. Detaliile prezentate in acest plan nu sunt obligatorii si pot fi modificate sau adaptate in functie de dotarile constructorului cu respectarea conditiilor de realizare a lucrarilor definitive prevazute in caietele de sarcini.
4. Orice neconcordanta intre elementele avute in vedere la elaborarea proiectului si teren va fi anuntata proiectantului pentru adaptare la situatia existenta.
5. Restrictia de viteza se va ridica dupa executia lucrarilor de ridicare a niveletei si aducerea liniilor la pozitia proiectata.
1. The works' execution sequence on line I or II is up to the constructor to decide.
2. The culvert works will be carried-out obligatorily before the line works.
3. The details presented in this plan are not compulsory and can be modified or adapted depending on the constructor's endowments by observing the execution conditions of the final works provided in the Technical Specifications.
4. Any incongruity between the elements taken into account when preparing the design and the site will be announced to the designer so that he can adapt to the existing situation.
5. The speed limit will be removed after the level lifting works and after bringing the lines to the designed position.

## FAZA II / STAGE II



FAZA II-INTRODUCERE POD PROVIZORIU PE LINIA I EXISTENTA

Linia I-Inchisa;

Linia II – circulatie cu restrictie de viteza=50km/h;

1. Se scoate de sub tensiune linia I si se asigura protectia electrica;
2. Se sectioneaza si se detensioneaza linia dupa care se demonteaza suprastructura CF pe zona podului;
3. Se scoate din cale tablierul aferent liniei I;
4. Se demoleaza partial infrastructurile aferente liniei I;
5. Se executa sapatura pentru introducerea in cale a fundatiilor prefabricate provizorii si a podurilor provizorii tip G18 sub protectia sprijinirilor din lungul caii ferate;
6. Se introduc in cale fundatiile prefabricate ale podurilor provizorii, corespunzatoare liniei I;
7. Se introduc in cale podurile provizorii tip G18;
8. Se moteaza suprastructura c.f. pe podurile provizorii si se racordeaza la capete la situatia exitenta. Montarea suprastructurii c.f. se va face la cota NSS existent;
9. Se executa lucrarile de protectie electrica a podurilor provizorii introduse in cale si se verifica electroizolarea.
10. Se repune sub tensiune linia de contact si se redeschide circulatia, cu restrictie de viteza de 30 km/h conform instructiilor c.f. in vigoare.
11. Se tin sub observatie podurile provizorii pe toata durata de exploatare, cu remedierea eventualelor defecte si aducerea lor in limita admisa de tolerante.

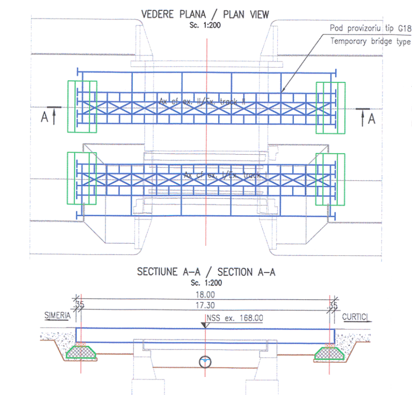
STAGE II – INTRODUCING THE TEMPORARY BRIDGE ON EXISTING LINE I

Line I – closed

Line II – traffic with speed limit=50km/h

1. Cutting off the voltage of line I and ensuring the electric protection.
2. Sectioning and removing the voltage of the line and dismantling the railway superstructure on the bridge area.
3. Removing from the track the deck afferent to line I.
4. Partially dismantling the infrastructures afferent to line I.
5. Making the excavation in order to introduce in the track the temporary precast foundation and the temporary bridges type G18 under the protection of propping along the railway track.
6. Introducing in the track the precast foundations of the temporary bridges, corresponding to line I.
7. Introducing in the track the temporary bridges type G18.
8. Mounting the railway superstructure on the temporary bridge and connecting at the ends to the existing situation. The railway superstructure is mounted at existing NSS (top of rail) level.
9. Carrying out the electric protection works for the temporary bridge introduced in the track and checking the electric insulation.
10. Restoring the voltage to the contact line and reopening the traffic with speed limit of 30 km/h according to the railway instructions in force.
11. Monitoring the temporary bridge during the entire operation period, by remedying the eventual defaults and bringing them to the admitted tolerance level.

## FAZA III / STAGE III



FAZA III-INTRODUCERE POD PROVIZORIU PE LINIA II EXISTENTA

Linia I – circulatie cu restrictie de viteza de 30km/h;

Linia II – inchisa;

1. Se scoate de sub tensiune linia II si se asigura protectia electrica;
2. Se sectioneaza si se detensioneaza linia dupa care se demonteaza suprastructura CF pe zona podului;
3. Se scoate din cale tablierul aferent liniei II;
4. Se demoleaza partial infrastructurile aferente liniei II;
5. Se executa sapatura pentru introducerea in cale a fundatiilor prefabricate provizorii si a podurilor provizorii tip G18 sub protectia sprijinirilor din lungul caii ferate;
6. Se introduc in cale fundatiile prefabricate ale podurilor provizorii, corespunzatoare liniei II;
7. Se introduc in cale podurile provizorii tip G18;
8. Se moteaza suprastructura c.f. pe podurile provizorii si se racordeaza la capete la situatia exitenta. Montarea suprastructurii c.f. se va face la cota NSS existent;
9. Se executa lucrarile de protectie electrica a podurilor provizorii introduse in cale si se verifica electroizolarea.
10. Se repune sub tensiune linia de contact si se redeschide circulatia, cu restrictie de viteza de 30 km/h conform instructiilor c.f. in vigoare.
11. Se tin sub observatie podurile provizorii pe toata durata de exploatare, cu remedierea eventualelor defecte si aducerea lor in limita admisa de tolerante.

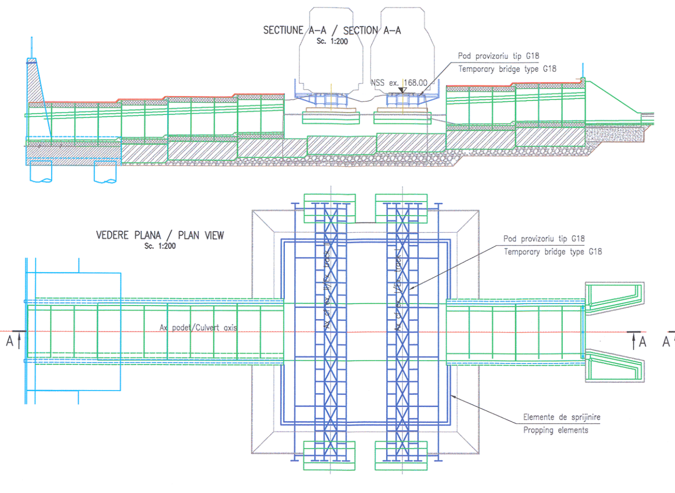
STAGE III – INTRODUCING THE TEMPORARY BRIDGE ON EXISTING LINE II

Line I – traffic with speed limit de 30km/h

Line II – closed

1. Cutting off the voltage of line II and ensuring the electric protection.
2. Sectioning and removing the voltage of the line and dismantling the railway superstructure on the bridge area.
3. Removing from the track the deck afferent to line II.
4. Partially dismantling the infrastructures afferent to line II.
5. Making the excavation in order to introduce in the track the temporary precast foundation and the temporary bridges type G18 under the protection of propping along the railway track.
6. Introducing in the track the precast foundations of the temporary bridges, corresponding to line II.
7. Introducing in the track the temporary bridges type G18.
8. Mounting the railway superstructure on the temporary bridge and connecting at the ends to the existing situation. The railway superstructure is mounted at existing NSS (top of rail) level.
9. Carrying out the electric protection works for the temporary bridge introduced in the track and checking the electric insulation.
10. Restoring the voltage to the contact line and reopening the traffic with speed limit of 30 km/h according to the railway instructions in force.
11. Monitoring the temporary bridge during the entire operation period, by remedying the eventual defaults and bringing them to the admitted tolerance level.

## FAZA IV / STAGE IV



FAZA IV-REALIZARE PARTIALA PODET

Linia I – circulatie cu restrictie de viteza de 30km/h;

Linia II – circulatie cu restrictie de viteza de 30km/h;

1. Se demoleaza podul existent si se executa sapaturile pentru fundatia podetului nou. Odata cu avansarea sapaturilor se monteaza si elemente de sprijinire;
2. Se executa fundatia podetului nou si a aripilor si zidul de sprijin din aval;
3. Se monteaza cadrele prefabricate in amonte si aval pana la limita permisa de gabaritul podurilor provizorii;
4. Se executa umpluturile din jurul cadrelor montate si drenurile;

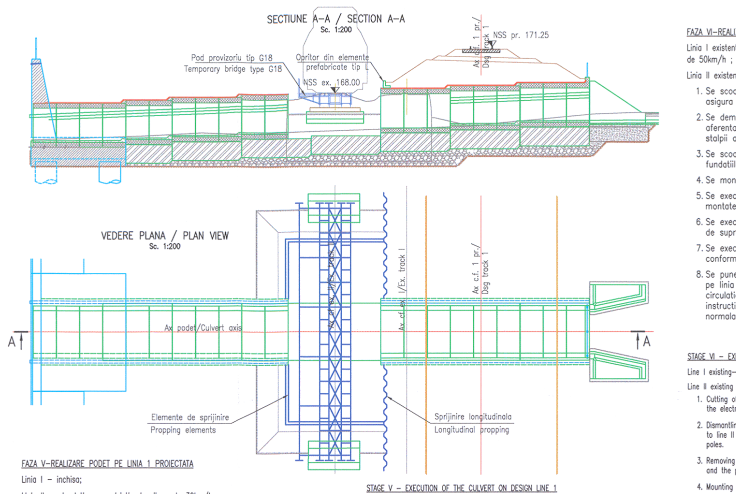
STAGE IV – EXECUTION OF PARTIAL CULVERT

Line I – traffic with speed limit de 30km/h

Line II – traffic with speed limit de 30km/h

1. Dismantling the existing culvert and executing the excavations for the foundation of the new culvert. Propping elements are mounted as the excavation progresses.
2. Making the foundation of the new bridge and of wings and the retaining wall;
3. Mounting the precast frames upstream and downstream up to the limit allowed by the gauge of temporary bridges;
4. Making the fillings around the mounted frames and the drains.

## FAZA V / STAGE V



FAZA V-REALIZARE PODET PE LINIA 1 PROIECTATA

Linia I – inchisa;

Linia II – circulatie cu restrictie de viteza de 30km/h;

1. Se scoate de sub tensiune linia I si se asigura protectia electrica;
2. Se demonteaza suprastructura c.f. aferenta liniei I si linia de contact cu stalpii aferenti;
3. Se scoate din cale podul provizoriu si fundatiile prefabricate;
4. Se monteaza inca 3 cadre prefabricate (cadrul din zona podului provizoriu se monteaza in pauze de circulatie);
5. Se executa umpluturile din jurul cadrelor montate si drenurile;
6. Se executa linia cf proiectata conform proiectului de suprastructura cf;
7. Se executa linia de contact noua conform proiectului de specialitate;
8. Se pune sub tensiune linia de contact pe linia I proiectata si se deschide circulatia, conform instructiilor c.f. in vigoare pana la viteza maxima de 50km/h.

STAGE V – EXECUTION OF THE CULVERT ON DESIGN LINE 1

Line I – closed

Line II – traffic with speed limit de 30km/h

1. Cutting off the voltage of line I and ensuring the electric protection.
2. Dismantling the railway superstructure afferent to line I and the contact line with the afferent poles.
3. Removing from the track the temporary bridge and the precast foundations.
4. Mounting 3 precast frames (the frame from the area of the temporary bridge is mounted during traffic breaks).
5. Making the fillings around the mounted frames and the drains.
6. Making the designed railway line according to the railway superstructure design.
7. Making the new contact line according to the specialty design.
8. Restoring the voltage to the contact line on designed line I and opening the traffic, according to the railway instructions in force up to the maximum speed of 50km/h.

## FAZA VI / STAGE VI

FAZA VI-REALIZARE PODET PE LINIA II EXISTENTA

Linia I existenta – circulatie cu restrictie de viteza de 50km/h ;

Linia II existenta – inchisa;

1. Se scoate de sub tensiune linia II si se asigura protectia electrica;
2. Se demonteaza suprastructura c.f. aferenta liniei II si linia de contact cu stalpii aferenti;
3. Se scoate din cale podul provizoriu si fundatiile prefabricate;
4. Se monteaza ultimele cadre prefabricate;
5. Se executa umpluturile din jurul cadrelor montate si drenurile;
6. Se executa linia cf, conform proiectului de suprastructura cf;
7. Se executa linia de contact noua conform proiectului de specialitate;
8. Se pune sub tensiune linia de contact pe linia I proiectata si se deschide circulatia pe ambele linii, conform instructiilor c.f. in vigoare pana la viteza normala.

STAGE VI – EXECUTION OF THE CULVERT ON LINE II

Line I existing– traffic with speed limit de 50km/h

Line II existing – closed

1. Cutting off the voltage of line II and ensuring the electric protection.
2. Dismantling the railway superstructure afferent to line II and the contact line with the afferent poles.
3. Removing from the track the temporary bridge and the precast foundations.
4. Mounting the last precast frames.
5. Making the fillings around the mounted frames and the drains.
6. Making the railway line, according to the railway superstructure design.
7. Making the new contact line according to the specialty design.
8. Restoring the voltage to the contact line on designed line I and opening the traffic on both lines, according to the railway instructions in force up to normal speed.

## FAZA VII / STAGE VII

FAZA VII – ALTE TIPURI LUCRARI:

Linia I – circulatie cu viteza normala;
Linia II – circulatie cu viteza normala;

1. Se executa pereul in podet, intre aripi si in amenajarea din amonte conform dispozitiei generale, scara de acces pe terasament si parapetul metalic.
3. Se executa salteaua din anrocamente in aval.
4. Se realizeaza racordarea santurilor de colectare existente pe zona podetului cu amenajarea din amonte.
5. Se dezafecteaza platforma tehnologica, accesele din zona de lucru si organizarea de santier.

STAGE VII – OTHER TYPES OF WORKS

Line I – traffic with normal speed

Line II – traffic with normal speed

1. Making the pitching in the culvert, between wings and in the upstream arrangement according to the general layout, the access stair on the embankment and the metallic handrail.
2. Making the riprap mattress downstream.
3. Making the connection of existing collecting ditches on the culvert area with the upstream arrangement.
4. Deallocating the technological platform, the accesses from the work area and the site organization.

TEHNOLOGIA DE POZARE A PREFABRICATELOR:
-pe betonul de fundatie intarit se astern 2cm de mortar de ciment pentru nivelare si 1cm pentru pozare;
-prefabricatele se aseaza in amplasament, dupa care se ridica si se observa urma lasata pe stratul de mortar proaspat. In cazul in care nu s-a realizat asezarea pe toata suprafata, se completeaza cu mortar de ciment de poza.
Operatia se repeta pana cand se obtine rezemarea pe toata suprafata.

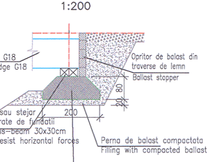
PREFABRICATED ELEMENTS LAYING TEHNOLOGY:
-2cm cement mortar for levelling and 1cm for laying are placed on the hardened foundation concrete;
-the prefabricated elements are placed on site, after than there are rising and the track leaved on the fresh mortar layer is observed. If the laying is not done on the whole surface, cement mortar is cast on.
The operation is repeated till the whole supporting surface is obtained.

Deschidea circulatiei feroviare pe podurile provizorii se face astfel:
– in primele 24h se ridica viteza in trepte de 5km/h, se tine sub observatie permanenta si se rectifica niveleta si tasarile aparute in exploatare; pe durata exploatarii podului provizoriu in cale acesta se tine sub observatie permanenta, iar eventualele deficiente aparute se remediaza imediat.
– dupa 24h de la darea in exploatare a podului provizoriu se va circula cu restrictie de viteza de 30 km/h.
The reopening of the traffic on the temporary bridges will be carried as following
– in the first 24 hours the speed is raised in stages of 5 km/h, the level is permanently kept under surveillance and there are rectified the level and settlings that occur during the operations. While the temporary bridge is in operation on the rail it is kept under permanent surveillance and the eventual deficiencies are instantly remedied
-after 24 hours since the temporary bridge is in operation the traffic will be under speed restriction of 30 km/h;

DETALIU DE REZEMAREA PODULUI PROVIZORIU

DETAIL FOR TEMPORARY BRIDGE SUPPORTING

1:200


Pod provizoriu G18
Temporary bridge G18
Opritor de balast din traverse de lemn
Ballast stopper
80
20
200
Babe de brad sau stejar 30x30cm ancorate de fundatii
Fir or oak cross-beam 30x30cm connected to resist horizontal forces
Perna de balast compactata
Filling with compacted ballast
Fundatie provizorie prefabricata
Temporary prefab. foundation

RĂCĂNEL I. IONUȚ RADU Nr. 07230

CHIRICA C. ANTON Nr. 1563

**Prezentul plan anuleaza si inlocuieste versiunea anterioara**
**This plan cancels and replaces previous version**

| Verificator / Expert<br>Checker / Expert | Cerinta<br>Requirement | Semnatura<br>Signature | Referat / Expertiza<br>Report / Expertise |
|---|---|---|---|
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European Investment Bank

MINISTERUL TRANSPORTURILOR

BENEFICIAR / BENEFICIARY :
COMPANIA NAȚIONALĂ DE CĂI FERATE "CFR" SA

| PROIECTANT / DESIGNER: PÖYRY | | | Data<br>Date | Semnatura<br>Signature |
|---|---|---|---|---|
| Aprobat<br>Approved | Sef de echipa<br>Team leader | C. Teodorescu | 01.2013 | |
| Verificat<br>Checked | Expert Cheie<br>Key Expert | R. Tudorascu | 01.2013 | |
| Subcontractant / Subcontractor | | VIOTOP | | |
| Aprobat<br>Approved | Adjunct Sef de echipa<br>Deputy Team leader | A.M. Baicu | 01.2013 | |
| Proiectat<br>Designed | Inginer<br>Engineer | T. Toma | 01.2013 | |

**"Reabilitarea liniei c.f. Frontieră - Curtici - Simeria, parte componentă a coridorului IV Pan - European pentru circulaţia trenurilor cu viteză maximă de 160 km/h"**
**Tronsonul 2-C : cap Y Ilteu - cap Y Gurasada**
**"Rehabilitation of the Railway Line Border - Curtici - Simeria, component Part of the IV Pan - European Corridor for the Trains Circulation with maximum speed of 160 km/h"**
**Section 2-C : end Y Ilteu - end Y Gurasada**

*Project 9i*
*35311.1*

Faza / Phase:
PTH+CS / TD+TS

Denumire desen / Drawing name:
**TEHNOLOGIE DE EXECUTIE/TECHNOLOGICAL PROCESS**
**PODET /CULVERT**
**km 514+572.00(pr.) 515+661(ex.)**

| Scara / Scale | Revizia / Revision | Cod desen / Drawing Code | Nr / No |
|---|---|---|---|
| 1:200 | 1 / 04.2013 | PT.02.02.18.PO.05.04 | 04 |