



HEAD OFFICE OF CRIC – CCCC  
JOINT VENTURE



Add: Vladete Kovačevića 8, Belgrade 11000 Fax: +381 11 401 0081 E-mail: [public@cric.rs](mailto:public@cric.rs)

Our Ref. HDJV-BCSP-CON-IZS-2022-00xx  
Date: December 16<sup>th</sup>, 2022

Наш Реф.: HDJV-NSSB-CON-IZS-2022-00xx  
Датум: 16. децембар 2022.

**DB Engineering & Consulting GmbH**  
Обилићев венац 18-20, 4. спрат,  
канцеларија 7, 11000 Београд  
Attn: Mr. Nikola Krsmanović, Engineer

**DB Engineering & Consulting GmbH**  
Obilićev venac 18-20, floor 4, office 7  
11000 Београд  
На руке: г. Никола Крсмановић, инжењер

**CC:**

“Infrastructure of Serbian Railways” JSC  
Nemanjina 6, 11000 Belgrade  
Attn: Mr. Nebojša Šurlan, acting General  
Director

**Достављено:**

Инфраструктура железнице Србије“ а.д  
Немањина 6, 11000 Београд  
На руке: г. Небојша Шурлан, в.д.  
генералног директора

**PROJECT: MODERNIZATION AND  
RECONSTRUCTION OF HUNGARIAN  
–SERBIAN RAILWAY CONNECTION  
IN THE TERRITORY OF THE  
REPUBLIC OF SERBIA**

**ПРОЈЕКАТ: МОДЕРНИЗАЦИЈА И  
РЕКОНСТРУКЦИЈА  
МАЂАРСКО-СРПСКЕ ПРУГЕ НА  
ТЕРИТОРИЈИ РЕПУБЛИКЕ СРБИЈЕ**

**SUBJECT: Reply to a letter number:  
NSL1/OR-JV/22-03-25 dated March 16th,  
2022**

**ПРЕДМЕТ: Одговор на допис број:  
NSL1/OR-JV/22-03-25, од 16.03.2022. године**

Report on Non-Compliance No. 24, tactile  
surfaces and warning strips on the staircases  
of the section Belgrade Centar - Stara  
Pazova

Izveštaj o neusaglašenosti br.24, taktilne  
površine i upozoravajuće trake na stepeništima,  
deonica Beograd Centar-Stara Pazova

Dear all,

Поштовани,

Regarding the abovementioned Non-Compliance Report, the Contractor instantly hired a Subcontractor, Dizajnbiro -Taktil, Rabrenovački put bb, Priboj, who immediately started to remove the tactile strips on all surfaces (attachment 1, dated March 16th, 2022)).

U vezi sa navedenim Izveštajem o neusaglašenosti, Izvođač je odmah angažovao podizvođača, Dizajnbiro -Taktil, Rabrenovački put bb, Priboj, koji je odmah pristupio uklanjanju taktilnih traka na svim površinama (prilog 1, od 16.03.2022.godine)).

Firstly, all of the unstable strips were removed to prevent passengers and passersby from falling. The surface has been cleaned of glue and prepared for gluing new strips.

This was followed by a proposal for the execution of tactile strips from the same Subcontractor (see attachment 2.1, 2.2, dated April 20th, 2022):

LEADING tactile tracks for interior spaces, embossed processing of lines according to the recommendations of the ISO 23599:2019 (E) standard. Made of vulcanized rubber, with exceptional mechanical properties, resistance to wear and tear, and hardness of  $70 \pm 5\text{ShA}$ . Delivery in rectangular boards  $800 \times 400 \times 5\text{mm}$ . The height of the convex parts according to 5.1.3.2.1. ISO 23599:2019 (E). Embossed edges on tracks cut at an angle of  $45^\circ$  (5.1.3.2.2 ISO 23599:2019(E)). Paths do not obstruct the movement of wheelchairs, pedestrians, or baby carriages. Tactile tracks are installed according to the specified width of 40cm. They contain five parallel convex lines (5.1.3.1 ISO 23599:2019(E)) that are installed so that the strips extend in the movement direction, in continuity, and without interruption.

WARNING tactile tracks for indoor spaces, embossed processing of circles according to the recommendations of the standard ISO 23599:2019 (E). Made of vulcanized rubber, with exceptional mechanical properties, resistance to wear and tear, and hardness of  $70 \pm 5\text{ShA}$ . Delivery in rectangular boards  $800 \times 400 \times 5\text{mm}$ . The height of the convex parts according to 5.1.3.2.1. ISO 23599:2019 (E). Embossed edges on tracks cut at an angle of  $45^\circ$  (5.1.3.2.2 ISO 23599:2019(E)). Paths do not obstruct the movement of wheelchairs, pedestrians, or baby carriages. Tactile tracks are installed according to the specified width of 40cm. In the basic field of  $40 \times 40\text{ cm}$ , there are 32 points, arranged

Prvo su uklonjene trake koje su bile nestabilne, kako bi se sprečila opasnost od pada putnika i prolaznika. Površina je očišćena od lepka i pripravljena za lepljenje novih traka.

Usledio je predlog istog podizvođača za izvođenje taktilnih traka (prilog 2.1, 2.2, od 20.04.2022.godine):

“Taktilne staze VODILJE za unutrašnje prostore, reljefna obrada linija prema preporukama iz standarda ISO 23599:2019 (E). Izrađene od vulkanizirane gume, izuzetnih mehaničkih svojstava, otporne na habanje, kidanje, tvrdoće  $70 \pm 5\text{ShA}$ . Isporučka u pravougaonim tablama  $800 \times 400 \times 5\text{mm}$ . Visina konveksnih delova prema 5.1.3.2.1. ISO 23599:2019(E). Reljefne ivice na stazama oborene pod uglom od  $45^\circ$  (5.1.3.2.2 ISO 23599:2019(E)). Staze ne ometaju kretanje invalidskih kolica, pešaka, dečijih kolica... Taktilne staze se montiraju na propisanu širinu 40cm,... Sadrže 5 paralelnih konveksnih linija, (5.1.3.1 ISO 23599:2019(E)) koje se montiraju tako da se trake pružaju po pravcu kretanja, u kontinuitetu bez prekida.

Taktilne staze UPOZORENJE za unutrašnje prostore, reljefna obrada krugova prema preporukama iz standarda ISO 23599:2019 (E). Izrađene od vulkanizirane gume, izuzetnih mehaničkih svojstava, otporne na habanje, kidanje, tvrdoće  $70 \pm 5\text{ShA}$ . Isporučka u pravougaonim tablama  $800 \times 400 \times 5\text{mm}$ . Visina konveksnih delova prema 5.1.3.2.1. ISO 23599:2019(E). Reljefne ivice na stazama oborene pod uglom od  $45^\circ$  (5.1.3.2.2 ISO 23599:2019(E)). Staze ne ometaju kretanje invalidskih kolica, pešaka, dečijih kolica... Taktilne staze se montiraju na propisanu širinu 40cm, ... U osnovnom polju od  $40 \times 40\text{ cm}$  nalaze se 32 tačke, raspoređene dijagonalno pod uglom

diagonally at an angle of 45° (5.1.2.1 ISO 23599:2019(E)).

On April 5th, 2008, a subcontractor's proposal regarding the delivery and installation of yellow strips on the staircases was submitted (see attachment 3):

"Manufacturing, delivery, and installation: Anti-slip protective profiles for staircases, yellow color RAL 1016, format 3000x100x2mm."

Preparation of the base: the base should be clean and dry, homogeneous, and free of grease, dust, and loose parts.

Installation by gluing Sikaflex-11 FC and bolting to concrete with bolts 9250 of A2 quality (attached product image and anti-slip certificate R13, technical sheet of Sikaflex-11 FC adhesive).

Liquid SIKA Lastic 200W, a one-component, liquid waterproofing coating, is poured into the drilled holes in the concrete.

A nylon dowel is installed; glue is applied to the underside of the anti-slip tape over the entire surface, especially around the hole where the chrome bolt passes. This way, the penetration of water into the concrete will be prevented (the attached is the technical sheet of insulating materials SIKA Lastic 200W)".

On May 20th, 2022, a Subcontractor's proposal was submitted for the delivery and installation of prochrome (inox) strips for exterior spaces (see the attachment 4):

LEADING tactile tracks for exterior spaces, embossed processing of lines according to the recommendations of the ISO 23599:2019 (E) standard. Made of INOX-a 316L, resistant to salt, resistant to abrasion, resistant to mechanical damage and extreme external weather conditions. Delivery in rectangular boards 300x35x5mm. Embossed edges on tiles cut at an angle of 45° (5.1.3.2.2 ISO 23599:2019(E)). Paths do not

45° (5.1.2.1 ISO 23599:2019(E)).

Dana 05.04.2022. godine dostavljen je predlog podizvođača za isporuku i motažu žutih traka na stepenicima (prilog 3):

„Izrada, isporuka i ugradnja: Protivklizni zastitni profili za stepeništa, žute boje RAL 1016, format 3000x100x2mm.

Priprema podloge: podloga treba da bude čista i suva, homogena, bez masti, prašine i rastresitih delova.

Ugradnja lepljenjem Sikaflex-11 FC i šrafljenjem za beton vijcima 9250 u A2 kvalitetu (u prilogu slike proizvoda i certifikat o antikličnosti R13, tehnički list lepka Sikaflex-11 FC)...

U izbušene rupe u betonu sipa se tečni SIKA Lastic 200W, jednodokomponentni, tečni hidroizolacioni premaz.

Ubacuje se najlonski tipl, na donju stranu antiklične trake nanosi se lepak po celoj površini, a posebno oko rupe gde prolazi prohromski vijak. Na ovaj način će biti sprečen prodor vode u beton (u prilogu teh. list izolacionih materijala SIKA Lastic 200W)“

Dana 20.05.2022. godine dostavljen je predlog podizvođača za isporuku i motažu prohromskih (inox) trakaza spoljašnje prostore (prilog 4):

„Taktilne staze VODILJE za spoljne prostore, reljefna obrada linija prema preporukama iz standarda ISO 23599:2019 (E). Izrađene od INOX-a 316L otporan na soli, otporne na habanje, otporne na mehanička oštećenja i ekstermne spoljne vremenske uslove. Isporuka u pravougaonim pločicama 300x35x5mm. Reljefne ivice na pločicama oborene pod uglom od 45° (5.1.3.2.2 ISO 23599:2019(E)). Staze ne

obstruct the movement of wheelchairs, pedestrians, or baby carriages. Tactile tracks are installed according to the specified width of 40cm. They contain four parallel convex lines (5.1.3.1 ISO 23599:2018(E)). The lines are installed along the route in three rows per meter length, with a drainage distance of 40 mm. Technical safety features:

Anti-slip certificate according to: DIN 51130, PCEN/TS 16165 method "B" for footwear in high value R 11, <http://www.taktilnestaze.rs/sr/sertifikati>.

They are installed on a solid surface (concrete, behaton, marble, ceramics...) with the help of metal templates 1000 x 400mm with steel dowels and chrome-plated screws with countersunk head and Allen bolts in A2 quality.

1 m<sup>1</sup> of LEADING track contains: 12 pieces of tiles 300x35x5, 36 pieces of steel dowels M6 x 25mm and 36 pieces of screws M6 x 20 with countersunk head and Allen bolts in A2 quality.

WARNING tactile tracks for exterior spaces, embossed processing of circles according to the recommendations of the standard ISO 23599:2019 (E). Made of INOX-a 316L, resistant to salt, resistant to abrasion, resistant to mechanical damage and extreme external weather conditions.. Delivery in tiles with a diameter of Ø 35x5mm. Embossed edges on tiles cut at an angle of 45° (5.1.3.2.2 ISO 23599:2019(E)). Paths do not obstruct the movement of wheelchairs, pedestrians, or baby carriages. Tactile tracks are installed according to the specified width of 40cm. In the basic field of 40x40 cm, there are 24 points, arranged diagonally at an angle of 45° (5.1.2.1 ISO 23599:2019(E)).

Technical safety features:

Anti-slip certificate according to: DIN 51130, PCEN/TS 16165 method "B" for

ometaju kretanje invalidskih kolica, pešaka, dečijih kolica... Taktilne staze se montiraju na propisanu širinu 40cm, ... u 4 paralelnih konveksnih linija, (5.1.3.1 ISO 23599:2018(E)). Linije se montiranjem pružaju po pravcima trase u tri reda po metru dužnom, sa drenažnim razmakom od 40mm. Tehničko bezbednosne karakteristike: Certifikat o antuikliznosti prema : DIN 51130, PCEN/TS 16165 metoda "B" na obuću u visokoj vrednosti R 11, <http://www.taktilnestaze.rs/sr/sertifikati> Montiraju se na čvrstu podlogu (beton, behaton, mermer, keramika...) uz pomoć metalnih šablona 1000 x 400mm sa čeličnim tiplovima i prohromskim vijcima sa upuštanom glavom i inbus zavrtanjem u A2 kvalitetu.

1 m<sup>1</sup> staze VODILJE sadrži: 12 kom. pločica 300x35x5, 36 kom. čel. tipl M6 x 25mm i 36 kom vijak M6 x 20 sa upuštenom glavom i inbus zavrtanjem u A2 kvalitetu.

Taktilne staze UPOZORENJE za spoljne prostore, reljefna obrada krugova prema preporukama iz standarda ISO 23599:2019 (E). Izrađene od INOX-a 316L otporan na soli, otporne na habanje, otporne na mehanička oštećenja i ekstermne spoljne vremenske uslove. Isporuka u pločicama prečnika Ø 35x5mm. Reljefne ivice na pločicama oborene pod uglom od 45° (5.1.3.2.2 ISO 23599:2019(E)). Staze ne ometaju kretanje invalidskih kolica, pešaka, dečijih kolica... Taktilne staze se montiraju na propisanu širinu 40cm ..., u osnovnom polju raporta 40x40 cm sa 24 tačke dijagonalno pod 45°. (5.1.2.1 ISO 23599:2019(E)) Tehničko bezbednosne karakteristike: Certifikat o antuikliznosti prema : DIN 51130, PCEN/TS 16165 metoda "B" na obuću u visokoj vrednosti R 11. <http://www.taktilnestaze.rs/sr/sertifikati> Montiraju se na čvrstu podlogu (beton, behaton,

footwear in high value R 11, <http://www.taktilnestaze.rs/sr/sertifikati>.

They are installed on a solid surface (concrete, behaton, marble, ceramics...) with the help of metal templates 400 x 400mm with steel dowels and prochrome-plated screws with countersunk head and Allen bolts in A2 quality. Two metal templates 400x400 form a pattern report for mounting in all directions.

1 m1 of WARNING track contains: 61 pieces of tiles Ø 35x5, 61 pieces of steel dowels M6 x 25mm and 61 pieces of screws M6 x 20 with countersunk head and Allen bolts in A2 quality. In the case of asphalt, a combination of self-tapping plastic dowels for asphalt is made with prochromic hole screws with countersunk head in A2 quality. Exclusively for pedestrian areas.

INSTALLATION: holes are drilled in the base with a vibrating drill with a diameter of 8 mm and a depth of 25 mm, installing a steel dowel in it, which is fixed in the base by core drilling. The elements are placed on the openings and screwed with prochromic screws, with an Allen bolts and countersunk head."

#### CERTIFICATES

The Subcontractor submitted certificates (see the attachment 6).

#### CHOICE OF COLORS

To achieve the necessary contrast between the tactile track and the surrounding surface, it is accepted that in all locations all the tactile strips are made in a dark gray color, RAL 9005, following the requirements of TSI PRM, except in the Stara Pazova station building, to achieve the necessary contrast with the dark floor covering, the accepted strip is in gray white color, RAL 9002.

The yellow strips on the staircases were

mermer, keramika...) uz pomoć 2 metalna šablona 400x400mm, čeličnim tiplovima i prohromskim vijcima sa upuštanom glavom i inbus zavrtanjem u A2 kvalitetu. Dva metalna šablona 400x400 čine raport dezena za montažu po svim pravcima.

1m1 staze UPOZORENJE sadrži: 61 kom. pločica Ø 35x5, 61 kom. čel. tipl M6x25mm i 61 kom vijak M6x20 sa upuštenom glavom i inbus zavrtanjem u A2 kvalitetu. Kod asfalta se vrši kombinacija samoguzvajućih plastičnih tiplova za asfalt sa prohromskim hol šrafovimama sa upuštanom glavom u A2 kvalitetu. Isključivo za pešačke površine.

MONTAŽA: u podlogu se buše rupe vibracionom bušilicom prečnika 8mm i dubine 25 mm, u njima se postavlja čelični tipl koji se kirnerovanjem fiksira u podlogu. Elementi se postavljaju na otvorima i šrafe prohromskim vijcima,... inbus zavrtanjem i upuštenom glavom."

#### ATESTI

Podizvođača je dostavio ateste (prilog 6).

#### IZBOR BOJA

Da bi se ostvario potreban kontrast između taktilne staze i okolne površine prihvaćeno je da se sve taktilne trake rade u tamno sivoj boji, RAL 9005, prema zahtevima TSI PRM, na svim lokacijama, osim, u staničnoj zgradi Stara Pazova, gde je prihvaćena traka sivo bele boje, RAL 9002, kako bi se ostvario potreban contrast sa izvedenom tamnom oblogom poda.

Žute trake na stepenicima su projektovane i

designed and purchased in RAL 1016.

Contrast calculations were submitted to the NoBo Commission during certification, and there were no objections.

#### METHOD STATEMENT

Considering that after the dismantling of the tactile strips, which were glued in a width of 60 cm, there were traces of glue that couldn't be completely removed, because it partially perforated the concrete base, the proposed Subcontractor's method statement of execution of the works was adopted:

In the underpasses, the tactile track is glued according to the specified width of 40 cm - Rulebook on technical standards of planning, design, and construction of buildings, which ensure uninterrupted movement and access for people with disabilities, children, and the elderly ("Official Gazette of RS" no. 22/15).

Visible traces of residual glue are covered with a coating, Mapecoat TNS race track, anti-slip compound in a width of 12-15 cm on both sides of the tactile track (or on one side in a width of 20 cm). This way, traces of glue are covered in an aesthetic, non-slip, and permanent way. In the underpasses, the tactile tracks are glued with Neoprene glue Elapren 780 produced by Elan from Prijepolje. For safety and exposure to external weather conditions, rain, snow, frost, etc. rubber boards are, if necessary, additionally fixed to the floor with prochrome (inox) screws in A2 quality on the compositions and ends of the route.

In station buildings, tactile tracks are glued in a width of 60 cm, along the existing route, with certain corrections according to the requirements of the NoBo Commission. It is due to glue residue that cannot be completely removed from granite ceramics.

Thick layers of glue are removed by heating with industrial blow dryers and scraping with

nabavljene u tonu RAL 1016.

Proračuni kontrasta su tokom sertifikacije dostavljeni Komisiji NoBo, nije bilo primedbi.

#### METODOLOGIJA IZVOĐENJA RADOVA

S obzirom da su posle demontaže taktilnih traka, koje su lepljene u širini od 60 cm ostali tragova lepka koje nije bilo moguće ukloniti upotpunosti, jer je delimično perforirao u betonsku podlogu, usvojena je tehnologija izvođenja radova, koju je predložio podizvođač:

U pothodnicima taktilna staza se lepi na propisanu širinu od 40cm, Pravilnik o tehničkim standardima planiranja, projektovanja i izgradnje objekata, kojima se osigurava nesmetano kretanje i pristup osobama sa invaliditetom, deci i starim osobama ("Sl.Glasnik RS", br 22/15). Tragovi zaostalog lepka koji su uočljivi se prekrivaju premazom, Mapecoat TNS race track, antikliznom masom u širini od 12-15 cm sa obe strane taktilne staze (ili sa jedne strane u širini od 20cm). Na ovaj način se prekrivaju tragovi lepka na estetski, antiklizan i postojan način. U pothodnicima, taktilne staze se lepe Neoprenskim lepkom Elapren 780 proizvođača Elan iz Prijepolja. Radi sigurnosti i izloženosti spoljnim vremenskim uslovima, kiša, sneg, mraz i sl. gumene table se, po potrebi, dodatno fiksiraju za pod prohromskim (inox) vijcima u A2 kvalitetu na sastavima i krajevima trase.

U staničnim zgradama taktilne staze se lepe u širini od 60cm, postojećom trasom, uz izvesne korekcije prema zahtevima Komisije NoBo. Ovo je uslovljeno ostacima lepka koji se ne može u potpunosti ukloniti sa granitne keramike.

Debeli slojevi lepaka se uklanjaju zagrevanjem industrijskim fenovima i struganjem špahtlama,

spatulas to level the base for the new tactile tracks installation. Tactile tracks are glued with 3M VHB GPH-060F double-sided adhesive tapes on a smooth surface or with the same glue on a rough surface.

In both cases, the sub-floor is machine-cleaned and washed with special machines for washing and cleaning sub-floors. The base is degreased with Isopropyl alcohol, and this way prepared base guarantees the durability of the gluing.

#### TSI PRM CONSENT

On October 12th, 2022, an official announcement from the Investor was received (see attachment 5) that all the points according to the NoBo TSI matrices were closed. Tactile strips are installed following the required standards and control reviews of the NoBo TSI Commission.

Best regards,

Zhou Xin  
Representative of CRIC & CCCC Joint  
Venture

kako bi se podloga izravnjala za postavljanje novih taktilnih staza. Taktilne staze se lepe 3M VHB GPH-060F dvostrano lepljivim trakama, na glatkoj površini, ili istim lepkom na hrapavoj površini.

U oba slučaja se podloga-pod mašinski čisti i pere namenskim mašinama za pranje i čišćenje podloga. Podloga se razmašćuje Izo-propil alkoholom, tako pripremljena podloga garantuje postojanost lepljenja.

#### SAGLASNOST TSI PRM

Dana 12.10. 2022.godine stiglo je zvanično obaveštenje (prilog 5) od Investitora da su sve tačke po matricama NoBo TSI zatvorene. Taktilne trake su urađene u skladu sa zahtevanim standardima i kontrolnim pregledima Komisije NoBo TSI.

Срдачан поздрав,

Цоу Син  
Представник Конзорцијума CRIC&CCCC