Prilog poboljšanju uslova za bezbedan rad sa dizalicama

Dragan Stanković^{1*}

¹ Ministarstvo za rad, zapošljavanje, boračka i socijalna pitanja, Inspektorat za rad, Inspekcija rada Kraljevo, Srbija

Dizalice su mašine sa povećanim opasnostima pri radu tako da je obaveza poslodavaca da ispituju njihovu ispravnost i vrše preventivne i periodične preglede i ispitivanja u cilju bezbednog rada na dizalicama. Primena tehničkih propisa iz oblasti bezbednosti na radu sa dizalicama na osnovu kojih se obezbeđuje donošenje i implementacija zahteva za bezbednost dizalica, posebno se odnosi na ostvarivanje bezbednih i zdravih uslova rada na dizalicama, što treba da utiče na smanjivanje povreda na radu i profesionalnih bolesti prilikom korišćenja dizalica. U tom cilju neophodan je stalni rad na unapređenju oblasti bezbednog rada sa dizalicama kroz podržavanje u punoj meri propisa u oblasti bezbednosti mašina, zajednički rad poslodavaca, zaposlenih i stručnih lica koja se bave bezbednošću na radu sa dizalicama na unapređenju ove oblasti, podizanje svesti u ovoj oblasti kao i unapređenje znanja i veština pri radu sa dizalicama. Primenom i implementacijom propisa kojima se uređuje bezbednost pri radu sa dizalicama u znatnoj meri utiče se na razvoj i unapređivanje kulture prevencije pri radu sa dizalicama. Posebnu ulogu u podizanju svesti o kulturi prevencije u ovoj oblasti treba da ima sistem obrazovanja putem podizanja nivoa obrazovanja i stručnosti zaposlenih, kao i razvijanja svesti kod učenika o važnosti sopstvenog zdravlja i bezbednosti pri radu sa dizalicama.

Cljučne reči: bezbednost dizalica, tehnički propisi, kultura prevencije, obrazovanje

1. UVOD

Bezbednost na radu pri radu sa dizalicama u okviru bezbednosti mašina uređena je brojnim tehničkim propisima. Takođe ova oblast je obrađena mnogobrojnim, naučnim i stručnim radovima, studijama i sl.

Pravna regulativa kojom se uređuje i propisuje bezbedan rad sa dizalicama podrazumeva interakciju velikog broja različitih činilaca, naravno u zavisnosti od posmatranog slučaja, kao što su zakonodavstvo, tehnička znanja, obrazovanje, medicina, ergonomija, informisanje, istraživački rad i mnoge druge discipline kojima se ostvaruje bezbedan rad prilikom korišćenja dizalica. Bezbedan rad sa dizalicama kontinuirano se nalazi u procesu dinamičkih promena, unapređivanja i usavršavanja. Takve promene su posledica stalnih promena vezanih za savremene zahteve prilikom korišćenja dizalica u tehnološkim procesima, u proizvodnji uopšte, kao i raznim drugim oblicima radnih i društvenih odnosa i shvatanja značaja socijalno-ekonomskih posledica koje mogu nastati prilikom korišćenja dizalica.

Problematika vezana za bezbednost i korišćenje dizalica kao i svih mašina, duži niz godina unazad bila je regulisana Zakonima o zaštiti na radu i nacionalnim standardima i kao takva bila je u stalnom usponu, međutim nikad nije bila posebno obrađena jedinstvenom regulativom kao celina pravnih propisa.

Donošenjem ključnih propisa posebno i isključivo vezanim za bezbednost mašina ova oblast je znatno unapređena i možemo slobodno reći usklađena sa obavezama kako se to zahteva od evropskih proizvođača mašina (dizalica), čime se obezbeđuje slobodan tržišni promet dizalica na teritoriji Evrope. Kako su u međuvremenu, usled ubrzanog transponovanja Direktiva Evropske unije u razne domaće zakone i podzakonke propise, doneti brojni tehnički i drugi propisi koji su posebno značajni u sistemu bezbednosti i zdravlja na radu,

radi obezbeđivanja, pre svega preventivnih mera na mašinama u skladu sa Zakonom, ovim radom učinjen je napor da se objektivno sagleda odnos novih ključnih tehničkih propisa u sistemu bezbednog rada sa dizalicama.

Kultura prevencije kao koncept bezbednosti i zdravlja na radu istražavana je u proteklom periodu samo u okvirima društveno-psiholoških ili organizacionih tradicija. Vršena su primenjena istraživanja sa nedovoljno efekta u njenoj promociji i primeni na svim nivoima organizacije rada. Ovaj rad ima za cilj da se kulturi prevencije u našem društvu pokloni veći značaj. Promovisanjem principa prevencije u osnovi je uvaženo shvatanje bezbednosne kulture koja se u procesu rada prihvata kao važan faktor organizacije rada, pogotovo vezano za pojave uzroka, sadržaja i posledica povreda na radu pri radu sa dizalicama. Osnovni akt kojim se promoviše kultura prevencije u oblasti bezbednosti i zdravlja na radu je Strategija bezbednosti i zdravlja na radu u Republici Srbiji za period od 2013. do 2017. godine. Strategija jeste akt kojim se na celovit način utvrđuje stanje u oblasti bezbednosti i zdravlja na radu u Republici Srbiji i mere koje treba preduzeti za njen razvoj, odnosno definišu aktivnosti, ciljevi i pravci unapređenja ove oblasti. Strategija teži da stvori socijalno- ekonomsku motivaciju kod svih učesnika u procesima rada, tako da sve veći broj privrednih subjekata aktivno upravlja bezbednošću i zdravljem na radu, kako bi se unapredilo stanje u ovoj oblasti. Novom politikom koja je utvrđena ovom strategijom promoviše se: uvođenje principa prevencije u sprečavanju nastajanja povreda na radu i profesionalnih oboljenja, aktivno uključivanje službe medicine rada, izbor predstavnika zaposlenih za bezbednost i zdravlje na radu, uključivanje bezbednosti i zdravlja na radu u školski obrazovni sistem (osnovno i srednje obrazovanje), kontinuirana edukacija stručnih i odgovornih lica za bezbednost i zdravlje na radu i drugih lica i promocija kulture prevencije i primera dobre prakse

u oblasti bezbednosti i zdravlja na radu. Nacionalna preventivna kultura bezbednosti i zdravlja na radu označava kulturu u kojoj se na svim nivoima poštuje pravo na bezbedno i zdravo radno okruženje, a poslodavci, zaposleni i svi ostali subjekti aktivno učestvuju u obezbeđivanju bezbednog i zdravog radnog okruženja kroz sistem definisanih prava, obaveza i dužnosti i gde se načelu preventivnosti daje najveći prioritet. Osnova za razvoj i unapređenje kulture prevencije je obrazovanje.

2. PRIMENA PREVENTIVNIH MERA ZA BEZBEDAN I ZDRAV RAD NA DIZALICAMA

U cilju poboljšanja uslova za bezbedan rad sa dizalicama u okviru suštinski novog pristupa u rešavanja bezbednosti i zdravlja na radu neophodno je obezbediti primenu preventivnih mera. Poslodavac je dužan da prilikom organizovanja rada i radnog procesa kao i izbora dizalice, obezbedi preventivne mere radi zaštite života i zdravlja zaposlenih kao i da za njihovu primenu obezbedi potrebna finansijska sredstva. Poslodavac je, po usvojenim principima preventivnog pristupa, dužan da obezbedi preventivne mere pre početka rada zaposlenog, u toku rada, kao i kod svakog izbora druge dizalice, čime se obezbeđuje najveća moguća bezbednost na radu sa dizalicama, zasnovana na primeni propisa u oblasti bezbednosti i zdravlja na radu, radnog prava, tehničkih propisa i standarda, propisa u oblasti zdravstvene zaštite, higijene rada, zdravstvenog i penzijskog i invalidskog osiguranja i dr. Na osnovu usvojenih principa, poslodavac je dužan da:

- 1) zaposlenom odredi obavljanje poslova (sa dizalicom) na kojima su sprovedene mere bezbednosti i zdravlja na radu;
- 2) obaveštava zaposlene i njihovog predstavnika o uvođenju novih dizalica, kao i o opasnostima od povreda i oštećenja zdravlja koji nastaju njihovim uvođenjem, odnosno da u takvim slučajevima donese odgovarajuća uputstva za bezbedan rad;
- 3) obezbedi održavanje dizalica u ispravnom stanju, čime obezbeđuje da zaposleni u radu koristi samo dizalicu na kojoj su primenjene propisane mere za bezbedan rad u skladu sa njenom namenom.
- 4) Poslodavac je dužan da zaposlenima da na upotrebu dizalice, na kojima su primenjene propisane mere za bezbednost i zdravlje na radu i da u toku rada obezbedi kontrolu njihove upotrebe u skladu sa namenom. Proizvođač dizalice u toku njene izrade utvrđuje namenu dizalice.

Takodje poslodavac je dužan da zaposlenom da na korišćenje dizalice, samo ako su usaglašene sa propisanim tehničkim zahtevima, ako je njihova usaglašenost ocenjena prema propisanom postupku, ako su označene u skladu sa propisima i ako ih prate propisane isprave o usaglašenosti i druga propisana dokumentacija. Poslodavac je dužan i da obezbedi uputstvo za njihovu upotrebu i održavanje. Tehničkim propisima (Zakonima i podzakonskim propisima), uređena su pitanja usaglašenosti dizalica sa tehničkim zahtevima, ocenjivanje usaglašenosti po propisanim postupcima, označavanje u skladu sa propisanim postupcima, oznake koje se stavljaju na

dizalice i obezbeđivanje propisanih isprava, kao i druga tehnička dokumentacija koja prati svaku dizalicu na tržištu.

Slobodan protok dizalica na međunarodnom tržištu, bez nepotrebnih tehničkih prepreka, se postiže primenom Sporazuma o uklanjanju tehničkih prepreka trgovini, o uzajamnom prihvatanju industrijskih proizvoda i ocenjivanju usaglašenosti. Ovim se eliminišu razlike u nacionalnim propisima i postupcima za ocenjivanje usaglašenosti, tj. potrebe za višestrukom proverom dizalica u odnosu na zahteve drugih zemalja, prilikom stavljanja dizalica na njihovo tržište. Slobodan protok dizalica na evropskom tržištu, bez nepotrebnih tehničkih prepreka, se postiže harmonizacijom propisa, standarda, postupaka za ocenjivanje usaglašenosti dizalica i tržišnog nadzora na evropskom nivou, uključujući i primenu principa uzajamnog priznavanja u neharmonizovanom području.

U procesu evropskih integracija, Srbija intenzivno radi na usklađivanju domaćeg tehničkog zakonodavstva i nacionalnih standarda sa evropskim zakonodavstvom i standardizacijom. Iako proizvođači koji izvoze na tržište EU mogu da primene zahteve evropskih propisa i standarda direktno, za privrednike je značajno olakšanje da isti propisi i standardi važe na domaćem tržištu i da budu dostupni na srpskom jeziku. Tako harmonizacija tehničkog zakonodavstva i standarda omogućava proizvođačima da dizalice stavljaju na domaće i inostrano tržište pod istim uslovima, što doprinosi njihovoj konkurentnosti na domaćem i inostranom tržištu. Primena savremenih standarda u svim fazama procesa industrijske proizvodnje usmerava proizvođače na kontinuirano prilagođavanje i usavršavanje tehničkih i tehnoloških rešenja čime se podstiče njihova inovativnost i konkurentnost. Savremeni i efikasniji sistem donetih zakona doprinosi jačanju konkurentne proizvodnje i zaštiti javnih interesa, i kao takav predstavlja okosnicu održivog ekonomskog razvoja.

3. USKLAĐIVANJE ZAKONA I PODZAKONSKIH PROPISA SA ZAHTEVIMA NOVIH TEHNIČKIH PROPISA PRI RADU SA DIZALICAMA

U cilju poboljšanja uslova za bezbedan rad sa dizalicama, korisno je sagledati nekoliko ključnih Zakona i podzakonskih propisa koji egzistiraju kao veoma važna dokumenta u savremenom obezbeđivanju bezbednih dizalica na našem i evropskom tržištu. Primenom tih propisa naša zemlja svrstava se u red razvijenih evropskih zemalja i radi ostvarivanja zajedničkog cilja u ovoj oblasti, kao što je obezbeđivanje bezbednih dizalica u proizvodnim i radnim procesima domaćih preduzeća, veoma važno je obezbediti potpunu primenu ključnih propisa u ovoj oblasti, kao što su:

- 1) Zakon o opštoj bezbednosti proizvoda („Sl. glasnik RS” br. 41/09), kojim se uređuje opšta bezbednost proizvoda (dizalica) koji su stavljeni na tržište, kriterijumi za ocenjivanje usaglašenosti proizvoda (dizalica) sa opštim zahtevom za bezbednost, obaveze proizvođača i distributera, uslovi i način informisanja i razmene informacija u vezi sa rizicima koje proizvod (dizalica) predstavlja po zdravlje i bezbednost potrošača i drugih korisnika, kao i vršenje nadzora. Zakon se

primenjuje na sve proizvode (dizalice) koji se u smislu ovog zakona smatraju proizvodima, osim na proizvode za koje je posebnim propisom uređena njihova bezbednost. Ispunjavanje obaveza propisanih ovim zakonom ne isključuje odgovornost proizvođača za štetu nastalu od proizvoda (dizalica) sa nedostatkom u smislu propisa kojima je uređena ta odgovornost. Ovaj zakon suštinski je usklađen sa osnovnim zahtevima Direktive 2001/95/EZ o opštoj bezbednosti proizvoda . Prema odredbama ovog Zakona, proizvođač je dužan da stavlja na tržište isključivo bezbedne proizvode, a proizvod se smatra bezbednim ako ispunjava zahteve srpskih standarda kojima se preuzimaju harmonizovani evropski standardi doneti radi ispunjenja opšteg zahteva za bezbednost proizvoda (dizalica) . Proizvođač je dužan da, u granicama delatnosti koju obavlja, pruža potrebne informacije potrošačima i drugim korisnicima koje će im omogućiti da procene rizik koji proizvod (dizalica) može da predstavlja tokom perioda njegove upotrebe koji određuje proizvođač ili razumno predvidljivog perioda upotrebe, ako takav rizik nije očigledan bez odgovarajućeg upozorenja i koje će im omogućiti da preduzmu odgovarajuće mere predostrožnosti u odnosu na takav rizik.

- 2) Zakon o tehničkim zahtevima za proizvode i ocenjivanju usaglašenosti („Sl. glasnik RS” br.36/09), kojim se uređuje način propisivanja tehničkih zahteva za proizvode(dizalice) i donošenje tehničkih propisa, ocenjivanje usaglašenosti proizvoda (dizalica)sa propisanim tehničkim zahtevima, obaveze isporučioaca proizvoda (dizalica) i vlasnika proizvoda u upotrebi, važenje inostranih isprava o usaglašenosti i znakova usaglašenosti, obaveštavanje o tehničkim propisima i postupcima ocenjivanja usaglašenosti i vršenje nadzora nad sprovođenjem ovog zakona i propisa donetih na osnovu ovog zakona. Ovaj Zakon predstavlja osnov za prenošenje evropskih direktiva, ukoliko propisivanje tehničkih zahteva i sprovođenje postupaka ocenjivanja usaglašenosti za proizvode (dizalice) nije propisano posebnim zakonima, ali takođe omogućava i propisivanje tehničkih zahteva u oblastima u kojima ne postoje harmonizovani propisi na nivou Evropske unije. Posebno, interesantno je konstatovati da je pregled aktivnosti redovnog ili vanrednog proveravanja ispunjenosti propisanih zahteva za bezbednost proizvoda (dizalica) tokom veka upotrebe. Zakonom se propisuje način propisivanja tehničkih zahteva i definicija tehničkih propisa.

Zahtevi vezani za bezbednost dizalica propisani su Pravilnikom o bezbednosti mašina („Službeni glasnik RS”, broj 13/10), kojim je transponovana Direktive 2006/42/EZ o bezbednosti mašina.

Ovim Pravilnikom propisuju se bitni zahtevi za zaštitu zdravlja i bezbednosti koji se odnose na projektovanje i izradu mašina, kao i drugi zahtevi i uslovi koji moraju biti ispunjeni za njihovo stavljanje na tržište i upotrebu-korišćenje; sadržina Deklaracije o usaglašenosti dizalice i Deklaracije o ugradnji delimično završene dizalice; sadržina tehničke dokumentacije; postupci za ocenjivanje usaglašenosti; zahtevi koje mora da ispuni telo za ocenjivanje usaglašenosti da bi bilo imenovano za ocenjivanje usaglašenosti; znak usaglašenosti i označavanje usaglašenosti; i dr. Pravilnik je usaglašen sa svim načelima i bitnim zahtevima Direktive 2006/42/EZ o mašinama, što je u skladu sa preuzetim obavezama Republike Srbije iz Sporazuma o stabilizaciji i pridruživanju , kao i obavezama iz Nacionalnog programa integracije Republike Srbije u Evropsku uniju . Obaveze se naročito odnose na slobodan protok roba i u tom smislu, neophodnost harmonizacije tehničkog zakonodavstva Republike Srbije sa tehničkim zakonodavstvom Evropske unije sa ciljem uklanjanja tehničkih prepreka za trgovinu kao jednog od ključnih elemenata za obezbeđivanje slobodnog protoka roba i stvaranja jedinstvenog tržišta. Ako se Pravilnik o bezbednosti mašina posmatra u tehničkom pogledu, može se reći da mu je primarni cilj da harmonizuje pravila koja uređuju - uslovljavaju prodaju mašina - dizalica dok u isto vreme garantuje najveći mogući nivo bezbednosti, ali se sa pravom može konstatovati i to da Pravilnik zapravo predstavlja uputstvo namenjeno inženjerskom kadru koje moraju primeniti na samom početku projektovanja dizalice sa osnovnim ciljem da se omogućí njeno stavljanje na tržište i upotrebu, što se u našim uslovima može reći i da se menja i sam pristup korišćenja u proizvodnji.

Pravilnikom je propisana pojačana i isključiva odgovornost proizvođača da dizalice koje se stavljaju na tržište i upotrebu moraju biti usaglašene sa bitnim zahtevima za zaštitu zdravlja i bezbednosti korisnika, što se postiže propisanom internom kontrolom proizvodnje, pregledom tipa dizalice i izdavanjem sertifikata o tome, kao i potpunim obezbeđivanjem kvaliteta. To uključuje i učešće Imenovanih tela, kao tzv. treće strane, u ocenjivanju usaglašenosti, što zavisi od potreba i izbora proizvođača. Ovim pravilnikom propisuju se:

- 1) bitni zahtevi za zaštitu zdravlja i bezbednosti koji se odnose na projektovanje i izradu dizalica, kao i drugi zahtevi i uslovi koji moraju biti ispunjeni za njihovo stavljanje na tržište i upotrebu;
- 2) sadržina Deklaracije o usaglašenosti dizalice i Deklaracije o ugradnji delimično završene dizalice;
- 3) sadržina tehničke dokumentacije;
- 4) postupci za ocenjivanje usaglašenosti;
- 5) zahtevi koje mora da ispuni telo za ocenjivanje usaglašenosti da bi bilo imenovano;
- 6) znak usaglašenosti i označavanje usaglašenosti;
- 7) poverljivost podataka i zaštitna klauzula.

Prema odredbama ovog Pravilnika smatra se da je dizalica , na koju je stavljen znak usaglašenosti i koju prati deklaracija o usaglašenosti dizalice, usaglašena sa zahtevima iz ovog pravilnika.

Ako je određena dizalica predmet i drugih propisa kojima se uređuju druga pitanja i kojima se propisuje stavljanje znaka usaglašenosti, stavljen znak usaglašenosti označava da je ta dizalica usaglašena i sa zahtevima iz tih drugih propisa. Veoma važno je uočiti činjenicu da se podaci o propisima koji su uzeti u obzir prilikom izrade dizalice navode u Deklaraciji o usaglašenosti mašine.

Proizvođač dizalice dužan je da izvrši procenu rizika ili obezbeđuje da se ta procena izvrši, radi utvrđivanja zahteva za zaštitu zdravlja i bezbednost koji se primenjuju za dizalicu. Posle procene rizika, dizalica se projektuje i izrađuje tako da se uzmu u obzir rezultati ove procene. Postupak procene rizika sprovodi se u skladu sa načelima standarda SRPS EN ISO 12100:2014 Bezbednost mašina - Opšti principi za projektovanje - Ocena rizika i smanjenje rizika. Osnovna svrha ovog međunarodnog standarda jeste da projektantima obezbedi opšte okvire i uputstva za odlučivanje tokom razvoja dizalice, koji će im omogućiti da projektuju dizalice koje su bezbedne pri njihovoj predviđenoj upotrebi. Koncept bezbednosti dizalica razmatra sposobnost dizalice da obavlja svoju predviđenu funkciju u toku svog radnog ciklusa, gde je rizik adekvatno smanjen. U procesu sprovođenja postupka procene rizika i smanjivanjem rizika do koga se došlo na navedeni način, proizvođač:

- 1) Određuje ograničenja dizalice, uključujući predviđenu namenu dizalice i njenu razumno predvidivu nepravilnu upotrebu;
- 2) Utvrđuje opasnosti koje dizalica može proizvesti i sa njom povezane opasne situacije;
- 3) Procenjuje rizike, uzimajući u obzir stepen mogućih povreda ili oštećenja zdravlja i verovatnoću njihovog nastanka;
- 4) Vrednuje rizike, radi utvrđivanja da li je potrebno smanjiti rizike u skladu sa ciljevima ovog pravilnika;
- 5) Otklanja opasnosti ili smanjuje rizike u vezi sa tim opasnostima, primenom zaštitnih mera, prvenstveno prioriteta (bezbednosna načela – eliminacija rizika, preduzimanje mera, instrukcije).

Procena rizika počinje sa određivanjem granica-ograničenja dizalice, uzimajući u obzir sve faze radnog veka dizalice. To znači da treba da se identifikuju karakteristike i performanse dizalice ili serije dizalica u integrisanom procesu, zajedno sa ljudima, okolinom i proizvodima. Granice upotrebe uključuju predviđenu upotrebu i nepravilnu upotrebu dizalice koja se može razumno predvideti. Uticaji koji se uzimaju u obzir su sledeći:

- a) različiti režimi rada dizalice i različite procedure intervencije za korisnike, uključujući zahtevane intervencije zbog neispravnosti dizalice;
- b) upotreba dizalice -mašine od strane lica koja su identifikovana prema korišćenju (dominantne ruke), ili prema ograničenim fizičkim sposobnostima (oštećenje vida ili sluha, veličina, snaga, itd.);

- c) predviđeni nivo obuke, iskustva ili sposobnosti korisnika, uključujući rukovaoce, osoblje za održavanje, lica na obuci i učenike i svu javnost;
- d) izlaganje drugih osoba opasnostima koje se odnose na dizalice tamo gde se to može razumno predvideti: lica koja su dovoljno svesna određenih opasnosti, kao što su rukovaoći susednih dizalica, lica koja nisu dovoljno svesna određenih opasnosti, ali su verovatno dovoljno svesna procedura za bezbednost terena, dozvoljenih puteva, itd. kao što je administrativno osoblje; lica koja bi mogla imati veoma malo svesti o opasnostima na radu sa dizalicom ili o procedurama za bezbednost.

Ponavljanjem postupka procene rizika i smanjivanjem rizika do koga se došlo, proizvođač:

- Određuje ograničenja dizalice, uključujući predviđenu namenu dizalice i njenu razumno predvidivu nepravilnu upotrebu;
- Utvrđuje opasnosti koje dizalica može proizvesti i sa njom povezane opasne situacije;
- Procenjuje rizike, uzimajući u obzir stepen mogućih povreda ili oštećenja zdravlja i verovatnoću njihovog nastanka;
- Vrednuje rizike, radi utvrđivanja da li je potrebno smanjiti rizike u skladu sa ciljevima ovog pravilnika;
- Otklanja opasnosti ili smanjuje rizike u vezi sa tim opasnostima, primenom zaštitnih mera, prvenstveno prioriteta (bezbednosna načela – eliminacija rizika, preduzimanje mera, instrukcije i dr.).

Tehnička dokumentacija za dizalicu mora da bude sačinjena na srpskom jeziku, odnosno na jednom od službenih jezika Evropske unije, sa odgovarajućim prevodom na srpski jezik. Tehnička dokumentacija obuhvata osnovnu konstrukcionu dokumentaciju, kao što su:

- 1) opšti opis dizalice;
- 2) sklopni crtež dizalice, kao i odgovarajuće opise i objašnjenja neophodne za razumevanje rada dizalice;
- 3) kompletne detaljne crteže, uz koje će biti priloženi proračuni, rezultati ispitivanja, sertifikati i dr., a koji su neophodni za ocenjivanje usaglašenosti dizalice sa bitnim zahtevima za zdravlje i bezbednost;
- 4) dokumentaciju o proceni rizika, iz koje je vidljivo koji je postupak primenjen, uključujući:
 - spisak bitnih zahteva za zdravlje i bezbednost koji se primenjuju na tu dizalicu;
 - opis zaštitnih mera koje su primenjene radi eliminisanja identifikovanih opasnosti ili radi smanjenja rizika i kad je to primenjivo, navođenje preostalih rizika u vezi sa dizalicom;

- 5) primenjene standarde i druge tehničke specifikacije, sa navođenjem bitnih zahteva za zdravlje i bezbednost koje pokrivaju ti standardi i specifikacije;
- 6) sve tehničke izveštaje sa rezultatima obavljenih ispitivanja od strane proizvođača ili od strane Imenovanog tela izabranog od strane proizvođača ili njegovog zastupnika;
- 7) jedan primerak uputstva za mašinu.

Dizalica koja je usaglašena sa zahtevima iz ovog pravilnika označava se znakom usaglašenosti u obliku i na način koji je propisan. Znak usaglašenosti stavlja na dizalicu proizvođač ili njegov zastupnik, odnosno uvoznik ako proizvođač ili njegov zastupnik nije registrovan na teritoriji Republike Srbije, na vidnom mestu tako da bude čitljiv i neizbrisiv, u skladu sa propisom kojim se određuje način stavljanja i upotreba znakova usaglašenosti.

Znak za usaglašenost „CE” (Sl. 1), sastoji se od stilizovanog latiničnog slovnog znaka CE.

Slika 1. Znak za usaglašenost “CE”

Slika 2. Srpski znak usaglašenosti

Srpski znak usaglašenosti sastoji se od tri velika slova A povezana u obliku jednakokraničnog trougla (3A), izgleda i sadržine kao na slici 2.

Veličina znaka određuje se prema visini V znaka koja može imati samo zaokružene vrednosti standardnih brojeva prema redu veličina R10 izraženih u milimetrima (mm) prema srpskom standardu SRPS A.A0.001.

Deklaracija o usaglašenosti dizalice i njeni prevodi moraju biti sačinjeni pod istim uslovima kao sva uputstva i moraju biti otkucani ili napisani rukom, velikim štampanim slovima. Deklaracija se odnosi isključivo na dizalice u stanju u kome su stavljene na tržište i isključuje komponente koje su naknadno dodate i operacije koje je naknadno izvršio krajnji korisnik. Deklaracija o usaglašenosti dizalice sadrži sledeće podatke:

- 1) poslovno ime, odnosno naziv i adresu sedišta proizvođača i kad to dolazi u obzir, njegovog zastupnika;
- 2) ime i adresu lica ovlašćenog za sačinjavanje tehničke dokumentacije;
- 3) opis i oznaku dizalice, uključujući opšti naziv, funkciju, model, tip, serijski broj i trgovinski naziv;
- 4) izričito navođenje da je dizalica u skladu sa svim zahtevima ovog pravilnika i gde je to moguće, navođenje o usaglašenosti sa drugim posebnim propisima i zahtevima sa kojima je dizalica usaglašena. Ovo navođenje sadrži i pozivanje na propis koji je primenjen i broj službenog glasila u kome je taj propis objavljen;
- 5) ako je to odgovarajuće, poslovno ime, odnosno naziv, adresu sedišta i jedinstvenog broja Imenovanog tela iz odgovarajućeg registra u skladu sa posebnim propisom;
- 6) ako je to odgovarajuće, poslovno ime, odnosno naziv, adresu sedišta i jedinstveni, odnosno identifikacioni broj Imenovanog tela, koje je odobrilo sistem potpunog obezbeđivanja kvaliteta;
- 7) pozivanje na primenjene srpske standarde za dizalice;
- 8) ako je to odgovarajuće, pozivanje na druge standarde i tehničke specifikacije kad su one primenjene;
- 9) mesto i datum izdavanja deklaracije;
- 10) identifikaciju i potpis ovlašćenog lica, odgovornog za sačinjavanje deklaracije o usaglašenosti dizalice u ime proizvođača ili njegovog zastupnika. Proizvođač dizalice ili njegov zastupnik čuva originalnu deklaraciju o usaglašenosti dizalice, u periodu od najmanje deset godina posle datuma izrade poslednje dizalice.

Poslodavac je dužan da rukovaocima dizalica obezbedi uputstvo za bezbednu upotrebu dizalice.

Poslodavac je dužan da, u slučaju kada se pri korišćenju dizalice pojavljuju specifični rizici od nastanka povreda i oštećenja zdravlja zaposlenih, obezbedi da:

- 1) tu dizalicu za rad mogu da koriste samo rukovaoci i
- 2) popravljjanje, izmenama kojima se ne menja namena, održavanje, servisiranje dizalice obavljaju zaposleni koji su za to određeni.

Poslodavac je dužan da obezbedi da se pri korišćenju dizalice u potpunosti poštuju ergonomske principi.

Poslodavac je dužan da angažuje pravno lice sa licencom za vršenje preventivnih i periodičnih pregleda i ispitivanja dizalica.

Poslodavac je dužan da zaposlenima ili njihovim predstavnicima za bezbednost i zdravlje na radu obezbedi informacije koje se odnose na bezbednost i zdravlje na radu, a naročito o merama koje se preduzimaju u cilju ostvarivanja bezbednih i zdravih uslova za rad pri korišćenju dizalica.

Poslodavac je dužan da u toku osposobljavanja za bezbedan i zdrav rad, zaposlene koji nisu rukovaoci dizalica, upozna sa svim vrstama rizika koji se mogu pojaviti na radnom mestu i u radnoj okolini, a koji nastaju pri korišćenju dizalica.

4. KULTURA PREVENCIJE NA RADU SA DIZALICAMA KROZ PERMANENTNO OBRAZOVANJE

Jedan od predloga za poboljšanje uslova za bezbedan rad sa dizalicama je i stvaranje kulture prevencije kroz permanentno obrazovanje a što obuhvata:

- uključivanje bezbednosti i zdravlja na radu u školski obrazovni sistem (osnovno i srednje obrazovanje),
- kontinuirana edukacija (obuka) stručnih i odgovornih lica za bezbednost i zdravlje na radu i drugih lica i
- promocija kulture prevencije i primera dobre prakse u oblasti bezbednosti i zdravlja na radu.

Kultura prevencije teži da stvori socijalno-ekonomsku motivaciju kod svih učesnika u procesu rada sa dizalicama, tako da sve veći broj privrednih subjekata aktivno upravlja bezbednošću na radu sa dizalicama, kako bi se unapredilo stanje u ovoj oblasti.

Kulturom prevencije promoviše se pre svega: uvođenje principa prevencije u sprečavanju nastajanja povreda na radu i profesionalnih oboljenja, aktivno uključivanje službe medicine rada, uvođenje principa odgovornosti za primenu mera iz oblasti bezbednosti i zdravlja na radu pri radu sa mašinama (dizalicama) i dr.

Vizija kulture prevencije treba da bude stalni rad na unapređenju ove oblasti kroz podržavanje, u punoj meri, propisa u oblasti bezbednosti i zdravlja na radu, zajednički rad poslodavaca i zaposlenih na unapređenju ove oblasti, podizanje svesti u ovoj oblasti, unapređenje znanja i veština odnosno uspostavljanje kulture rada i stvaranje preduslova dobrobiti na radu i kvaliteta života i zdravlja na radu.

Opšti cilj jeste unapređenje i očuvanje zdravlja radno aktivnog stanovništva, odnosno unapređenje uslova rada radi sprečavanja povreda na radu, profesionalnih bolesti i bolesti u vezi sa radom i njihovog svodenja na najmanju moguću meru, odnosno otklanjanje profesionalnih rizika.

Svi činioци u sistemu bezbednosti i zdravlja na radu treba da učestvuju u aktivnostima implementacije i

pune integracije propisa u oblasti bezbednosti na radu pri radu sa mašinama (dizalicama), odnosno njihovom potpunom prihvatanju i korišćenju u praksi.

Time bi se stvarali uslovi za promociju kulture prevencije i primera dobre prakse u oblasti bezbednosti na radu sa dizalicama na svim nivoima organizovanja poslodavaca, zaposlenih, obrazovnih ustanova i dr.

Osnova za razvoj i unapređivanje kulture rada sa dizalicama treba da bude obrazovanje.

Obrazovni sistem Republike Srbije treba da teži svrsishodnom obrazovanju u funkciji suočavanja sa sve većim izazovima i stvaranju novih kvalitetnih i bezbednih radnih mesta pri radu sa dizalicama.

U obrazovnom sistemu Republike Srbije postoje visokoškolske ustanove koje obrazuju kadrove u oblasti bezbednosti i zdravlja na radu na studijskim programima inženjerstva zaštite na radu, na nivou osnovnih akademskih i osnovnih strukovnih studija, master akademskih studija, specijalističkih akademskih i specijalističkih strukovnih studija.

Međutim, radi sveopšteg podizanja svesti od najranijeg uzrasta o važnosti sopstvenog zdravlja i bezbednosti, neophodno je ovom tematikom obuhvatiti i osnovno i srednje obrazovanje u celosti, kako bi se učenici i u osnovnom i u srednjem obrazovanju upoznali sa potrebom za negovanjem kulture bezbednosti i zdravlja na radu i dobili potrebna znanja iz ove oblasti.

Promocijom bezbednosti i zdravlja na radu u obrazovno-vaspitnom sistemu razvija se kultura rada i prevencija u ovoj oblasti.

Podizanje svesti o značaju bezbednosti i zdravlja na radu u obrazovno-vaspitnom sistemu označava integraciju oblasti koja se bavi bezbednošću i zdravljem na radu u oblast koja se bavi obrazovanjem. To označava potrebu za uspostavljanjem saradnje institucija koje se bave bezbednošću i zdravljem na radu sa institucijama koje se bave obrazovanjem.

Obrazovanje je jedan od ključnih faktora za razvijanje i jačanje kulture prevencije. Podizanje svesti o značaju bezbednosti i zdravlja na radu u obrazovno-vaspitnom sistemu, između ostalog, ima za cilj da se razvije svest o važnosti sopstvenog zdravlja i bezbednosti, kao i o rizicima na radnom mestu pri radu sa dizalicama.

Način i model uključivanja bezbednosti i zdravlja na radu u obrazovno-vaspitni sistem treba da se sagleda kroz pravni okvir, kroz učešće svih zainteresovanih strana, bezbednost i zdravlje na radu kao deo doživotnog učenja, bezbedno i zdravo učenje i radnu okolinu, obuku nastavnog osoblja u školama (predavača), interaktivne i fleksibilne obrazovne metode kao i direktnu povezanost sa radnim mestom na dizalicama.

Neadekvatni programi obrazovanja mogu biti jedan od faktora koji utiče na stanje u oblasti bezbednosti na radu sa dizalicama. Programi obrazovanja u koje je uključena bezbednost i zdravlje na radu predstavljaju jedan od osnova za unapređenje ove oblasti.

Povećanje ulaganja u obrazovni sistem, uz efikasno korišćenje postojećih

resursa, omogućiće značajnu modernizaciju nastave (laboratorije, računarske mreže, istraživanja kao deo obrazovanja, razmena sa inostranstvom, kvalitetan radni prostor).

U školski program neophodno je uvesti program bezbednosti i zdravlja na radu koji obuhvata zajedničke aktivnosti škole, roditelja, odnosno staratelja i jedinice lokalne samouprave usmeren na razvoj svesti za sprovođenje i unapređivanje bezbednosti i zdravlja na radu. U sklopu toga treba propisati programe formalnog i neformalnog obrazovanja, a između ostalog i program razvoja i očuvanja bezbednih i zdravih uslova rada pri radu sa dizalicama.

Pored formalnog obrazovanja u oblasti bezbednosti i zdravlja na radu važan segment za unapređenje znanja i sticanje veština treba da budu i kontinuirane obuke (teorijske i praktične), koje treba da budu prilagođene uslovima svakodnevnog rada i specifičnostima radnog mesta. U ovom strateškom periodu treba stvoriti uslove da poslodavci i zaposleni, kao i druga lica, budu svesni potrebe kontinuiranog usavršavanja znanja i veština iz ove oblasti.

Bezbednost i zdravlje na radu lica koja će se u budućnosti zaposliti, je u vezi sa nivoom svesti koja se stiče od najranijeg uzrasta. Učenici u osnovnim i srednjim školama, a naročito u srednjim stručnim školama (mašinske, građevinske, i sl.) treba da steknu osnovna znanja o bezbednosti i zdravlju na radu u toku svog školovanja kako bi sa ovim znanjima pripremljeniji započeli svoju profesionalnu karijeru na radu sa dizalicama.

Mogućnost uključivanja bezbednosti i zdravlja na radu u obrazovno-vaspitni sistem ogleda se i kroz vannastavne aktivnosti, tribine, predavanja, prezentacije, stručnu praksu itd.

Jedan od glavnih ciljeva treba da bude i osnivanje centara za trening i edukaciju iz oblasti bezbednosti na radu. Takvih centara u Evropi ima mnogo. Osnivanje takvog centra će upotpuniti sistem bezbednosti i zdravlja na radu u Srbiji sa obavezom permanentnog učenja i stalnog usavršavanja svih subjekata koji se bave poslovima bezbednosti. U tim centrima sve zainteresovane strane, od poslodavaca, preko lica zaduženih za bezbednost i zdravlje na radu, inženjera, izvođača radova, sindikata, predstavnika zaposlenih do medija imaće između ostalog i potreban nivo edukacije u cilju poboljšanja uslova za bezbedan rad sa dizalicama.

5. ZAKLJUČAK

U skladu sa Zakonom o bezbednosti i zdravlju na radu, poslodavac može zaposlenom dati na korišćenje samo ispravne dizalice, na kojima su primenjene propisane mere za bezbedan i zdrav rad. Takođe, navedenim tehničkim propisima propisana je obaveza poslodavca da uz dizalicu, kao proizvod, obezbeđuje određenu propisanu tehničku dokumentaciju, kojom tvrdi da ja na dizalici primenio sve mere za bezbedan rad sa dizalicom u skladu sa zahtevima Pravilnika o bezbednosti mašina. Ovim radom naglašavaju se propisane obaveze poslodavca, odnosno uvoznika dizalica sa ciljem da se pomogne poslodavcima koji se bave nabavkom novih dizalica i licima koja rade na poslovima bezbednosti i zdravlja na radu, kako bi se primenile preventivne mere i poboljšali uslovi za bezbedan rad sa dizalicama.

Podizanje svesti o značaju bezbednosti i zdravlja na radu u obrazovno - vaspitnom sistemu kod učenika u osnovnom i srednjem obrazovanju i vaspitanju kao jedan od novih elemenata preventivnog pristupa će kod budućih poslodavaca i zaposlenih omogućiti preduzimanje odgovarajućih mera na poboljšanju uslova za bezbedan rad sa dizalicama.

6. LITERATURA

- [1] The Law on Occupational Safety and Health ("The Off. Gazette of RS", no. 101/2005 and 91/2015);
- [2] General Product Safety Directive 2001/95/EZ;
- [3] Directive 2006/42/EZ on the Safety of Machinery;
- [4] The Law on General Product Safety ("The Off. Gazette of RS", no. 41/09);
- [5] The Law on Standardization ("The Off. Gazette of RS", no. 36/09)
- [6] The Rulebook on Preventive Measures for Safe and Healthy Work while Using the Equipment for Work ("The Off. Gazette of RS", number 123/12);
- [7] The Rulebook on Machinery Safety ("The Off. Gazette of RS", number 13/10);
- [8] SRPS EN ISO 12100:2014 Safety of machinery – General principles for design – Risk estimation and risk reduction,
- [9] The Law on Technical Requirements for Products and Conformity Assessment ("The Off. Gazette of RS", no. 36/09),
- [10] The Law on Market Surveillance ("The Off. Gazette of RS", no. 92/11),
- [11] Directive of the Council 89/391/EEC on the Minimum Requirements for Safety and Health Protection in the Workplace;
- [12] The Strategy of Occupational Safety and Health in the Republic of Serbia for the Period from 2013 to 2017 ("The Off. Gazette of RS", no. 100/013)
- [13] The Law on Confirmation of the Convention of the International Labour Organization Number 187 on the Promotional Framework for Occupational Safety and Health ("The Off. Gazette of RS" 42/09),
- [14] The National Programme for Integration of the Republic of Serbia into the EU –Government of the Republic of Serbia, 2008
- [15] The Strategy for Development of Education in Serbia until 2020 ("The Off. Gazette of RS", no. 107/2012)
- [16] Kosić S., Tošić S., "Primena ergonomskih principa u cilju povećanja bezbednosti dizalica sa aspekta zahteva EU" (The Application of Ergonomic Principles for the Purpose of Increasing Crane Safety from the Aspect of EU Requirements), The Proceedings of SIE-96, The First International Symposium "Industrial Engineering" - 1996
- [17] Klarin M., "Industrijsko inženjerstvo" (Industrial Engineering) – Volume III Work Study, Belgrade, 1994

- [18] Božić, V., Kosić, S., Nikolić, B., Pravilnik o načinu i postupku procene rizika na radnom mestu i u radnoj okolini – komentar (The Rulebook on the Manner and Procedure of Risk Assessment in the Workplace and in the Working Environment - Comment), VTŠ Novi Sad, 2006
- [19] The Rulebook on Technical Norms for Cranes (The Off. Gazette of SFRY” no. 65/1991)
- [20] Ostrić D. “Dizalice” (Cranes), Faculty of Mechanical Engineering Belgrade, Belgrade 1992
- [21] Tošić S. “Transportni uređaji” (Transport Devices), Faculty of Mechanical Engineering Belgrade, Belgrade, 1992

A Contribution to the Improvement of Conditions for the Safe Operation of Cranes

Dragan Stanković^{1*}

¹ Ministry for Labour, Employment, Veteran and Social Policy, Labour Inspectorate, Labour Inspection Kraljevo, Serbia

Cranes are machines with increased hazards during operation so that employers are obliged to examine their proper functioning and perform preventive and periodic inspections and tests for the purpose of safe operation of cranes. The application of technical regulations from the field of occupational safety in the operation of cranes which provide the basis for definition and implementation of requirements for crane safety refers particularly to accomplishing safe and healthy working conditions for the operation of cranes, which should reduce injuries in the workplace and occupational diseases during the use of cranes. Hence, continuous improvement of the field of occupational safety in the operation of cranes through providing full support to the regulations in the field of machine safety, common work of employers, employees and professionals dealing with occupational safety in the operation of cranes on the improvement of this field, raising awareness in this field as well as improvement of knowledge and skills in the operation of cranes. The application and implementation of regulations defining the occupational safety in the operation of cranes considerably influences the development and improvement of the culture of prevention in the operation of cranes. A special role in raising awareness of the culture of prevention in this field should be given to the education system by increasing the level of education and expertise of employees as well as by developing students' awareness of the importance of health and occupational safety in the operation of cranes.

Keywords: crane safety, technical regulations, culture of prevention, education

1. INTRODUCTION

Occupational safety in the operation of cranes is regulated by numerous technical regulations on machine safety. This field is also treated by a lot of scientific and professional papers, studies, etc.

The legal regulations which define and prescribe the safe operation of cranes imply the interaction of a large number of different factors, which certainly depends on the case observed, such as legislation, technical knowledge, education, medicine, ergonomics, informing, research work and many other disciplines that deal with safe operation in the exploitation of cranes. Safe operation of cranes is continuously in the process of dynamic changes and improvement. Such changes are the consequence of constant changes connected with modern requirements during the use of cranes in technological processes, in production in general, as well as in other various forms of labour and social relations and understanding of the significance of social-economic consequences which may arise during the use of cranes.

The problems of safety and exploitation of cranes as well as all machines have for a long time been regulated by the Laws on Occupational Safety and national standards and their importance has been constantly rising; however, they have never been covered by separate legislation, i.e. by a special group of legal regulations.

This field has been considerably improved by adopting key regulations especially and exclusively related to machine safety and it can be freely said that it has been coordinated with the obligations required by European manufacturers of machines (cranes), which provides free market sale of cranes in the territory of Europe.

As in the meantime, due to the intensified transposition of European Union directives into various domestic laws and bylaws, numerous technical and other regulations particularly important in the system of occupational safety and health have been adopted for the purpose of providing, before all, preventive measures on machines in accordance with the Law, this paper represents the effort to objectively consider the relation of new key technical regulations in the system of safe operation of cranes.

The culture of prevention as a concept of occupational safety and health was previously investigated only within social-psychological or organizational traditions. Applied research was conducted with insufficient effects in its promotion and application at all levels of organization of work. This paper aims at drawing more attention to the importance of the culture of prevention in our society. Promotion of the principle of prevention has basically contributed to the understanding of safety culture which is, in the process of work, accepted as an important factor of organization of work, particularly regarding the appearance of causes, contents and consequences of injuries in the operation of cranes. The main document which promotes the culture of prevention in the field of occupational safety and health is the Strategy of Occupational Safety and Health in the Republic of Serbia for the period from 2013 to 2017. The Strategy is a document which comprehensively establishes the state in the field of occupational safety and health in the Republic of Serbia and measures which should be taken for its development, i.e. defines the activities, goals and directions of improvement of this field.

*Corresponding author: Labour Inspection Kraljevo, Cara Lazara 44, 36000 Kraljevo, Serbia, stankovic.gane@gmail.com

The Strategy tends to create social-economic motivation among all participants in the work processes, so that more and more business entities could actively manage occupational safety and health in order to improve the situation in this field. The new policy established by this Strategy promotes: introduction of the principle of prevention for the purpose of preventing injuries in the workplace and occupational diseases, active involvement of the occupational health service, selection of employees' representatives for occupational safety and health, including occupational safety and health in the education system (primary and secondary education), continuous education of professional and responsible persons for occupational safety and health as well as education of other persons, and promotion of the culture of prevention and examples of good practice in the field of occupational safety and health. The national preventive culture of occupational safety and health means culture in which the right to a safe and healthy work environment is respected at all levels, and employers, employees and all other subjects actively participate in providing a safe and healthy work environment through a system of defined rights, obligations and duties where the principle of prevention is given the highest priority. Education represents the basis for development and improvement of the culture of prevention.

2. APPLICATION OF PREVENTIVE MEASURES FOR SAFE AND HEALTH OPERATION OF CRANES

For the purpose of improving conditions for the safe operation of cranes within an essentially new approach to solving occupational safety and health issues it is necessary to ensure the application of preventive measures. The employer is bound, while organizing work and the work process as well as the selection of crane, to ensure preventive measures to protect the employees' lives and health and provide necessary funds for their application. According to the adopted principles of preventive approach, the employer is bound to ensure preventive measures before the employee starts work, during the work itself, as well as in every selection of another crane, which provides the highest degree of safety in the operation of cranes based on the implementation of regulations in the field of occupational safety and health, labour law, technical regulations and standards, regulations in the field of health care, industrial hygiene, health insurance, pension and disability insurance, etc. Based on the adopted principles, the employer is bound to:

- 1) assign the employee to the jobs (with the crane) where the measures of occupational safety and health have been taken;
- 2) inform the employees and their representative about the introduction of new cranes – as well as about dangers of injuries and health impairments which may occur due to their introduction, i.e. make appropriate instructions for safe operation in such cases;
- 3) maintain proper functioning of cranes and thus make sure that the employee works using only the crane for which the prescribed measures for safe

operation in accordance with its purpose have been taken;

- 4) The employer is bound to make sure that the prescribed measures for occupational safety and health have been applied on the cranes used by the employees and provide inspection of their exploitation during operation in accordance with their purpose. The manufacturer of the crane establishes the purpose of the crane during its manufacturing.

The employer is also bound to allow the employee to use the cranes only if they comply with the prescribed technical requirements, if their compliance has been evaluated according to a prescribed procedure, if they are designated in accordance with the regulations and if they are accompanied by the prescribed certificates of conformity and other prescribed documentation. The employer is bound to provide the instructions for their use and maintenance, too. Technical regulations (laws and bylaws) define the compliance of cranes with technical requirements, conformity assessment according to the prescribed procedures, designations which should be put on cranes and providing prescribed documents, as well as other technical documentation which accompanies every crane on the market.

The free flow of cranes on the international market, without unnecessary technical barriers, is achieved by the application of the Agreement on the Removal of Technical Barriers to Trade, Common Acceptance of Industrial Products and Conformity Assessment. It eliminates differences in national regulations and conformity assessment procedures, i.e. the need for multiple checking of cranes in relation to the requirements of other countries, when cranes are placed on their markets. The free flow of cranes on the European market, without unnecessary technical barriers, is accomplished by the harmonization of regulations, standards, procedures for conformity assessment of cranes and market surveillance at the European level, including the application of the mutual recognition principle in a non-harmonized area.

In the process of European integration, Serbia intensively works on the harmonization of domestic technical legislation and national standards with the European legislation and standardization. Although the manufacturers that export to the EU market can apply the requirements of the European regulations and standards directly, an important relief for businessmen is when the same regulations and standards are valid on the domestic market and available in the Serbian language. The harmonization of technical legislation and standards thus enables manufacturers to place their cranes on the domestic and foreign markets under the same conditions, which contributes to their competitiveness on the domestic and foreign markets. The application of modern standards in all phases of the process of industrial production directs manufacturers to continuous adaptation and improvement of technical and technological solutions, which encourages their innovativeness and competitiveness. A modern and efficient system of adopted laws contributes to strengthening competitive production and protection of public interests and, as such, represents the backbone of sustainable economic development.

3. HARMONIZATION OF LAWS AND BYLAWS WITH THE REQUIREMENTS OF NEW TECHNICAL REGULATIONS IN THE OPERATION OF CRANES

For the purpose of improving conditions for the safe operation of cranes, it is useful to consider several key laws and bylaws which exist as very important documents in modern providing of safe cranes on the domestic and European markets. The application of those regulations classifies our country among European developed countries and for the purpose of achieving a common goal in this field, such as providing safe cranes in production and work processes of domestic companies, it is very important to ensure full application of key regulations in this field, such as:

- 1) The Law on General Product Safety ("The Official Gazette of RS" no. 41/09), which regulates the general safety of products (cranes) placed on the market, criteria for conformity assessment of products (cranes) with general safety requirements, obligations of manufacturers and distributors, conditions and manner of informing and exchange of information regarding risks of the product (crane) for the health and safety of consumers and other users, as well as performance of supervision. The Law is applied to all products (cranes) which are considered products according to this Law, except for the products whose safety is defined by a special regulation. The fulfilment of obligations prescribed by this Law does not exclude the responsibility of the manufacturer for the damage incurred by the product (crane) with a weakness in terms of the regulations which define that responsibility. This Law is essentially harmonized with the main requirements of the General Product Safety Directive 2001/95/EZ. According to the provisions of this Law, the manufacturer is bound to place exclusively safe products on the market, and a product is considered safe if it fulfils the requirements of Serbian standards which take over the harmonized European standards adopted in order to fulfil the general safety requirement for the product (crane). The manufacturer is bound, within the scope of the activities it performs, to provide necessary information to the consumers and other users that will allow them to assess the possible risk of the product (crane) during a period of its exploitation which is determined by the manufacturer or during a reasonably predictable period of use, if such a risk is not obvious without an appropriate warning, and which will enable them to take adequate precautions against such a risk.
- 2) The Law on Technical Requirements for Products and Conformity Assessment ("The Official Gazette of RS" no. 36/09), which regulates the manner of prescribing technical requirements for products (cranes) and making technical regulations, assessment of conformity of products (cranes) with the prescribed technical requirements, obligations of the supplier of

products (cranes) and the owner of products in use, validity of foreign documents of conformity and marks of conformity, informing about technical regulations and procedures for conformity assessment and performance of supervision over the implementation of this Law and regulations brought on the basis of this Law. This Law represents the basis for transposition of European directives if the prescribing of technical requirements and implementation of procedures for the assessment of conformity of products (cranes) is not prescribed by special laws, but it also allows prescribing technical requirements in the fields in which there are no harmonized regulations at the level of the European Union. Especially, it is interesting to state that the review of activities of regular or irregular checking of fulfilment of the prescribed requirements for the safety of products (cranes) is during their life. The Law prescribes the manner of prescribing technical requirements and definitions of technical regulations.

The requirements related to the safety of cranes are prescribed by the Rulebook on Machinery Safety ("The Official Gazette of RS", number 13/10), which transposes the Directive 2006/42/EZ on the Safety of Machinery. This Rulebook prescribes important requirements for the protection of health and safety which refer to the design and production of machines as well as other requirements and conditions which must be fulfilled for their placing to the market and use-exploitation; contents of the Declaration of Crane Conformity and the Declaration of the Installation of a Partially Completed Crane; content of technical documentation; conformity assessment procedures; requirements which must be fulfilled by the conformity assessment body so that it could be nominated for conformity assessment; mark of conformity and conformity marking; etc. The Rulebook is harmonized with all principles and important requirements of the Machinery Directive 2006/42/EZ, which is in accordance with the obligations from the Stabilization and Association Agreement assumed by the Republic of Serbia, as well as with the obligations from the National Programme for Integration of the Republic of Serbia into the European Union. The obligations particularly refer to the free flow of goods and, in that context, the necessity of harmonization of technical legislation of the Republic of Serbia with the technical legislation of the European Union aiming at the removal of technical barriers to trade as one of the key elements for providing the free flow of goods and creation of a unique market. If the Rulebook on Machinery Safety is considered in the technical sense, it can be said that its primary goal is to harmonize the rules which regulate – condition the sale of machines – cranes, while at the same time it guarantees the highest level of safety possible, but it can also be rightly stated that the Rulebook actually represents an instruction intended for engineering staff which they must apply at the very beginning of crane design with the main goal to enable its placing to the market and use, which, in our conditions, means that it may change the approach to its exploitation in production.

The Rulebook prescribes a stronger and exclusive responsibility of manufacturers that the cranes placed on the market and for use must be in compliance with important requirements for the protection of health and safety of users, which is accomplished by the prescribed internal control of production, inspection of the crane type and issuing certificates about that, as well as by full quality assurance. It includes the participation of nominated bodies, as the so-called third party, in the conformity assessment, which depends on the needs and selection of manufacturers. This Rulebook prescribes:

- 1) important requirements regarding health protection and safety which refer to crane design and manufacturing, as well as other requirements and conditions which must be fulfilled for their placing to the market and for use;
- 2) the contents of the Declaration of Crane Conformity and the Declaration of the Installation of a Partially Completed Crane;
- 3) the content of technical documentation;
- 4) conformity assessment procedures;
- 5) requirements which must be fulfilled by the conformity assessment body so that it could be nominated for conformity assessment;
- 6) the mark of conformity and conformity marking;
- 7) data confidentiality and the protection clause.

According to the provisions of this Rulebook, it is considered that the crane on which the mark of conformity has been put and which is accompanied by the declaration of crane conformity is in compliance with the requirements from this Rulebook. If a certain crane is also the subject of other regulations which define other issues and which prescribe putting the mark of conformity, the mark of conformity put on it means that the crane is also in compliance with the requirements from those regulations. It is very important to note the fact that the data about the regulations taken into account during crane manufacturing are stated in the Declaration of Machine Conformity.

The crane manufacturer is bound to carry out the risk assessment or have that assessment carried out for the purpose of establishing requirements for health protection and safety which are applied for the crane. After the risk assessment, the crane is designed and manufactured in such a way that the results of this assessment are taken into account. The risk assessment procedure is performed in accordance with the principles of standard SRPS EN ISO 12100:2014 Safety of machinery – General principles for design – Risk estimation and risk reduction. The main purpose of this international standard is to provide designers with general frameworks and instructions for making decisions during crane development, which will enable them to design cranes that are safe in their prescribed operation. The concept of crane safety considers the capability of the crane to perform its foreseen function during its operating cycle, where the risk is adequately reduced. In the process of implementation of the risk assessment procedure and by reducing the risk that has occurred in the mentioned way, the manufacturer:

- 1) Determines restrictions of the crane, including the foreseen purpose of the crane and its reasonably predictable improper use;

- 2) Establishes hazards which may be caused by the crane and crane-related dangerous situations;
- 3) Assesses risks, taking into account the degree of possible injuries or health impairments and the probability of their occurrence;
- 4) Evaluates risks for the purpose of establishing whether it is necessary to reduce risks in accordance with the goals of this Rulebook;
- 5) Eliminates hazards or reduces risks connected with those hazards, by applying protective measures, primarily priorities (safety principles – elimination of risks, taking measures, instructions).

Risk assessment starts with the determination of limits – restrictions of the crane, taking into account all phases of the crane life. It means that the characteristics and performances of the crane or a series of cranes should be identified in an integrated process, together with the people, environment and products. The limits of use include the foreseen use and the improper use of the crane which can be reasonably predicted. The influences which are taken into account are as follows:

- a) different operation modes of the crane and different intervention procedures for users, including the required interventions because of the improper functioning of the crane;
- b) the use of the crane – machine by the persons identified according to the use (dominant hands), or according to the restricted physical abilities (vision or hearing impairment, size, strength, etc.);
- c) the foreseen level of training, experience or capability of users, including operators, maintenance staff, trainees and students, and the whole public;
- d) exposing other persons to crane-related hazards where they can be reasonably predicted: the persons that are sufficiently aware of certain hazards, such as operators of neighbouring cranes, the persons that are not sufficiently aware of certain hazards, but are probably sufficiently aware of the procedures for terrain safety, allowed roads, etc. such as the administrative staff; the persons that can have very little awareness of hazards in the operation of cranes or safety procedures.

By repeating the risk assessment procedure and reducing the risks that has occurred, the manufacturer:

- Determines restrictions of the crane, including the foreseen purpose of the crane and its reasonably predictable improper use;
- Establishes hazards which may be caused by the crane and crane-related dangerous situations;
- Assesses risks, taking into account the degree of possible injuries or health impairments and the probability of their occurrence;
- Evaluates risks for the purpose of establishing whether it is necessary to reduce risks in accordance with the goals of this Rulebook;

- Eliminates hazards or reduces risks connected with those hazards, by applying protective measures, primarily priorities (safety principles – elimination of risks, taking measures, instructions, etc.).

The technical documentation for the crane must be elaborated in the Serbian language, i.e. in one of the official languages of the European Union, with the corresponding translation into the Serbian language. The technical documentation covers the main construction documentation, such as:

- 1) the general description of the crane;
- 2) the assembly drawing of the crane, as well as the corresponding descriptions and explanations necessary for understanding the operation of the crane;
- 3) complete detailed drawings, with enclosed calculations, results of testing, certificates, etc. which are necessary for evaluating the compliance of the crane with important requirements regarding health and safety;
- 4) documentation on risk assessment, which visibly presents the procedure applied, including:
 - the list of important requirements regarding health and safety which are applied to that crane,
 - the description of protective measures applied for the purpose of eliminating identified hazards or for reducing risks and, when applicable, stating the remaining risks connected with the crane;
- 5) the standards applied and other technical specifications, with stating important requirements regarding health and safety covered by those standards and specifications;
- 6) all technical reports with the results of tests performed by the manufacturer or a nominated body selected by the manufacturer or its representative;
- 7) one copy of the instructions for the machine.

The crane which is in compliance with the requirements from this Rulebook is marked with the mark of conformity in the prescribed form and manner. The mark of conformity is put on the crane by the manufacturer or its representative, i.e. importer if the manufacturer or its representative has not been registered in the territory of the Republic of Serbia, in a visible place so that it can be legible and indelible, in accordance with the regulation which defines the manner of putting and using marks of conformity.

The mark of conformity “CE” (Fig. 1) consists of the stylized Latin letter mark CE. The Serbian mark of conformity consists of three capital letters A connected in such a manner as to form an equilateral triangle (3A), with the appearance and content as in Fig. 2. The size of the mark is determined according to the height of the V mark which may only have values of standard numbers rounded up to the order of magnitude R10 expressed in millimetres (mm) as per the Serbian standard SRPS A. A0.001.

Figure 1 The mark of conformity “CE”

Figure 2 The Serbian mark of conformity

The Declaration of Crane Conformity and its translations must be elaborated under the same conditions as all instructions and must be typed or written by hand, in block capital letters. The Declaration refers exclusively to the cranes in the state in which they have been placed to the market and excludes the components which are subsequently added and the operations subsequently carried out by the end user. The Declaration of Crane Conformity contains the following data:

- 1) business name, i.e. name and address of the seat of manufacturer and, when applicable, its representative;
- 2) name and address of the person authorized for elaboration of technical documentation;
- 3) description and designation of the crane, including the general name, function, model, type, serial number and trademark;
- 4) explicit stating that the crane is in accordance with all requirements of this Rulebook and, where possible, stating its conformity with other special regulations and requirements with which the crane complies.

- 5) This stating also contains the reference to the regulation applied and the number of the official gazette in which the regulation was published;
- 6) if appropriate, business name, i.e. name, address of the seat and unique identification number of the nominated body from the corresponding register in accordance with a special regulation;
- 7) if appropriate, business name, i.e. name, address of the seat and unique, i.e. identification number of the nominated body, which has verified the system of complete quality assurance;
- 8) reference to the applied Serbian standards for cranes;
- 9) if appropriate, reference to other standards and technical specifications when they are applied;
- 10) place and date of issuing the declaration;
- 11) identification and signature of the authorized person responsible for the elaboration of the Declaration of Crane Conformity for the sake of the manufacturer or its representative. The crane manufacturer or its representative keeps the original Declaration of Crane Conformity in the period of at least ten years after the date of manufacturing the last crane.

The employer is bound to provide crane operators with the instructions for safe operation of the crane. If, during the use of the crane, there are specific risks of the occurrence of injuries and health impairments of employees, the employer is bound to ensure that:

- 1) only operators can use that crane for work, and
- 2) repair, modifications which do not change the purpose, maintenance, servicing of the crane are performed by the employees assigned to those jobs.

The employer is bound to ensure that ergonomic principles are fully respected in the use of the crane.

The employer is bound to engage a legal person with the licence for performing preventive and periodic inspections and testing of cranes.

The employer is bound to provide the employees or their representatives for occupational safety and health with the information that refer to occupational safety and health, and particularly with the information about the measures taken for the purpose of accomplishing safe and healthy working conditions in the operation of cranes.

The employer is bound, during the training for safe and healthy work, to introduce the employees who are not crane operators to all types of risks which may appear in the workplace and in the working environment, and which occur during the use of cranes.

4. THE CULTURE OF PREVENTION IN THE OPERATION OF CRANES THROUGH PERMANENT EDUCATION

One of the proposals for improving conditions for the safe operation of cranes is the creation of the culture of prevention through permanent education, which covers:

- including occupational safety and health in the education system (primary and secondary education),

- continuous education (training) of professionals and persons responsible for occupational safety and health and other persons, and
- promotion of the culture of prevention and examples of good practice in the field of occupational safety and health.

The culture of prevention tends to create social-economic motivation among all participants in the process of operation of cranes so that more and more business entities actively manage the occupational safety in the operation of cranes in order to improve the situation in this field.

The culture of prevention promotes, before all: introduction of the principle of prevention in the prevention of occurrence of injuries in the workplace and occupational diseases, active involvement of the occupational health service, introduction of the principle of responsibility for the application of measures in the field of occupational safety and health in the operation of machines (cranes), etc.

The vision of the culture of prevention should be constant work on the improvement of this field through showing full support to the regulations in the field of occupational safety and health, common work of employers and employees on the improvement of this field, raising awareness in this field, improvement of knowledge and skills, i.e. establishing the occupational culture and the creation of preconditions for occupational welfare and the quality of life and occupational health.

The general goal is to improve and preserve the health of currently active population, i.e. to improve working conditions in order to prevent injuries in the workplace, occupational and work-related diseases and reduce them to the minimum, i.e. to eliminate professional risks.

All stakeholders in the system of occupational safety and health should participate in the activities of implementation and full integration of regulations in the field of occupational safety in the operation of machines (cranes), i.e. their full acceptance and use in practice.

It would create the conditions for promotion of the culture of prevention and examples of good practice in the field of occupational safety in the operation of cranes at all levels of organization of employers, employees, educational institutions, etc.

Education should be the basis for development and improvement of the culture of operation of cranes.

The education system in the Republic of Serbia should be oriented toward purposeful education for the purpose of facing the increasing challenges and creation of new quality and safe workplaces for the operation of cranes.

In the education system of the Republic of Serbia there are higher education institutions which educate students in the field of occupational safety and health in study programmes of occupational safety engineering at the level of basic academic and basic vocational studies, master academic studies, specialist academic and specialist vocational studies.

However, for the purpose of general raising of awareness of the importance of one's own health and safety, from an early age, it is necessary to include this

subject matter in both primary and secondary education so that children attending primary and secondary schools could be introduced to the need for cherishing the culture of occupational safety and health and obtain necessary knowledge in this field.

The promotion of occupational safety and health through the education system develops the occupational culture and prevention in this field.

Raising awareness of the importance of occupational safety and health through the education system means the integration of the field which deals with occupational safety and health into the field dealing with education.

It shows the need for establishing cooperation between the institutions dealing with occupational safety and health with the institutions dealing with education.

Education is one of the key factors for development and strengthening of the culture of prevention. One of the aims of raising awareness of the importance of occupational safety and health through the education system is to develop the awareness of one's own health and safety as well as of the risks in the workplace in the operation of cranes.

The manner and model of including occupational safety and health in the education system should be considered through a legal framework, through participation of all stakeholders, occupational safety and health as part of lifelong learning, safe and healthy learning and the working environment, training of teaching staff in schools (lecturers), interactive and flexible educational methods as well as direct connection with the workplace on cranes.

Inadequate educational programmes can be one of the factors influencing the situation in the field of occupational safety in the operation of cranes. Educational programmes which involve occupational safety and health represent one of the bases for improvement of this field.

Increased investment in the education system, with the efficient use of the existing resources, will enable significant modernization of teaching (laboratories, computer networks, research as part of education, exchange with foreign countries, quality working space).

It is necessary to introduce the programme of occupational safety and health into the school programme. It will cover common activities of the school, parents, i.e. guardians and local self-government units directed to development of awareness for implementation and improvement of occupational safety and health. The programmes of formal and informal education should be prescribed as well, and, among them, the programme of development and preservation of safe and healthy working conditions in the operation of cranes.

Besides formal education in the field of occupational safety and health, an important segment for the improvement of knowledge and acquiring skills should also be continuous training (theoretical and practical), which should be adapted to the conditions of everyday work and specificities of the workplace. This strategic period should result in the creation of such conditions that employers and employees, as well as other persons, could be aware of the need for continuous improvement of knowledge and skills in this field.

Occupational safety and health of the persons that will be employed in the future is connected with the level of awareness gained from an early age. Children in primary and secondary schools, particularly those in secondary vocational schools (mechanical engineering schools, civil engineering schools, etc.) should acquire basic knowledge about occupational safety and health during their schooling, which would enable them to be more prepared to start their professional career in the operation of cranes.

The possibility of including occupational safety and health in the education system is also seen in extracurricular activities, rallies, lectures, presentations, professional practice, etc.

One of the main goals should also be establishing centres for training and education in the field of occupational safety. There are a lot of such centres in Europe. Establishing such a centre will complement the system of occupational safety and health in Serbia with the obligation of permanent learning and constant additional training of all subjects dealing with safety jobs. In those centres, all stakeholders, from employers, through the persons in charge of occupational safety and health, engineers, contractors, trade unions, employee's representatives up to the media will have a necessary level of education for the purpose of improving conditions for the safe operation of cranes.

5. CONCLUSION

In accordance with the Law on Occupational Safety and Health, the employer can allow the employee to use only properly functioning cranes, i.e. those on which the prescribed measures for safe and healthy work have been applied. Also, the mentioned technical regulations prescribe the obligation of the employers to ensure that the crane, as a product, is accompanied by the prescribed technical documentation, by which they state that they have applied all measures for safe operation of the crane in accordance with the requirements from the Rulebook on Machinery Safety. This paper emphasizes the prescribed obligations of the employer, i.e. importer of cranes aiming at helping employers that deal with the purchase of new cranes and persons working on the jobs of occupational safety and health to apply preventive measures and improve conditions for the safe operation of cranes.

Raising awareness of the importance of occupational safety and health through the education system, among pupils and students in primary and secondary education, as one of new elements of the preventive approach, will enable future employers and employees to take appropriate measures in order to improve conditions for the safe operation of cranes.

REFERENCES

- [1] The Law on Occupational Safety and Health ("The Off. Gazette of RS", no. 101/2005 and 91/2015);
- [2] General Product Safety Directive 2001/95/EZ;
- [3] Directive 2006/42/EZ on the Safety of Machinery;
- [4] The Law on General Product Safety ("The Off. Gazette of RS", no. 41/09);

- [5] The Law on Standardization ("The Off. Gazette of RS", no. 36/09)
- [6] The Rulebook on Preventive Measures for Safe and Healthy Work while Using the Equipment for Work ("The Off. Gazette of RS", number 123/12);
- [7] The Rulebook on Machinery Safety ("The Off. Gazette of RS", number 13/10);
- [8] SRPS EN ISO 12100:2014 Safety of machinery – General principles for design – Risk estimation and risk reduction,
- [9] The Law on Technical Requirements for Products and Conformity Assessment ("The Off. Gazette of RS", no. 36/09),
- [10] The Law on Market Surveillance ("The Off. Gazette of RS", no. 92/11),
- [11] Directive of the Council 89/391/EEC on the Minimum Requirements for Safety and Health Protection in the Workplace;
- [12] The Strategy of Occupational Safety and Health in the Republic of Serbia for the Period from 2013 to 2017 ("The Off. Gazette of RS", no. 100/013)
- [13] The Law on Confirmation of the Convention of the International Labour Organization Number 187 on the Promotional Framework for Occupational Safety and Health ("The Off. Gazette of RS" 42/09),
- [14] The National Programme for Integration of the Republic of Serbia into the EU –Government of the Republic of Serbia, 2008
- [15] The Strategy for Development of Education in Serbia until 2020 ("The Off. Gazette of RS", no. 107/2012)
- [16] Kosić S., Tošić S., "Primena ergonomskih principa u cilju povećanja bezbednosti dizalica sa aspekta zahteva EU" (The Application of Ergonomic Principles for the Purpose of Increasing Crane Safety from the Aspect of EU Requirements), The Proceedings of SIE-96, The First International Symposium "Industrial Engineering" - 1996
- [17] Klarin M., "Industrijsko inženjerstvo" (Industrial Engineering) – Volume III Work Study, Belgrade, 1994
- [18] Božić, V., Kosić, S., Nikolić, B., Pravilnik o načinu i postupku procene rizika na radnom mestu i u radnoj okolini – komentar (The Rulebook on the Manner and Procedure of Risk Assessment in the Workplace and in the Working Environment - Comment), VTŠ Novi Sad, 2006
- [19] The Rulebook on Technical Norms for Cranes (The Off. Gazette of SFRY" no. 65/1991)
- [20] Ostrić D. "Dizalice" (Cranes), Faculty of Mechanical Engineering Belgrade, Belgrade 1992
- [21] Tošić S. "Transportni uređaji" (Transport Devices), Faculty of Mechanical Engineering Belgrade, Belgrade, 1992