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К РЕШЕНИЮ ДИНАМИЧЕСКИХ ЗАДАЧ НЕЛИНЕЙНОЙ ТЕОРИИ ВЯЗКОУПРУГИХ СПЛОШНЫХ СРЕД

Негматиллаев Б.

*Негматиллаев Баходира - кандидат технических наук,
Бухарский инженерно – технологический институт,
г. Бухара, Республика Узбекистан*

Аннотация: *в статье приводятся основные соотношения динамической теории вязко упругости. При этом реологические свойства сплошной среды рассматриваются в линейной и нелинейной постановке, вводятся соотношения между напряжениями и деформациями с учётом вязкоупругих свойств среды.*

Ключевые слова: *вязкоупругая сплошная среда, тензоры напряжения и деформации, ядра интегральных операторов, шаровой тензор.*

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Следуя работам [2, 3, 4] рассмотрим напряженно - деформированное состояние сплошной среды в упругой и вязкоупругой постановках.

Под влиянием сил, приложенных к сплошному деформируемому телу, во взаимном расположении его частиц происходят изменения, т.е. деформируемое тело изменяет свою форму и объем. Простейший пример такого тела - сжатый или растянутый стержень.

Для математического описания процесса деформации твердого тела используется та или иная система координат. Например, в декартовой системе координат $x_1 = x$, $x_2 = y$, $x_3 = z$ положение каждой точки тела определяется радиусом-вектором \vec{r} с компонентами (x_1, x_2, x_3) , После деформации положение точки определяется другим вектором \vec{r}' с координатами (x_1', x_2', x_3') .

Вектор $\vec{u} = \vec{r}' - \vec{r}$ определяет вектор перемещения точки тела, причем координаты (x_1', x_2', x_3') являются функциями первоначальных координат точки (x_1, x_2, x_3) . Следовательно, вектор перемещения также есть функция координат (x_1, x_2, x_3) .

Рассмотрим какие-либо две близкие точки с радиусом-вектором между ними (dx_1, dx_2, dx_3) и расстоянием $dl = \sqrt{dx_1^2 + dx_2^2 + dx_3^2}$. После деформации тела расстояние между точками меняется и становится равным, $dl' = \sqrt{(dx_1^l)^2 + (dx_2^l)^2 + (dx_3^l)^2}$ где $dx_j^l = dx_j + du_j$, u_j -координаты вектора перемещения.

Записав коротко $dl^2 = (dx_j)^2$; $(dl')^2 = (dx_j^l)^2$ и подставив $du_j = \frac{\partial u_j}{\partial x_k} dx_k$, получим $(dl')^2 = dl^2 + 2 \frac{\partial u_j}{\partial x_k} dx_k + \frac{\partial u_j}{\partial x_k} \frac{\partial u_i}{\partial x_i} dx_k dx_i$. После элементарных преобразований имеем

$$(dl^l)^2 = (dl)^2 + 2\gamma_{jk} dx_j dx_k; \quad \gamma_{jj} = \varepsilon_{jj}; \quad \gamma_{jk} = \frac{1}{2} \varepsilon_{jk},$$

где

$$\gamma_{jk} = \frac{1}{2} \left(\frac{\partial u_j}{\partial x_k} + \frac{\partial u_k}{\partial x_j} + \frac{\partial u_n}{\partial x_k} \frac{\partial u_n}{\partial x_j} \right) \quad (1.1)$$

Так как в дальнейшем рассмотрим лишь малые деформации, то в (1.1) произведениями производных от перемещений по координатам будем пренебрегать и положим

$$\varepsilon_{jj} = \frac{\partial u_j}{\partial x_j}; \quad \varepsilon_{jk} = \frac{\partial u_j}{\partial x_k} + \frac{\partial u_k}{\partial x_j}; \quad j \neq k \quad (1.2)$$

Малые деформации, определяемые по формулам (1.2), образуют тензор деформации

$$D = \begin{pmatrix} \varepsilon_{11} & \frac{1}{2} \varepsilon_{12} & \frac{1}{2} \varepsilon_{13} \\ \frac{1}{2} \varepsilon_{21} & \varepsilon_{22} & \frac{1}{2} \varepsilon_{23} \\ \frac{1}{2} \varepsilon_{31} & \frac{1}{2} \varepsilon_{32} & \varepsilon_{33} \end{pmatrix}; \quad \varepsilon_{jk} = \varepsilon_{kj}, \quad (1.3)$$

который имеет три независимых инварианта:

$$\begin{aligned} J_1 &= \varepsilon_{11} + \varepsilon_{22} + \varepsilon_{33}; \quad J_3 = |\partial|; \\ J_2 &= \varepsilon_{11}\varepsilon_{22} + \varepsilon_{11}\varepsilon_{33} + \varepsilon_{22}\varepsilon_{33} - \frac{1}{4}(\varepsilon_{12}^2 + \varepsilon_{13}^2 + \varepsilon_{23}^2) \end{aligned} \quad (1.4)$$

Инвариант J_1 называется объемным расширением.

Можно ввести также три главных удлинения $\varepsilon_1, \varepsilon_2, \varepsilon_3$, и тогда инварианты

$$J_1 = \varepsilon_1 + \varepsilon_2 + \varepsilon_3; \quad J_2 = \varepsilon_1\varepsilon_2 + \varepsilon_1\varepsilon_3 + \varepsilon_2\varepsilon_3; \quad J_3 = \varepsilon_1\varepsilon_2\varepsilon_3$$

При этом удлинения $\varepsilon_1, \varepsilon_2, \varepsilon_3$, являются корнями кубического уравнения

$$\varepsilon^3 - J_1\varepsilon^2 + J_2\varepsilon - J_3 = 0.$$

Через главные удлинения вводится среднее удлинение

$$\varepsilon_0 = \frac{1}{3}(\varepsilon_{11} + \varepsilon_{22} + \varepsilon_{33}) = \frac{1}{3}J_1;$$

и соответствующий шаровой тензор

$$D_0 = \frac{1}{3}J_1E = \varepsilon_0E = \begin{pmatrix} \varepsilon_0 & 0 & 0 \\ 0 & \varepsilon_0 & 0 \\ 0 & 0 & \varepsilon_0 \end{pmatrix}. \quad (1.5)$$

Разность между тензорами (1.3) и (1.5) называется девиаторным тензором деформации

$$D' = D - D_0; \quad D' = \begin{pmatrix} \varepsilon_{11} - \varepsilon_0 & \frac{1}{2}\varepsilon_{12} & \frac{1}{2}\varepsilon_{13} \\ \frac{1}{2}\varepsilon_{21} & \varepsilon_{22} - \varepsilon_0 & \frac{1}{2}\varepsilon_{23} \\ \frac{1}{2}\varepsilon_{31} & \frac{1}{2}\varepsilon_{32} & \varepsilon_{33} - \varepsilon_0 \end{pmatrix}, \quad (1.6)$$

в котором также можно ввести главные удлинения $\varepsilon_1^l = \varepsilon_1 - \varepsilon_0$; $\varepsilon_2^l = \varepsilon_2 - \varepsilon_0$; $\varepsilon_3^l = \varepsilon_3 - \varepsilon_0$; $\varepsilon_1^l + \varepsilon_2^l + \varepsilon_3^l = 0$, т.е. девиатор D' определяет деформации без объемного расширения или деформацию формоизменения.

Важное значение в теории деформации имеет понятие интенсивности деформации сдвига

$$\begin{aligned} \psi_0^2 &= \frac{2}{\sqrt{3}} \left[\frac{2}{3}(\varepsilon_{11}^2 + \varepsilon_{22}^2 + \varepsilon_{33}^2 - \varepsilon_{11}\varepsilon_{22} + \varepsilon_{11}\varepsilon_{33} + \varepsilon_{22}\varepsilon_{33}) \right. \\ &\quad \left. + \frac{1}{2}(\varepsilon_{12}^2 + \varepsilon_{13}^2 + \varepsilon_{23}^2) \right]. \end{aligned} \quad (1.7)$$

В частности, деформации (1.2) в цилиндрических координатах равны

$$\begin{aligned} \varepsilon_{rr} &= \frac{\partial u_r}{\partial r}; & \varepsilon_{\theta\theta} &= \frac{1}{r} \frac{\partial u_\theta}{\partial \theta} + \frac{u_r}{r}; & \varepsilon_{zz} &= \frac{\partial u_z}{\partial z}; \\ \varepsilon_{\theta z} &= \frac{\partial u_\theta}{\partial z} + \frac{\partial u_z}{\partial \theta}; & \varepsilon_{rz} &= \frac{\partial u_r}{\partial z} + \frac{\partial u_z}{\partial r}; & \varepsilon_{r\theta} &= \frac{1}{r} \frac{\partial u_r}{\partial \theta} + \frac{\partial u_\theta}{\partial r} + \frac{u_\theta}{r}. \end{aligned} \quad (1.8)$$

Для описания напряженного состояния сплошного тела рассмотрим произвольную точку M внутри тела и всевозможные площадки $d\sigma$ в этой точке. На данную площадку со стороны среда действует сила, которую обозначим через $d\vec{P}$. Положим

$$d\vec{P} = \vec{P}_n d\sigma, \quad (1.9)$$

где \vec{P}_n - конечный вектор; \vec{n} - нормаль к площадке $d\sigma$.

Разлагая силу \vec{P}_n на составляющие по нормали \vec{n} и по касательной $\vec{\tau}$ к площадке $d\sigma$ получаем

$$\vec{P}_n = \sigma_{nn} \vec{n} + \sigma_{n\tau} \vec{\tau}. \quad (1.10)$$

Здесь σ_{nn} нормальные напряжения; $\sigma_{n\tau}$ - касательные или тангенциальные напряжения.

Так как через точку M можно провести бесконечное число площадок $d\sigma$ то существует бесконечно много сил \vec{P}_n соответствующих этим площадкам. Однако среди данных сил имеются лишь три линейно независимые, а остальные могут быть выражены через них. В качестве независимых рассмотрим силы, действующие по площадкам, перпендикуляр ним выбранной ортогональной системе координат, т.е. перпендикулярным осям этой системы координат. Указанные силы как три независимых вектора образуют тензор напряжения

$$T = \begin{pmatrix} \sigma_{xx} & \sigma_{xy} & \sigma_{xz} \\ \sigma_{yx} & \sigma_{yy} & \sigma_{yz} \\ \sigma_{zx} & \sigma_{zy} & \sigma_{zz} \end{pmatrix}, \quad (I.II)$$

причем он считается симметричным, так как предполагается, что выполним закон парности касательных деформаций $\sigma_{ij} = \sigma_{ji}$.

Для тензора деформации (I.П) можно ввести понятие главных напряжений $\sigma_1, \sigma_2, \sigma_3$ и инвариантов [2, 4]:

$$S_1 = \sigma_{xx} + \sigma_{yy} + \sigma_{zz}$$

$$S_3 = |T|$$

$$S_2 = \sigma_{xx}\sigma_{yy} + \sigma_{xx}\sigma_{zz} + \sigma_{zz}\sigma_{yy} - \sigma_{xy}^2 - \sigma_{xz}^2 - \sigma_{yz}^2$$

Главные напряжения - корни кубического уравнения

$$\sigma^3 - S_1\sigma^2 + S_2\sigma - S_3 = 0$$

Вводя среднее напряжение $\sigma_0 = \frac{1}{3}S_1$ тензор (I.П) можно разбить на две составляющие

$$T = T_0 + T'$$

где T_0 - шаровой тензор или тензор гидростатического напряжения; T' - девиаторный тензор:

$$T_0 = \begin{pmatrix} \sigma_0 & 0 & 0 \\ 0 & \sigma_0 & 0 \\ 0 & 0 & \sigma_0 \end{pmatrix} \quad T' = \begin{pmatrix} \sigma_{xx} - \sigma_0 & \sigma_{xy} & \sigma_{xz} \\ \sigma_{yx} & \sigma_{yy} - \sigma_0 & \sigma_{yz} \\ \sigma_{zx} & \sigma_{zy} & \sigma_{zz} - \sigma_0 \end{pmatrix} \quad (1.12)$$

При исследовании напряженного состояния в теле важное значение имеет понятие интенсивности касательных напряжений

$$\tau_0^2 = \sqrt{\frac{2}{3} \left[\frac{1}{3} (\sigma_{xx}^2 + \sigma_{yy}^2 + \sigma_{zz}^2 + \sigma_{xx}\sigma_{yy} + \sigma_{xx}\sigma_{zz} + \sigma_{zz}\sigma_{yy}) + \sigma_{xy}^2 + \sigma_{xz}^2 + \sigma_{yz}^2 \right]}$$

Введенные в вышеизложенном понятия и величины полностью характеризуют напряженно-деформированное состояние сплошного тела в любой точке в случае малых деформаций. Зная свойства введенных величин, определяющих напряженно-деформированное состояние тела, сформулируем законы, связывающие эти величины, для упругого и вязкоупругого тела при малых деформациях.

Приведем нелинейный закон зависимости $\sigma_{ij} \sim \varepsilon_{ij}$ для упругого изотропного тела в форме, изложенной в монографии [2].

Вначале представим линейный закон зависимости $\sigma_{ij} \sim \varepsilon_{ij}$ в форме

$$\sigma_0 = 3K\varepsilon_0 \quad T' = 2GD' \quad (1.13)$$

где K , G - модули соответственно объемного сжатия и сдвига, которые с постоянными Ламе λ, μ , связаны зависимостями

$$K = \lambda + \frac{2}{3}\mu; \quad G = \mu \quad (1.14)$$

Нелинейный закон зависимости $\sigma_{ij} \sim \varepsilon_{ij}$ для малых деформаций запишем таким образом, чтобы он в пределе для бесконечно малых деформаций переходил в закон Гука (1.13).

Рассмотрим удельную работу деформации

$$A = \int_0^D (\sigma_{xx} d\varepsilon_{xx} + \sigma_{yy} d\varepsilon_{yy} + \sigma_{zz} d\varepsilon_{zz} + \sigma_{xy} d\varepsilon_{xy} + \sigma_{xz} d\varepsilon_{xz}). \quad (1.15)$$

Здесь интегрирование ведется от состояния, при котором все компоненты деформации равны нулю, до того состояния, при котором они представляются тензором D .

Если положить $\sigma_{xx} = \sigma_{xx}^l + \sigma_0, \dots$ и учесть, что $\sigma_{xx}^l + \sigma_{yy}^l + \sigma_{zz}^l = 0, \quad d\varepsilon_{xx}^l + d\varepsilon_{yy}^l + d\varepsilon_{zz}^l = 0$ то получим

$$A(x, y, z) = A_0(x, y, z) + A'(x, y, z),$$

где

$$A_0 = 3 \int_0^D \sigma_0 d\varepsilon_0 \quad (1.16)$$

означает работу изменения объема, а

$$A'(x, y, z) = \int_0^D (\sigma'_{xx} d\varepsilon'_{xx} + \sigma'_{yy} d\varepsilon'_{yy} + \sigma'_{zz} d\varepsilon'_{zz} + \sigma_{xy} d\varepsilon_{xy} + \sigma_{xz} d\varepsilon_{xz}). \quad (1.17)$$

- работу изменения формы.

Для вывода нелинейной зависимости $\sigma_{ij} \sim \varepsilon_{ij}$ необходимо выполнение следующих условий [2]:

- удельная работа деформации A должна быть однозначной функцией компонент тензора деформации D ;

- материал тела должен быть однородным и изотропным;

- как и в законе Гука, шаровой тензор напряжения T_0 должен зависеть лишь от шарового тензора деформации D_0 , а девиатор тензора напряжений T' - от девиатора тензора

деформации D'

- для бесконечно малых деформаций устанавливаемый закон должен по форме совпадать с законом Гука (1.13).

Исходя из того, что указанные условия должны выполняться, для удельной работы A получаем выражение [2].

$$A = A_0(\varepsilon_0) + A'(\psi_0^2, J_3^I), \quad (1.18)$$

где J_3^I - третий инвариант девиатора тензора деформаций.

Как показано в работе [2], величина A' от инварианта не должна зависеть, и тогда нелинейный закон зависимости $\sigma_{ij} \sim \varepsilon_{ij}$ имеет вид

$$\sigma_0 = 3K\varepsilon_0\kappa_0(\varepsilon_0); \quad T' = 2G\gamma(\psi_0^2)D' \quad (1.19)$$

Здесь κ_0, γ - функции соответственно удлинения и сдвига, которые через составляющие удельной работы деформации выражаются формулами

$$\kappa_0(\varepsilon_0) = \frac{1}{9K\varepsilon_0} \frac{dA_0}{d\varepsilon_0}; \quad \gamma(\psi_0^2) = \frac{4}{3G} \frac{dA'}{d\psi_0^2}; \quad (1.20)$$

Из закона (1.19) для отдельных компонент тензора напряжений получим зависимости

$$\begin{aligned} \sigma_{jj} &= 3K\varepsilon_0\kappa_0(\varepsilon_0) + 2G(\varepsilon_{jj} - \varepsilon_0)\gamma(\psi_0^2) \\ \sigma_{ij} &= G\varepsilon_{ij}\gamma(\psi_0^2); \quad i \neq j; \quad i, j = x, y, z \end{aligned} \quad (1.21)$$

В дальнейшем функции удлинения и сдвига удобнее выражать как и тогда (1.21) принимает вид

$$\begin{aligned} \kappa_0(\varepsilon_0) &= 1 + f_0(\varepsilon_0); \quad \gamma(\psi_0^2) = 1 + f_1(\psi_0^2); \quad f_j(0) \\ &= 0 \end{aligned} \quad (1.22)$$

И тогда (1.21) принимает вид

$$\begin{aligned} \sigma_{jj} &= 3K\varepsilon_0[1 + f_0(\varepsilon_0)] + 2G(\varepsilon_{jj} - \varepsilon_0)[1 + f_1(\psi_0^2)] \\ \sigma_{ij} &= G\varepsilon_{ij}[1 + f_1(\psi_0^2)]; \quad i \neq j \end{aligned} \quad (1.23)$$

В силу того, что закон (1.23) должен быть одинаковым как при нагружении, так и при разгрузке, то функция $f_0(\varepsilon_0)$

должна быть чет. ной по ε_0 , а $f_1(\psi_0^2)$ зависеть лишь от ψ_0^2 . В частности, разлагая эти функции в степенной ряд, имеем

$$f_0(\varepsilon_0) = \sum_{n=0}^{\infty} \alpha_n \varepsilon_0^{2(n+1)} ; \quad f_0(\psi_0^2) = \sum_{n=0}^{\infty} \gamma_n \psi_0^{2(n+1)} \quad (1.24)$$

Обобщим нелинейный закон (1.21) на случай вязкоупругого тела [5].

Линейная теория вязко упругости основана на эффекте памяти, т.е. линейной интегральной зависимости напряжений от деформаций. Тогда для линейного вязкоупругого тела

$$\sigma_{00} = 3KR_0\varepsilon_0; \quad T' = 2GR(D') \quad (1.25)$$

где R_0 и R - линейные интегральные операторы типа вольтеровских:

$$R_0(\zeta) = \zeta(t) - \int_0^t F_{10}(t - \xi)\zeta(\xi)d\xi;$$

$$R_0(\zeta) = \zeta(t) - \int_0^t F_{20}(t - \xi)\zeta(\xi)d\xi \quad (1.26)$$

$F_{j0}(t)$ – ядра этих операторов.

Как и при выводе (1.21), для удельной работы деформации A можно получить представление

$$A = A_0 + A' \quad (1.27)$$

Для обобщения закона (1.21) на случай вязкоупругого тела формулируем ряд условий:

- удельная работа деформации A должна быть однозначной функцией истории деформирования от его начала до текущего момента времени t ;

- материал вязкоупругого тела должен быть однороден и изотропен;

- девиатор тензора напряжений T' должен зависеть лишь от истории изменения девиатора D' , а среднее напряжение σ_0 - лишь от истории изменения средней деформации ε_0 ;

- для бесконечно малых деформаций нелинейный закон зависимости $\sigma_{ij} \sim \varepsilon_{ij}$ в пределе должен переходить в закон (1.25).

Исходя из указанных условий для удельной работы деформации A получаем представление

$$A(x, y, z) = P_0(J_1) + P_1(\psi_0^2) \quad (1.28)$$

где P_0 и P_1 - нелинейные функционалы.

Имея представление (1.28), обобщенный закон (1.19) для вязкоупругого тела выражаем зависимостями

$$\sigma_0 = 3KR_0[\Gamma_0(\varepsilon_0)\varepsilon_0]; \quad T' = 2GR[\Gamma_0(\psi_0^2)D'] \quad (1.29,$$

Здесь

$$R_0[\Gamma_0(\varepsilon_0)\varepsilon_0] = \frac{1}{9K} \frac{dP_0}{d\varepsilon_0}; \quad R[\Gamma_0(\psi_0^2)D'] = \frac{4}{3G} \frac{dP_1}{d\psi_0^2} D'.$$

Исходя из постулата изотропии, предполагаем, что нелинейные функционалы Γ_0, Γ имеют производные по Фреше [1] любого порядка в нуле, и при этом должны выполняться условия $\Gamma_0(o) = \Gamma(o) = I$. Следовательно, операторы или функционалы Γ_0, Γ можно разложить в ряды

$$\Gamma_0(\varepsilon_0) = 1 + \sum_{n=1}^{\infty} K_n(\varepsilon_0^n); \quad \Gamma_0(\psi_0^2) = 1 + \sum_{n=1}^{\infty} G_n(\psi_0^{2n}); \quad (1.30)$$

где

$$K_n(\varepsilon_0^n) = \alpha_n \left[\varepsilon_0^{2n}(t) - \int_0^t \dots \int_0^t F_{1n}(t - \xi_1, \dots, t - \xi_n) \times \varepsilon_0^2(\xi_1) \dots \varepsilon_0^2(\xi_n) d\xi_1, \dots, d\xi_n \right];$$

$$G_n(\psi_0^{2n}) = \gamma_n \left[\psi_0^{2n}(t) - \int_0^t \dots \int_0^t F_{1n}(t - \xi_1, \dots, t - \xi_n) \times \psi_0^2(\xi_1) \dots \psi_0^2(\xi_n) d\xi_1, \dots, d\xi_n \right]$$

(1.31)

$F_{jn} - n$ - мерные ядра интегральных операторов K_n и G_n .

Для компонент напряжений закон (1.29) можно записать в виде

$$\sigma_{jj} = 3KR_0[\Gamma_0(\varepsilon_0)\varepsilon_0] + 2GR[\Gamma(\psi_0^2)(\varepsilon_{jj} - \varepsilon_0)]$$

$$\sigma_{ij} = G[\Gamma(\psi_0^2)\varepsilon_{jj}]; \quad i \neq j; \quad i, j = x, y, z \quad (1.32)$$

Выражения (1.32) являются нелинейными зависимостями между σ_{ij} , ε_{ij} для изотропного вязкоупругого тела при малых деформациях.

Список литературы

1. *Ильюшин А.А., Победря Б.Е.* Основы математической теории термо вязко упругости М. Наука, 1970. 280 с.
2. *Каудерер Г.* Нелинейная механика М.ИЛ. 1961.778с.
3. *Ляв А.* Математическая теория упругости. М.: Л.:ОНТИ 1935. 674 с.
4. *Новожилов В.В.* Основы нелинейной теории упругости М. Гостехиздат 1998. 212 с.
5. *Филиппов И.Г.* К нелинейной теории вязкоупругих изотропных сред. Прикл. механика. 1983. Т 19, №3 с. 3-8.
6. *M.Sh. Akhmedov, Zh. Namozov, B. Eshpulatov, B.B. Negmatullayev, F.B. Jalolov.* Natural oscillations of three-layered viscoelastic flat spherical shells. AIP Conf. Proc. 2969, 050025 (2024). <https://doi.org/10.1063/5.0187770>.
7. *Teshaev M., Axmedov M., Ruziyeva M., Sobirova R., Axmedov S.* Propagation of purely shear viscose-elastic waves with allowance for the of particle rotation in a flat layer. E3S Web of Conferences.2023, 414, 06009.

FEATURES OF METHODS USED IN DIGITAL MAPPING

Khodzalyev D.¹, Sukhanov D.², Ovezov E.³, Ishanov M.⁴

¹*Khodzalyev Dovlet -student,*

²*Sukhanov Dayanch - student,*

³*Ovezov Emirkhan - student,*

⁴*Ishanov Maksat - senior lecturer,*

*TURKMEN STATE ARCHITECTURE AND CONSTRUCTION
INSTITUTE*

ASHGABAT, TURKMENISTAN

Abstract: *the features of the main methods used in digital mapping are shown. The positive aspects of raster systems are*

indicated. We come to the conclusion that vector structures very well represent the positions of objects in space on individual layers of a digital map.

Keywords: *digital mapping, digital map layer, raster method, vector structures.*

There are two main methods used in digital mapping. The first method uses quantization, or the division of space into many elements, each of which represents a small but well-defined part of the earth's surface. This raster method can use elements of any geometric shape, provided that they can be connected to form a continuous surface representing the entire space of the study area. Although many raster element shapes are possible, such as triangular or hexagonal, it is usually easier to use rectangles, or even better, squares called cells.

Consider models in which all cells are the same size and represent the same amount of geographic space as any other. Raster data structures do not provide precise location information because geographic space is divided into discrete cells of a finite size. Instead of exact coordinates of points, there are individual raster cells in which these points are located. This is another form of changing spatial dimensionality. Lines, that is, one-dimensional objects, are depicted as chains of connected cells. Each line point is represented by a raster cell, and each line point must be somewhere inside one of the raster cells. In raster systems, there are two ways to include attribute information about features [1, 2].

The simplest is to assign an attribute value to each raster cell. When distributing these values, the positions of the attribute values play the role of the locations of the objects. For example, if the number 10 represents the water surface, which is recorded in the upper left cell of the raster, then by default this cell is also the area of the earth's surface that represents water. Thus, each cell on a given map is assigned only one attribute value. An alternative approach, actually an extension of what was just described, is to associate each raster cell with a database. This approach is

becoming increasingly prevalent as it reduces the amount of data stored and can provide connectivity to other data structures.

Raster data structures lack precise location information. However, raster structures also have many advantages over others. In particular, they are relatively easy to understand as a method of representing space. For example, television uses the same raster representation of images as a set of dots (pixels). Another great characteristic of raster systems is that many functions, especially those related to surface operations and overlays, can easily be built on this type of data structure. Among the main disadvantages of the raster data structure is the problem of low spatial accuracy, which reduces the reliability of measuring areas and distances, and the need for a large amount of memory due to the fact that each raster cell is stored as a separate numerical value [3, 4].

The second method used in digital mapping, called vector, allows you to explicitly specify precise spatial coordinates. The implication here is that geographic space is continuous rather than divided into discrete cells. This is achieved by assigning to points a pair of coordinates (X and Y) of the coordinate space, to lines - a connected sequence of pairs of coordinates of their vertices, to areas - a closed sequence of connected lines, the starting and ending points of which coincide. The vector data structure shows only the geometry of map objects. To give it the usefulness of a map, we associate geometric data with corresponding attribute data stored in a separate file or database. In a raster structure, the attribute value is specified in each cell. In vector data structures, a line consists of two or more pairs of coordinates; for one segment, two pairs of coordinates are sufficient, giving the position and orientation in space.

More complex lines consist of a number of segments, each of which begins and ends with a pair of coordinates. This shows that although vector data structures are better at representing the positions of objects in space, they are not completely accurate. They are still an approximate representation of geographic space. Although some lines exist independently and have certain attribute information, other, more complex sets of lines, called

networks, also contain additional information about the spatial relationships of these lines. For example, a road network not only contains information about the type of road and the like, it also shows the possible direction of travel. Other codes linking these segments may include information about the nodes that connect them. All of these additional attributes must be defined throughout the network in order for the computer to know the inherent relationships that the network is modeling. This information about connectivity and spatial relationships is called topology.

Before we can use data structures, models, and systems, we need to transform our reality into a computer-understandable form. The methods by which this is done will depend on the equipment available and the specific system. First, the input subsystem is designed to transfer graphical and attribute data to the computer. Secondly, it must comply with at least one of the two fundamental methods of representing graphic objects - raster or vector. Third, it must be linked to a storage and editing system to ensure that what is entered is stored and retrievable and to allow errors to be corrected and changes to be made as needed. It is first necessary to determine what type of GIS, vector or raster, will be used, and whether the GIS will be capable of converting these data types into one another [5].

Area objects can be represented in a vector data structure similar to linear ones. By connecting line segments into a closed loop, in which the first pair of coordinates of the first segment is simultaneously the last pair of coordinates of the last segment, an area or polygon is created. Both points and lines and polygons are associated with a file containing the attributes of these objects. While raster and vector data structures provide a means of displaying individual spatial phenomena on individual maps, there is still a need to develop more complex approaches, called data models, to incorporate feature relationships into the database, link features and their attributes, and enable collaborative analysis several map layers.

References

1. Жуков А.В. Моделирование информационных систем с использованием теории перколяции // Academy. 2017. № 7 (22).
2. Майкл де Мерс. Географические информационные системы. Москва. 2000.
3. Тикунов В.С. Геоинформатика. Москва. 2005.
4. Атаев Р. Теоретические основы использования картографических проекций при создании электронных карт // Актуальные исследования. 2023. № 46 (176).
5. Жеруков Т.Б. Географические информационные системы в аспекте оценки окружающей действительности // NovaInfo. 2016. № 57.

POTENTIAL OPPORTUNITIES FOR DEVELOPMENT OF THE CONSTRUCTION INDUSTRY OF TURKMENISTAN

**Byashimov A.¹, Goshzhanov K.², Gummiyeva G.³,
Orazova A.⁴**

¹Byashimov Annageldi - senior lecturer,

²Goshzhanov Khangeldi - student,

³Gummiyeva Gulyalek - student,

⁴Orazova Aytach - student,

*TURKMEN STATE ARCHITECTURE AND CONSTRUCTION
INSTITUTE
ASHGABAT, TURKMENISTAN*

Abstract: *the current state of the construction industry of Turkmenistan is shown. The significant role of private entrepreneurship in the development of the production of building materials is indicated.*

Keywords: *construction industry, domestic building materials, imports substitution.*

In the modern period, large plants and factories, schools, kindergartens, hospitals, luxury residential building complexes,

livestock and poultry complexes, and greenhouse farms are being built at an accelerated pace in independent and neutral Turkmenistan. The construction of infrastructure facilities, roads and railways, gas pipelines and power lines, and communication systems is being carried out on a large scale. It should be especially noted that every year the number of private firms - members of the Union of Industrialists and Entrepreneurs, involved in large-scale development projects in cities and villages of Turkmenistan is growing. By actively participating in the implementation of comprehensive transformation programs, representatives of private domestic construction organizations make a significant contribution to strengthening the economic power of our state. Considerable attention is paid to such important aspects as increasing competitiveness and expanding the range of products of the construction industry, strengthening its production and scientific and technical potential, and introducing effective forms of management.

Objects being built throughout the country, organically combining the original national traditions of architecture and modern trends in global urban planning, indicate that the domestic construction industry is keeping up with the times, taking into account the best world experience [1, 2].

In accordance with the requirements, only high-quality materials are used in the construction and finishing of objects. When selecting them, the climatic conditions of our country, compliance with environmental standards, national design features, durability and ease of use must be taken into account. All this predetermined the need for the comprehensive development of the domestic construction industry, expanding the production base of building materials from local raw materials.

Currently, the country is successfully solving problems related to the modernization of the construction industry, the creation of new capacities for the production of building materials and new jobs, increasing the volume of production of import-substituting and export-oriented goods, expanding their range, and introducing innovative technologies into production [3]. To fully meet the needs within the country, industry enterprises have launched the

production of a wide variety of products, including wall panels and reinforced blocks, characterized by strength, seismic resistance and improved performance characteristics. The production of facing slabs, cement, bricks, expanded clay, non-metallic building materials, metal structures, prefabricated reinforced concrete products. A lot of work is being done aimed at the technical and economic stabilization of existing production facilities, their modernization and reconstruction, and the overhaul of outdated enterprises. In various regions of the country, active geological surveys are being carried out to identify new mineral deposits necessary to expand the industry's raw material base.

The effectiveness of these works directly serves to increase the potential of the production complex, increase the range of high-quality building materials and other industrial products that are in demand in the country and abroad. One of the strategically important segments of the national industrial complex is cement production. Currently, cement plants subordinate to the Ministry, based on innovative technologies, produce Portland cement of various brands that meets international standards. The “Türkmen aýna önümleri” enterprise produces a variety of products that meet high international standards. Here, based on float technology, thermopolished tempered transparent and colored glass is produced. In addition, the company produces dozens of types of containers of various capacities for household and medical purposes. This enterprise serves as an example of the successful implementation of programs to expand the range of import-substituting products and increase its export potential [4, 5]. The “Demirbetonönümleri”, “Demirbetonkonstruksiya”, aerated concrete and Yashlyk expanded clay plants produce wall materials, prefabricated reinforced concrete and large-panel structures, facing and roofing slabs, curbs, lighting poles, expanded clay and many other building materials. The Ministry of Industry and Construction Production, together with the business company “Aýdyň gijeler”, has begun producing various types of LED lamps that not only save energy, but are also durable and environmentally friendly.

The business company “Aýdyň gijeler” has launched the production of electronic information boards, educational computers for primary school students and televisions of various sizes. Non-metallic materials (crushed stone, crushed enriched sand, sand and gravel mixture) produced by quarry departments and farms of the Ministry of Industry and Construction Production are widely used in construction work. Finishing materials are produced by the closed joint stock company “Türkmenmermer”. Using modern equipment from the world's leading manufacturers, they produce architectural decorative elements, slabs for cladding columns, and enclosing borders.

The “Polimer önümleri” plant produces equipment used in the installation of various-sized pipes and wires, as well as elastic products widely used in the national economy, disposable food containers and other polymer products. The blocks of the plant for the production of aerated concrete are environmentally friendly products that have a number of advantages, in particular, they are 3-4 times lighter than ordinary bricks, which reduce the specific weight of the structure and, as a result, increases its seismic resistance.

Thus, the wide scope of construction of industrial and social facilities, the emergence of new industrial giants and high-tech enterprises, and the active development of the natural resources of the Turkmen land indicate the significant role assigned to the construction and industrial sector in the successful implementation of a large-scale transformation strategy for the sustainable development of the manufacturing sector of our country.

References

1. *Мамметдурдыев Э., Мерданов С. Особенности внедрения инноваций в дорожном строительстве Туркменистана // Символ науки.2023. № 3-2.*

2. *Машырыков Э., Оразов А., Овезова А., Бегмурадова Б.* Возможности производства инновационных строительных материалов в Туркменистане // Вестник науки. 2024. № 2 (71). Выпуск 3.
3. *Mamenov Y., Amansahedov B.* Fine-grained high-strength concrete on enriched dune sand // Construction and architecture of Turkmenistan. 2023. № 4 (36).
4. *Morozov M.S., Korolkov V.G.* The microwave energy in the manufacture of bricks // Наука, техника и образование. 2017. №3 (33).
5. *Гулиев А.А.* Устойчивое развитие экономики через экспорторасширение и импортозамещение // Вестник науки и образования. 2020. №21 (99). Часть 3.

CURRENT STATE AND PROSPECTS FOR THE DEVELOPMENT OF BRIDGE CONSTRUCTION IN TURKMENISTAN

Charyeva S.¹, Marlyev P.², Merdanov A.³, Nurberdyev S.⁴

¹*Charyeva Saadat - senior lecturer,*

²*Marlyev Pena - student,*

³*Merdanov Azat- student,*

⁴*Nurberdyev Selim- student,*

*TURKMEN STATE ARCHITECTURE AND CONSTRUCTION
INSTITUTE*

ASHGABAT, TURKMENISTAN

Abstract: *the current state of affairs in the field of construction of bridge structures in Turkmenistan is shown. A conclusion is made about the prospects for further work on the introduction of innovative technologies in relation to domestic bridge construction.*

Keywords: *transport industry, bridge structures, modern technologies.*

The total length of highways in Turkmenistan is more than 14,000 kilometers. Highways in our country are both being built

and reconstructed, where modern bridge structures are also being built. The Turkmenavtoyollary State Concern is doing a lot of work in this direction. Thus, about 30 bridges were built on the Turkmenbashi-Ashgabat highway. 12 bridges were built on the Ashgabat-Mary highway, and 62 bridges were put into operation on the section from Archman to Turkmenbashi.

The transport infrastructure of the Turkmen capital is actively developing. The key object of the city's transport infrastructure is the International Airport, the original appearance of which has become the new calling card of Ashgabat. The International Passenger Auto Terminal is located in the northern part of the city, and the future highway to Turkmenbashi, 562 kilometers long, will also run. The width of its road with 6 lanes is 34.5 meters. In total, 12 overpasses and 217 reinforced concrete bridges will be built along the route. The potential of the developing multimodal transport system of Turkmenistan is high. The Ashgabat-Karakum-Dashoguz railway, about 600 kilometers long, runs north of the capital through the Karakum desert and a highway runs parallel to it.

The implementation of large transport projects makes reality the idea of diversifying and optimizing the transport system on the Eurasian continent, which will involve more and more new geographical spaces, economic and production centers. This will inevitably entail an increase in business activity, an influx of large investments, and the creation of jobs.

In independent and neutral Turkmenistan, the Turkmenabat-Farab railway and road bridges were put into operation, which are key elements of the country's transport infrastructure, reviving the Great Silk Road in a new quality. Thus, the territory of Central Asia is step by step becoming one of the most important transport and transit crossroads of the continent [1, 2].

This railway bridge has a length of 1750 meters. This is a category I overpass with a width of about 6 meters, built using the most advanced technologies in the field of global bridge construction, adapted to the conditions of the Amu Darya with its strong current and other "whims". Designs of increased seismic resistance and operational strength were used, designed for super-

heavy freight trains. The underbridge navigation clearance is 10 meters in height and 60 meters in width. The bridge spans are supported by 18 reinforced concrete supports, of which 16 are built at various water depths and 2 supports are located on the banks of the river.

Reinforced concrete piles with a diameter of about two meters each, made of monolithic high-quality concrete and durable reinforcement structures, evenly distribute the load on the supports, which entered the ground from the bottom of the river more than 40 meters deep. To protect against abrasion by sediments within the river bed, the piles are located inside glass-polyester pipes, the total length of which was about 7,000 meters. Crossbars are installed in the upper part of the supports. Over 500 thousand cubic meters of high-quality concrete were used to construct bored piles with a total length of about 18,000 meters and supports for the railway bridge.

A full range of technological operations was carried out for anti-corrosion protection of supports and spans, straightening and balancing of the upper structure of the tracks, including at the approaches to the bridge, which in total amount to about 2 kilometers. The latest alarm, communication and broadcasting systems, fire water supply, and air duct have been installed. An operational area for maintenance personnel of a unique engineering structure was built. In addition, a large complex of concrete bank protection works was carried out on both banks of the Amu Darya within the radius of the railway bridge [3].

The length of the road bridge is 1600 meters; it was built downstream of the river, 450 meters from the railway. The most modern designs and advanced technologies that have no analogues in the Central Asian region were used here. The design of the road bridge takes into account such operational and technical characteristics as: load capacity, speed, use of all high-strength structures, high seismic resistance. The bridge is designed to withstand earthquakes measuring 9 on the Richter scale. A large complex of scientific and survey, geophysical, geological, engineering, technical and construction work was carried out with high quality. Using bored technology, 17

powerful supports were built from high-quality concrete and reinforcement. Powerful foundations for multi-ton steel bridge structures are based on the supports. The roadway of the bridge, consisting of four lanes, is 21.5 meters wide.

To ensure the safe movement of vehicles at the approaches to the bridge, ramped road junctions with a length of 6 kilometers have been made, which will allow cars entering and leaving the side tracks to change the direction of movement without entering the oncoming lane. On both sides of the bridge there are pedestrian paths with metal fences 1.5 meters. The road surface of the bridge consists of a cutting-edge polymer material called matacryl, which is characterized by high strength, durability, resistance to ultraviolet radiation and, at the same time, thin layers and low weight compared to asphalt concrete.

A significant factor is that it will be possible to access the left bank side of the road bridge not only from Turkmenabat, but also along a new wide highway laid from the nearby Serdarabat etrap. Transit heavy trucks will travel along this road, without entering the administrative center and without congesting city streets, to the new Turkmenabat-Farab road bridge. The highest requirements for the quality of construction and operational parameters are typical for all such facilities in Turkmenistan, where large-scale programs are being implemented to develop all types of transport communications, including road transport, and a huge amount of work is being done to develop road infrastructure.

In a short period of time - 2009-2016, only in Lebap velayat, ultra-modern road bridges Atamurat-Kerkichi, Seydi-Eljik, the Atamurat-Kerkichi railway bridge, and the interstate railway Atamurat-Imamnazar-Akina with a length of 88 kilometers were put into operation across the full-flowing Amudarya River. The development of the transport infrastructure of Lebap velayat is associated with the industrial diversification of this region, one of the points of industrial growth of which is the Garlyk mining and processing plant.

References

1. *Ablayeva U.Sh.* Technological methods for improving the durability of concrete in a dry hot climate of Uzbekistan // Вестник науки и образования. 2020. № 21 (99). Часть 3.
2. *Покровская О.Д., Ёлдашов З.Н., Марченко М.А., Шевердова М.В.* Транспортно-логистическая система Туркменистана // Известия Петербургского университета путей сообщения. - СПб.: 2022. Т. 19. Вып. 2.
3. *Ýalkabow P., Nurmatmedow S.* Gurluşyk we ýol gurluşyk maşynlaryny awtomatlaşdyrmak - Aşgabat: 2010. (In Turkmen).

ВЗГЛЯД НА YOLOV5 ДЛЯ РАСПОЗНАВАНИЯ ОБЪЕКТОВ

Зейнетдинов Б.Г.

*Зейнетдинов Бауыржан Габдулхакимович - магистр,
кафедра «Автоматизации производственных процессов»,
Карагандинский технический университет
имени Абылкаса Сагинова,
г. Караганда, Республика Казахстан*

***Аннотация:** статья описывает архитектуру для распознавания объектов на изображениях. В работе представлены методология, использованные наборы данных, точность модели и ее применимость в реальных условиях. Процесс обучения нейросети и валидация проведены на собранном наборе данных с применением передовых технологий. Результаты демонстрируют высокую точность модели и ее успешное применение в различных сценариях. Работа является важным вкладом в область компьютерного зрения, расширяя перспективы использования нейросетевых моделей в задачах распознавания объектов на изображениях.*

***Ключевые слова:** нейросеть, система автоматического распознавания, детектинг, архитектура YOLOv5.*

В современном обществе проблема курения и его негативного влияния на здоровье становится все более актуальной. Для эффективного контроля и мониторинга данной проблемы необходимо иметь эффективные методы и инструменты для определения наличия сигарет. В рамках научной стажировки было разработано определение сигареты с использованием передовой технологии нейросетей - YOLOv5.

YOLOv5 - это мощная архитектура нейросети, основанная на глубоком обучении, которая позволяет обнаруживать и классифицировать объекты на изображениях с высокой точностью и скоростью. В рамках данной стажировки, исследовательская команда предприняла попытку применить YOLOv5 для разработки системы определения сигарет на изображениях.

Целью данной работы было создание эффективного инструмента, способного автоматически обнаруживать наличие сигарет на изображениях. Это имеет большое значение для проведения контроля курения в различных общественных местах, улучшения безопасности и содействия приверженности здоровому образу жизни.

Методы на основе сетей преобразований (Transform-based Networks) являются эффективными методами обнаружения объектов на изображениях. Они включают в себя различные архитектуры нейронных сетей, разработанные специально для задачи обнаружения объектов.

Одним из самых известных методов на основе сетей преобразований является алгоритм R-CNN (Region-based Convolutional Neural Network). R-CNN разбивает задачу обнаружения объектов на два этапа: выделение регионов, содержащих объекты, и классификацию этих регионов. Сначала R-CNN применяет алгоритмы сегментации, такие как Selective Search или EdgeBoxes, чтобы получить предварительные пропозалы регионов. Затем каждый регион

обрабатывается независимо с помощью сверточной нейронной сети для извлечения признаков, а затем классифицируется с использованием классификатора, такого как SVM. Однако R-CNN является вычислительно затратным и медленным методом из-за необходимости обрабатывать каждый регион независимо.

Дальнейшее развитие R-CNN привело к появлению более быстрых алгоритмов, таких как Fast R-CNN и Faster R-CNN. Fast R-CNN вместо обработки каждого региона работает с целым изображением, используя предварительно выделенные регионы. Он применяет сверточную нейронную сеть ко всему изображению для извлечения признаков, а затем использует RoI Pooling для выделения признаков из предварительно выделенных регионов. Faster R-CNN вводит дополнительный модуль Region Proposal Network (RPN), который позволяет генерировать предварительные пропозалы регионов прямо на основе признаков, полученных от сверточной нейронной сети [1].

Семейство YOLO (You Only Look Once) также является одним из популярных методов на основе сетей преобразований. YOLO архитектура, включая YOLOv2, YOLOv3, YOLOv4 и YOLOv5, использует одну нейронную сеть для прогнозирования рамок объектов и их классификации. YOLO разбивает изображение на сетку ячеек и каждая ячейка предсказывает несколько прямоугольных рамок и соответствующие вероятности классов объектов. YOLO обладает высокой скоростью работы и хорошей точностью, что делает его привлекательным методом для реального времени обнаружения объектов[2].

Методы на основе сетей преобразований позволяют автоматически извлекать признаки из изображений и обнаруживать объекты в эффективном и точном режиме. Они продолжают активно развиваться и улучшаться с использованием новых архитектур и техник обучения.

Методология

В данной статье был выбран метод Yolov5 из за нескольких причин.

Во-первых, метод YOLOv5 представляет собой современную архитектуру сети преобразований, которая продолжает развитие и улучшение предыдущих версий YOLO. Он имеет ряд оптимизаций, которые делают его более быстрым и точным в сравнении с предыдущими версиями.

Во-вторых, YOLOv5 обладает гибкостью и способностью обнаруживать объекты различных размеров и форм. Он может эффективно работать с маленькими и большими объектами на изображении

В-третьих, YOLOv5 имеет открытый и активно развивающийся исходный код, что позволяет исследователям настраивать и адаптировать его под конкретные требования исследования.

Разработка

В ходе научной стажировки было разработано определение сигареты с помощью нейросети YOLOv5.

Для тренировки нейросети, используемой в методе YOLOv5, требуются наборы данных, состоящие из изображений и соответствующих координат объектов, которые необходимо обнаружить. В данном случае, набор данных разделен на две основные папки: "images" и "labels".

В папке "images" содержатся изображения, на которых присутствуют объекты, которые нужно обнаружить. Эти изображения могут быть в формате JPEG, PNG или любом другом поддерживаемом формате изображений. Каждое изображение представляет собой пример сцены или ситуации, где находится объект, в данном случае - сигарета.

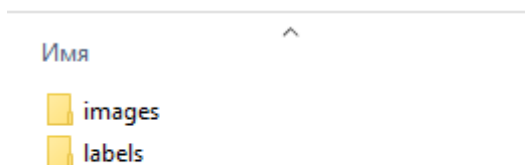


Рис. 1. Папка с данными.

В папке "labels" содержатся файлы с координатами объектов на изображениях. Обычно эти файлы имеют текстовый формат, такой как TXT или CSV. Каждый файл с координатами соответствует изображению из папки "images" и содержит информацию о положении объектов на изображении.

Каждая из основных папок "images" и "labels" дополнительно содержит две подпапки: "train" и "val". Подпапка "train" содержит обучающие данные, которые используются для тренировки нейросети. Эти данные составляют основу для обучения модели и помогают ей научиться обнаруживать объекты на изображениях. Подпапка "val" содержит данные для валидации модели, то есть для оценки ее производительности и точности на независимых данных, которые модель ранее не видела.



Рис. 2. Папка Images/Labels.

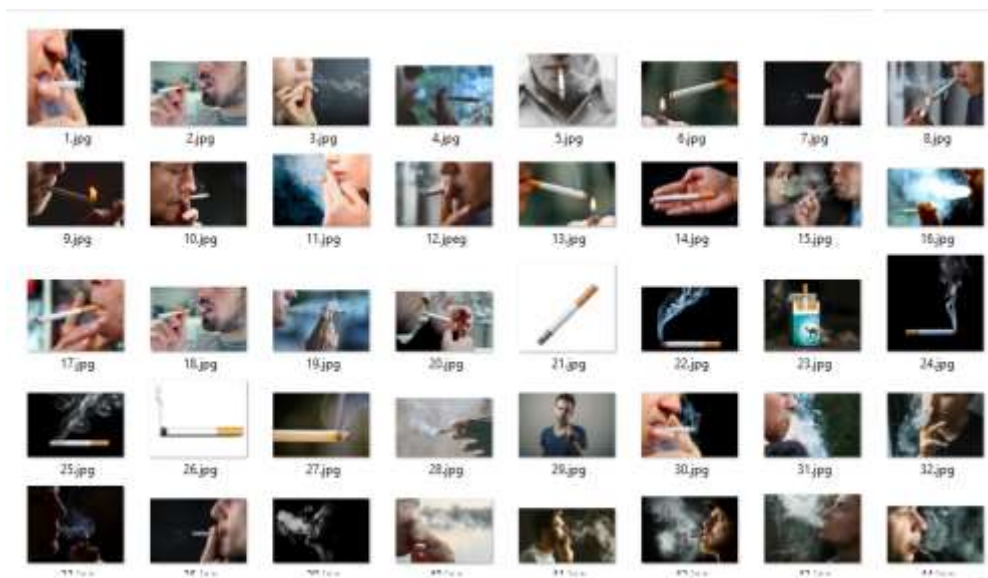


Рис. 3. Набор данных.

Для тренировки нейросети было использовано 45 картинок(train). Для теста нейросети 30 картинок(val).

Для того чтобы начать тренировку нейросети предмет определения маркируется. Можно воспользоваться сайтом makesense.io или приложением [labelimg](https://labelimg.com).



Рис. 4. Маркировка предмета.

Переходим на сайт github.com/ultralytics/yolov5 и нажимаем open in colab.

Скачиваем библиотеку на созданное пространство. Google Colab предоставляет нам бесплатное аппаратное обеспечение на своих серверах.

Помещаем папку с изображениями на пространство и указываем адрес в файле `Coco128.yaml` который лежит по директории `yolov5/data`

```
train: content/train_data/images/train # train images (relative to 'path') 128 images
```

```
val: content/train_data/images/val
```

```
и внизу указываем класс
```

```
# Classes
```

```
names:
```


0: cigarette

Потом запускается код

```
!python train.py --img 640 --batch 16 --epochs 100 --data  
coco128.yaml --weights yolov5s.pt --cache
```

--img: размер входного изображения для тренировки (по умолчанию 640)

--batch: размер пакета (batch size) для тренировки (по умолчанию 16)

--epochs: количество эпох тренировки (чем больше, тем лучше результат)

--data: путь к файлу конфигурации данных (сейчас coco128.yaml)

--weights: путь к предварительно обученным весам YOLOv5 (например, yolov5s.pt, можно подключить и свои веса).

В результате после 200 эпох нейросеть научилась определять сигарету.



Рис. 5. Результат определения по картинке.

Заключение

В ходе экспериментов и оценки производительности модели YOLOv5 при определении сигареты были получены

следующие результаты. Средний процент определения сигареты составил 50-55%. Отмечается, что наилучший процент определения был достигнут в случае, когда сигарета не была прикурена.

Однако, при наличии ситуаций, когда сигарета была прикурена или присутствовал дым, процент определения снизился. Когда сигарета была прикурена, процент определения составил около 30%. При этом, чем больше сигарета была скурена (более половины), тем ниже точность определения.

Наличие дыма также оказало негативное влияние на процент определения сигареты. В присутствии дыма точность определения также снизилась до около 30%.

Для дальнейшего улучшения процента определения сигареты в различных ситуациях, можно рассмотреть возможности дополнительного обучения модели на большем и разнообразном наборе данных, включая изображения с прикуренными сигаретами и наличием дыма.

В будущем Модель YOLOv5 может быть интегрирована с системой видеонаблюдения, используя видеокамеры для непрерывного мониторинга окружающей обстановки. Это позволит системе обнаруживать сигареты в реальном времени и предотвращать возможные пожары или нарушения правил в определенных зонах.

Список литературы

1. R. Girshick, J. Donahue, T. Darrell, and J. Malik. / «Rich feature hierarchies for accurate object detection and semantic segmentation», 2014.-2 с.
2. Гленн Й. Сергей В. Ultralytics YOLOv5 Архитектура. [Электронный ресурс]. 2023 URL: http://docs.ultralytics.com/ru/yolov5/tutorials/architecture_description/#44-build-targets (Дата обращения: 26.02.2024).

PECULIARITIES OF TEACHING CHINESE HIEROGLYPHS

Charyyev M.B.

*Charyyev Maksat Begenchovich - graduate student,
TURKMEN NATIONAL INSTITUTE OF WORLD LANGUAGES
NAMED AFTER. DOVLETMAMMET AZADI,
ASHGABAT, TURKMENISTAN*

Abstract: *this article explores the intricacies and challenges of learning the Chinese language, particularly for foreigners. It delves into the complexity of Chinese characters, the phonetic nuances of tones, and the unique features of the Chinese writing system. Additionally, the article discusses the historical context of efforts to facilitate Chinese language learning, such as the creation of a phonetic alphabet and hieroglyph simplification. Furthermore, it highlights the limitations of traditional foreign language teaching methods in the context of Chinese learning and emphasizes the need for innovative approaches to address these challenges.*

Keywords: *chinese language, hieroglyphs, tones, simplified, traditional.*

The Chinese language has over 400 different types of syllable words. These words are said in different tones, and thus their number reaches 1000. In Chinese, the same sound can have up to 40 different meanings for a word. The Chinese alphabet consists of more than 50,000 characters, of which 5-8 thousand are in active use. Learning the hieroglyphs is a key step in learning Chinese [1, p. 147].

In the 60s of the last century, the government of the People's Republic of China, with the advice of scientists, decided to prepare a special project so that foreigners could learn Chinese easily and quickly. In 1958, at the 5th session of the 1st National People's Congress of China, a phonetic alphabet for reading hieroglyphs was created based on Latin letters, and the writing of hieroglyphs was simplified, that is, the number of hieroglyphs

was reduced and lines were simplified so that hieroglyphs could be written quickly and easily, so that they would be easy to remember [1, p. 151].

The number of hieroglyphs used in spoken language is more than 3500, and a separate hieroglyph is used for each morpheme in the word. Chinese has 36 vowels (syllabic consonants) and 21 consonants (initial consonants) [2, p. 12].

Today, only simplified hieroglyphs are used in traditional writing, while full hieroglyphs are used in printing ancient literary sources.

Foreigners face some challenges when learning Chinese. It is not advisable to use traditional foreign language teaching methods when teaching Chinese. Because those methods are effective in teaching alphabetic languages. But they cannot be used because of the existence of Chinese hieroglyphs and symbols.

First, the hieroglyphic images do not represent the phonetic pronunciation of the word. Therefore, while teaching Chinese writing, reading, writing, and speaking skills cannot be developed at the same time. If it is required to learn hieroglyphic writing along with spoken language, it is not easy for Chinese language learners to master the pronunciation of the sounds.

There are several ways to teach hieroglyphs. Some linguists reiterate that learning hieroglyphs depends on being able to decipher their keys. But when teaching hieroglyphs, it is effective to use the simple to difficult principle.

Second, Chinese characters are composed of a certain number of similar components, which are arranged in a certain pattern. The Chinese writing system has a single component system.

Third, Chinese characters perform a word-forming service. The word is formed from hieroglyphs. In other words, each hieroglyph represents a separate word.

If Chinese learners know the meaning of the hieroglyph, they can read the word. Therefore, the more hieroglyphs are studied, the more words can be learned. One of the first prerequisites for learning Chinese is to memorize a large number of characters.

In the first stage of Chinese language learning, it is suitable for students to study in two areas: written and spoken.

Using the transcription of Chinese characters in conversation lessons helps to master the writing of characters and quickly learn to speak Chinese.

Teaching Chinese characters requires special methods and techniques. First, students need to be introduced to the formation of hieroglyphs. Second, only after mastering a large number of hieroglyphs students can they develop reading and writing skills. However, according to some scholars, since a lot of time is spent on learning hieroglyphics, it is not considered advisable to postpone learning the formation of writing and reading skills.

The emergence of different views on the methods and types of teaching Chinese writing has led to many studies on the methodology of teaching Chinese hieroglyphs. Therefore, multifaceted approaches to this problem have emerged. But most of them were devoted to teaching Chinese children to write [3]. Because they are intended for native speakers of Chinese, that is, those who can understand and speak them, they cannot be used for those learning Chinese as a foreign language.

It should be noted that writing hieroglyphs correctly is the same as writing the letters of the Turkmen alphabet correctly. In elementary school, the alphabet is taught first. It shows where the letters should start and how they should end. In the Workbooks, the writing of the letters is marked with lines and is taught to the student by writing it on his own hand. The same is true in Chinese. For example: When the word 水shuǐ (shuwei) is written in hieroglyphs, first the common straight line is written, then the part on the left, then the part on the right. There are three lines in total. Each hieroglyph must be written correctly. Lines must be correctly counted.

In dictionaries, hieroglyphs can often be found by line. If the line of hieroglyphs is long or short, the required hieroglyph cannot be found. Correctly counting the lines of hieroglyphs is the main demand for their correct writing.

In addition, as a result of scientific and technical progress, interactive methods, innovative technologies, new programs, electronic and multimedia devices appeared. Appropriate use of

such methods, types and resources makes the learning process more effective.

In the modern methodology, there are several types of interactive methods of teaching languages: discussion, case method, question-answer method, project method, "good job", dilemma, systematization and others [3]. They help language learners to develop their logical thinking, activate their speaking skills, teach them to justify their ideas, and encourage them to find solutions to problems. This gives them emotional motivation for further research, and inspires them to do certain things. Thus, interactive methods allow students to think creatively, approach the problem in a unique way and solve it independently; ensures that he expresses his point of view in a justified manner; it develops the skills of tolerance, politeness, kindness, listening to the opinions of others, and cooperation with them.

Interactive methods are also very important in teaching Chinese hieroglyphs. Their appropriate use helps students master Chinese hieroglyphs. As mentioned above, Chinese language learners should first have an understanding of the formation of hieroglyphs. Then a teacher has to teach how the hieroglyphs are formed.

For example:

In ancient times, the Chinese ☉ is considered the DAY. Then this hieroglyph was gradually simplified so that it could be written beautifully and easily, and it was transformed into the shape of 日, that is, it changed from a circle shape to a rectangle, and the circle point became a line.

Reference

1. Sun, Chaofen. Chinese: A Linguistic Introduction. Cambridge University Press, 2006. 147-159 p.
2. Yip, Po-Ching; Rimmington, Don. Chinese: A Comprehensive Grammar. Routledge, 2004. 10-14 p.
3. [Electronic Resource]. URL: www.zdic.net

WORDS BORROWED FROM ARABIC IN THE POEMS OF MAKHTUMKULI FRAGI

Kakadzhikov H.

*Kakadzhikov Khalnazar – graduate student,
TURKMEN NATIONAL INSTITUTE OF WORLD LANGUAGES
NAMED AFTER. DOVLETMAMMET AZADI,
ASHGABAT, TURKMENISTAN*

Abstract: *the article examines the historical influence of the Arabic language on the development of the modern Turkmen language. The Turkmen language has a long history and its development has been influenced by other languages over time. The article highlights that although Magtymguly used many Arabic-Persian words, most of them were already integrated into the Turkmen language, some served specific purposes such as expressing religious concepts and enhancing artistic expression, and others served specific poetic functions.*

Keywords: *Magtymguly, poetry, Arabic words, borrowings.*

Our national language, which is one of the ancient languages, has experienced a very long historical period and events until it acquired the form of the modern Turkmen language. During that period, some languages had a positive effect on the enrichment and development of the Turkmen language. One of the languages that influenced the improvement of the Turkmen language and the enrichment of its scientific and artistic value in the past is the Arabic language. The favourable influence of these two languages on each other is due to long historical circumstances [3].

Turkmen-Arab relations go back to the middle of the 7th century. With the arrival of the Arabs to Central Asia, including Turkmenistan, new concepts, philosophical ideas, and terms appeared [4, p. 288]. From those times, Turkmen-Arab literary and scientific relations began to develop. For a while, Arabic was considered the language of science. Then famous Turkmen scientists, writers, historians, poets, and medical doctors began to write their works in Arabic, as Magtymguly Pyragy said, "You gave the cart a good language." This also has a certain influence

on the scientific, literary and conversational language of the people. After that, in works written in Turkmen language, many Arabic-Persian words, which have already become Turkmen, begin to be used in accordance with the internal norms of the Turkmen language. This has led to the transfer of several words from Arabic to Turkmen or from Turkmen to Arabic. This is proved by the matching Arabic-Persian words in the poems of our classical poets, including Magtymguly.

Magtymguly, who knew the Turkmen language very well, used Arabic-Persian words in his poems in the following ways:

First, Magtymguly used original Arabic words in his poems, he used Turkmenized Arabic words that had already become Turkmen.

Second, to make Magtymguly's poems more effective, he also used many names of people whose names appear in various legends.

Third, Magtymguly had to use in his poems the names of places other than Turkmenistan that passed through the Arabic language in order to express some legends, events or religious concepts.

Fourth, Magtymguly used in his poems words, concepts and terms that previously had no meaning in the Turkmen language and corresponded in the Arabic language. These are mainly words and expressions that convey religious concepts.

Fifth, the poet made extensive use of Arabic-Persian words, which perform an artistic service, in order to avoid repetition of one word in his poems, and to make his poems more artistic, sweeter, and colourful. These include similes, comparisons, superlatives, etc.

Sixth, the poet also used some Arabic-Persian words that perform the function of rhyme in his poems:

Seventh, there was a time when the poet used some Arabic-Persian words to keep the number of syllables correct in his poems.

As it turns out, the sage used most of the Arabic-Persian words used in his poems because they were already absorbed into the Turkmen language, that is, they were Turkmenized, some of them

were used to express religious terms, names of people and places that did not fit in the Turkmen language, and some of them were more artistic in his poems, to make it more juicy, more colourful, and some for rhyme or syllabic matches.

Reference

1. Magtymguly. Goşgular. – Aşgabat, 2008.
2. Magtymguly. Saýlanan eserler. Iki tomluk. – Aşgabat, 1983.
3. Азимов П., Амансарыев Дж., Сарыев К. Туркменский язык // Языки народов СССР, т. II. М., 1966.
4. Грунина Э.А. Туркменский язык. — М.: Восточная литература, 2005. — 288 с.

ИСКОВОЕ ПРОИЗВОДСТВО КАК ВИД ГРАЖДАНСКОГО СУДОПРОИЗВОДСТВА

Хакимова Г.И.

*Хакимова Гульназ Ильнуровна – студент, бакалавриат,
факультет Юриспруденция,
Казанский филиал Российский государственный
университет правосудия,
г. Казань*

***Аннотация:** в научной статье рассматривается и анализируется такой вид гражданского судопроизводства, как исковое производство. Оно характеризуется наличием спора о праве, возбуждается путем подачи искового заявления, сторонами являются истец и ответчик. Исковое производство позволяет в полной мере реализовать, в отличие от других видов гражданского судопроизводства, такой принцип гражданского судопроизводства, как состязательность сторон, обеспечить законность и правопорядок при разрешении и рассмотрении гражданских дел.*

***Ключевые слова:** исковое производство, спор о праве, состязательность.*

УДК 347.9

Основным и наиболее распространенным видом гражданского судопроизводства является исковое производство, исходя из статистики Судебного департамента Верховного суда РФ: «гражданские дела искового производства составили 97,2 %, или 3,2 тыс. дел, от общего числа оконченных производством гражданских дел (3,3 тыс.)» [1].

«Деятельность суда по разрешению вопроса о применении мер гражданско-правового принуждения и по рассмотрению правовых споров в своей совокупности составляет исковое производство» [2]. Основным признаком данного

производства является наличие спора о праве при активной реализации принципа состязательности сторон. Как пишет Шилов П.И., «урегулирование споров о праве представляет собой самостоятельную форму правовой защиты, суть которой заключается в совместных действиях спорящих сторон по ликвидации возникшего конфликта» [3].

Сторонами в исковом производстве выступают истец и ответчик. Исковое производство возбуждается путем подачи искового заявления в суд.

Стоит отметить, что даже несмотря на появившиеся упрощенные виды гражданского судопроизводства, наиболее распространенным на практике является именно исковое производство, так как оно наиболее полным образом позволяет реализовать права сторон, их защиту. Несомненными преимуществами являются наличие различных направлений обеспечения действий законности и правопорядка искового производства, чего не скажешь про унифицированные процессы в гражданском судопроизводстве [4].

Подытожим, что исковое производство часто используется на практике и в полной мере реализует принцип состязательности сторон в гражданском процессе.

Список литературы

1. Обзор судебной статистики о деятельности федеральных судов общей юрисдикции и мировых судей в 2022 году // Судебный департамент Верховного суда РФ URL: http://www.cdep.ru/userimages/Obzor_sudebnoy_statistiki_SO_YU_2022_na_sayt_SD.pdf (Дата обращения: 18.03.2024).
2. *Солдатова О.Е.* Юрисдикционный процесс как вид юридического процесса // Проблемы науки №5 (23), 2014 - С. 62.
3. *Шилов П.И.* Институт медиации как способ разрешения судебных споров // European science, 2015, № 6(7) – С. 43.
4. *Восканян М.Р.* Этапы развития упрощенного производства в гражданском судопроизводстве // Проблемы науки №6 (30), 2018 - С. 81.

ОСОБЕННОСТИ УПРОЩЕННОГО ПРОИЗВОДСТВА КАК УНИКАЛЬНОГО ВИДА ИСКОВОГО ПРОИЗВОДСТВА

Хакимова Г.И.

*Хакимова Гульназ Ильнуровна – студент, бакалавриат,
факультет Юриспруденция,
Казанский филиал Российский государственный
университет правосудия,
г. Казань*

***Аннотация:** в научной статье рассматривается и анализируется упрощенное производство как подвид искового производства. Упрощенное производство является уникальным в виду того, что в арбитражном и административном судопроизводстве такой вид процесса не выделяется. Также оно характеризуется наличием спора о праве, согласием сторон на проведение ускоренного процесса должно быть очевидным. Гражданский процессуальный кодекс РФ предъявляет определенные требования к иску, чтобы дело могло быть рассмотрено в порядке искового производства.*

***Ключевые слова:** упрощенное производство, исковое производство, спор о праве, иск.*

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Исковое производство представляет собой «деятельность суда по разрешению вопроса о применении мер гражданско-правового принуждения и по рассмотрению правовых» [1]. Разновидностью искового производства является упрощенное производство.

«Упрощенное производство в нашей стране появилось лишь в 1891 году и применялось к бесспорным требованиям о взыскании определенной денежной суммы по письменным обязательствам» [2].

Итак, упрощенное производство в гражданском процессе – это несамостоятельный вид искового процесса, в ходе которого принимается решение без вызова сторон на основании доказательств, представленных сторонами в установленные судом сроки. В ГПК РФ прописан порядок упрощенного производства: дела рассматриваются по общим правилам искового производства с особенностями главы, регулирующий упрощенный порядок; при участии иностранных граждан в деле применяются дополнительно особенности 5 главы указанного кодекса; определен срок рассмотрения и разрешения дела - до истечения двух месяцев со дня поступления заявления в суд.

Основанием для рассмотрения дела в упрощенном производстве является определение о принятии искового заявления к производству. В ст. 232.2 указан перечень дел, которые рассматриваются в порядке упрощенного производства. Например, требование к цене иска о взыскании денежных средств - она не должна превышать 100 тыс. руб. для районных судов и 50 тыс. руб. для мировых судей.

Согласие сторон на рассмотрение дела в порядке упрощенного производства должно быть очевидным, например, следовать из письменного либо зафиксированного в протоколе заявления сторон.

Таким образом, упрощенное производство, являясь подвидом искового, не исключает наличие спора о праве в отличие от особого и приказного судопроизводства, также является уникальным видом, так как в арбитражном и административном процессе данный вид не был выделен.

Список литературы

1. *Солдатова О.Е.* Юрисдикционный процесс как вид юридического процесса // Проблемы науки №5 (23), 2014 - С. 62.
2. *Восканян М.Р.* Этапы развития упрощенного производства в гражданском судопроизводстве // Проблемы науки №6 (30), 2018 - С. 81.

ИННОВАЦИОННАЯ ДЕЯТЕЛЬНОСТЬ КАК ВИД ПРЕДПРИНИМАТЕЛЬСТВА

Ханжина О.А.

*Ханжина Ольга Александровна - студент магистратуры,
Высшая школа права, Российский экономический
университет Г.В. Плеханова,
г. Москва*

Аннотация: данная статья структурирована на исследовании концепта предпринимательства и выявления его видов относительно конкурентных преимуществ, по средствам реализаций инноваций. На основании скорости эксплуатации инновационного новаторства удалось провести анализ относительно дифференциации типов нововведений и определить базовые основы. Анализируя комплексность зарубежных источников, отождествленных углублением в малое предпринимательство определить структурно-динамичную составляющую потенциала рыночных инноваций. Значимость работы определена многочисленными результатами исследований, конкретизирующих необходимость процесса совершенствования предприятий в качестве сохранения конкурентоспособности в сфере рыночной активности, благодаря чему должно происходить повышение качества товаров повышенного спроса и широкого потребления.

Ключевые слова: предпринимательство, инновации, рынок, предприятие, стратегии, производство, конкуренция.

УДК 340.13

Углубляясь в теорию процесса возникновения и развития предпринимательской деятельности выделяют историческую, традиционную и инновационную фазы. Исторический этап распространился на весь временной промежуток формирования предпринимательства до второй половины 19 века. Касательно инновационного этапа, динамично

продуктивное распространение инновационного предпринимательства значительно набирает обороты на рубеже высоко производительной, постиндустриальной экономики.

Апеллируя понятием «*предпринимательства*» и «*предпринимателя*» в нынешнем восприятии следует упомянуть английского экономиста Ридарда Кантильона, который изначально ввел в употребление концепт наряду с понятием «риск» в определение составляющего звена предпринимательского поведения.

Определяющим толчком роста инноваций прежде всего служит рыночная конкурентоспособность. Отрасли производства первостепенно освоившие эффективные инновации, обладают возможностью понижать производственные затраты и соответственно стоимость сбываемых товаров (продукции, услуг). Тем самым получая укоренение собственных позиций в конкурентном соперничестве с фирмами и организациями, выдвигающими предложения с аналогичными товарами (продукцией, услугами). В результате чего новаторская деятельность дает возможность перенести конкурентную борьбу среди фирм.

Дифференциация категорий нововведений происходит по отраслевому признаку: в топливной, полиграфической промышленности и металлургии преобладают инновации технологических компетенций; в прочих направлениях – продовольственные, на которые приходится около две трети общих расходов.

Каждая деятельность, затрагивающая инновации, относится к предпринимательской и основана на:

- Исследования и отборе последних концепций (начиная новым продуктом и заканчивая новой структурой) и проведения оценки;
- Подбор дополнительных источников;
- формировании и менеджменте предприятия;
- увеличении прибыли и индивидуальном удовлетворении, основанном на достижении результата.

Не считая других типологий, в соответствии с законодательством, конфигурации предприятий связывающих свою деятельность с инновационным подходом подразделяют на малые, средние и крупные. Малый бизнес в инновационной области – первостепенный, если говорить о массовости, также более структурно-динамичный при детальном изучении. Основную базу «скелет» инновационного предпринимательства составляют именно малые инновационные компании - технологические лидеры в зарождающихся отраслях экономики, раскрывающие последние участки рынка, выступающие в пользу развития нового производства, увеличивающие показатель величины расходов в научной области и конкурентоспособность потребления, тем самым предоставляя возможность для формирования новейших технологических правил и режимов.

К фигурам субъектного характера инновационного предпринимательства относятся предприятия и организации, реализовывающие инновационную деятельность.

Инновации - мощный механизм для эффективного внешнего финансирования. Наличие или отсутствие инноваций в деятельности предпринимательских структур дает представление не только о потенциале предпринимательского сектора в настоящее время, но и позволяет оценить устойчивость положения многих компаний и перспективы их развития в будущем. Инновации играют важную роль в мобилизации внешнего финансирования, поскольку они подчеркивают уникальность новой компании, зарождающейся в любой сфере и области. Важно отметить, что инновации имеют отношение не только к технологиям, но и к социально-экономическим ценностям, которые они создают.

Список литературы

1. *Дынкин А.А.* Предпринимательство в конце XX века. - М., 1992.

2. *Шумпетер Й.А.* Теория экономического развития: исследование предпринимательской прибыли, капитала, кредита, процента и цикла конъюнктуры. - М., 1982.
3. *Валента Ф.* Управление инновациями. - М.: Прогресс, 1989.
4. *Медынский В.Г.* Инновационный менеджмент: учебник. - М.: ИНФРА, 2008.
5. *Пиннингто И.П.* Новая технология как организационное нововведение //Новая технология и организационные структуры. - М.: Экономика, 1990.

SURGICAL TREATMENT OF TIBIAL DIAPHYSEAL FRACTURES

Davlatov B.N.¹, Tukhtayev J.T.², Melikuzizoda Sh.³

¹*Davlatov Bakhodir Nabiyevich - Doctor of medical sciences, Associate Professor,*

²*Tukhtayev Jura Tukhtayevich - Associate Professor,*

³*Melikuzizoda Shokhislom – Master,*

ANDIJAN STATE MEDICAL INSTITUTE

ANDIJAN, REPUBLIC OF UZBEKISTAN

Abstract: *this article reviews the effectiveness of surgical treatment in diaphysis fractures of the shin bones. Surgical treatment options include intramedullary nailing, tension band or compression plating, and drilling with debridement and bone grafting. The decision to attempt closed treatment on tibial shaft fractures can be challenging. At our institution, we attempt treatment of nearly all closed, isolated tibial shaft fractures.*

Keywords: *surgical treatment, technique, minimal surgery, osteoporosis, X-rays, bones and muscles, magnetic resonance tomography (MRT), computed tomography (CT or CAT), ORIF, fixation.*

The tibia is the major weight bearing bone of the leg. It is connected to the less important bone, the fibula, through the proximal and distal tibiofibular joints. Like fractures of forearm bones, these bones frequently fracture together, and are referred to as ‘fracture both bones of leg’. The following are some of the characteristics of these bones.

- **A subcutaneous bone:** This is responsible for the large number of open tibial fractures; also, often there is loss of bone through the wound. **Fractures in this region** are often associated with *massive loss* of skin, necessitating care by plastic surgeons, early in the treatment.

- **Precarious blood supply:** The distal-third of tibia is particularly prone to delayed and non-union because of its

precarious blood supply. The major source of blood supply to the bone is the medullary vessels. The periosteal blood supply is poor because of few muscular attachments on the distal-third of the bone. The fibula, on the other hand is a bone with many muscular attachments, and thus has a rich blood supply.

- **Hinge joints proximally and distally:** Both, the proximal and distal joints (the knee and ankle) are hinge joints. So, even a small degree of rotational mal - alignment of the leg fracture becomes noticeable.

The tibia and fibula may be fractured by a direct or indirect injury.

Direct injury: Road traffic accidents are the commonest cause of these fractures, mostly due to direct violence. The fracture occurs at about the same level in both bones. Frequently the object causing the fracture lacerates the skin over it, resulting in an open fracture.

Indirect injury: A bending or torsional force on the tibia may result in an oblique or spiral fracture respectively. The sharp edge of the fracture fragment may pierce the skin from within, resulting in an open fracture.

Diagnosis: The diagnosis is usually confirmed by X-ray examination. Evaluation of the anatomical configuration of the fracture on X-ray helps in reduction.

Treatment: For the purpose of treatment, fractures of the tibia and fibula may be divided into two types: closed or open.

Open fractures: The aim in the treatment of open fractures is to convert it into a closed fracture by judicious care of the wound and maintain the fracture in good alignment. Following methods can be used for treating the fracture, depending upon the grade of open fracture:

- *Grade I:* Wound dressing through a window in an above-knee plaster cast, and antibiotics.

- *Grade II:* Wound debridement and primary closure (if less than 6 hours old), and above-knee plaster cast. The wound may need dressings through a window in the plaster cast.

- *Grade III:* Wound debridement, dressing and external fixator application. The wound is left open. The *trend is changing*, from

primarily conservative treatment to operative treatment, in care of open tibial fractures. More and more open fractures in grade I and II are being fixed internally. In a number of other cases, a delayed operation (ORIF) is done once the wound is taken care of.

Technique of closed reduction: Under an anesthesia, the patient lies supine with his knees flexed over the end of the table. The surgeon is seated on a stool, facing the injured leg. The leg is kept in traction using a halter, made of ordinary bandage, around the ankle. The fracture ends are manipulated, and good alignment achieved, a below-knee cast is applied over evenly applied cotton padding. Once this part of the plaster sets, the cast is extended to above the knee. *Wedging:* Sometimes, after a fracture has been reduced and the plaster applied, check X-ray shows a little angulation at the fracture site. Instead of cutting open the plaster and reapplying it, it is better to *wedge* the plaster as shown in. In this technique, the plaster is cut circumferentially at the level of the fracture, the angulation corrected by forcing open the cut on the *concave* side of the angulation, and the plaster reinforced with additional plaster bandages.

Currently, the method most surgeons use for treating tibia fractures is intramedullary nailing. During this procedure, a specially designed metal rod is inserted into the canal of the tibia. The rod passes across the fracture to keep it in position. The intramedullary nail is screwed to the bone at both ends.

Intramedullary nails are usually made of titanium. They come in various lengths and diameters to fit most tibia bones.

Intramedullary nailing is not ideal for fractures in children and adolescents because care must be taken to avoid crossing the bone's growth plates.

Plates and screws. During this operation, the bone fragments are first repositioned (reduced) into their normal alignment. They are held together with screws and metal plates attached to the outer surface of the bone.

Plates and screws are often used when intramedullary nailing may not be possible, such as for fractures that extend into either the knee or ankle joints.

External fixation. In this type of operation, metal pins or screws are placed into the bone above and below the fracture site. The pins and screws are attached to a bar outside the skin. This device is a stabilizing frame that holds the bones in the proper position so they can heal.

Be aware that although opioids help relieve pain after surgery or an injury, they are a narcotic and can be addictive. Opioid dependency and overdose has become a critical public health issue in the U.S. It is important to use opioids only as directed by your doctor. As soon as your pain begins to improve, stop taking opioids. Talk to your doctor if your pain has not begun to improve within a few days of your treatment.

Most tibial shaft fractures take 4 to 6 months to heal completely. Some take even longer, especially if the fracture was open or broken into several pieces or if the patients use tobacco products.

References

1. *B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda.* Use of bios in diaphysis fractures of the shin bones. "Экономика и социум" №12 (115) 2023. p. 190-194.
2. *B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda.* Optimization of the treatment in open fractures of the shin bones. "Экономика и социум" №12 (115) 2023. p. 186-190.
3. *Toivanen J.A., Honkonen S.E., Koivisto A.M., Järvinen M.J.* Treatment of low-energy tibial shaft fractures: plaster cast compared with intramedullary nailing. *Int.* 2001; 25(2): 110-113.
4. *Ikem I., Oginni L., Ogunlusi J.J.* Determinants of management outcome in open tibia fractures. *Niger J. Surg. Res.* 2006; 8(1): 81-83.

5. C.A. Lin, M. Swiontkowski, M. Bhandari, S.D. Walter, E.H. Sch emitsch, D. Sanders, et al. Reaming Does Not Affect Functional Outcomes After Open and Closed Tibial Shaft Fractures: The Results of a Randomized Controlled Trial, 30 (3) (2016), pp. 142-148.
6. A. Sarmiento, L.L. Latta. 450 closed fractures of the distal third of the tibia treated with a functional brace. (428) (2004), pp. 261-271.
7. R.W. Lindsey, S.R. Blair. Closed Tibial-Shaft Fractures: which Ones Benefit From Surgical Treatment? 4 (1) (1996), pp. 35-43.

INJURIES TO THE LOWER EXTREMITIES IN POLYTRAUMA: TIBIAL BONES FRACTURE AND TREATMENT

Davlatov B.N.¹, Mirzayuldashev N.Yu.², Abdukhalimov O.O.³

¹*Davlatov Bakhodir Nabiyevich - Doctor of medical sciences,
Associate Professor,*

²*Mirzayuldashev Numon Yuldashevich - Associate Professor,*

³*Abdukhalimov Obidjon Odiljon ugli – Master,*

*ANDIJAN STATE MEDICAL INSTITUTE
ANDIJAN, REPUBLIC OF UZBEKISTAN*

Abstract: *the aim in the treatment of open fractures is to convert it into a closed fracture by judicious care of the wound, and maintain the fracture in good alignment.*

Keywords: *injuries, treatment, polytrauma, tibial bone fracture, plastic surgeons, fracture lacerates, skin.*

The tibia is the major weight bearing bone of the leg. It is connected to the less important bone, the fibula, through the proximal and distal tibiofibular joints. Like fractures of forearm bones, these bones frequently fracture together, and are referred to as ‘fracture both bones of leg’. The following are some of the characteristics of these bones.

a) A subcutaneous bone: This is responsible for the large number of open tibial fractures; also, often there is loss of bone through the wound.

b) Fractures in this region are often associated with massive loss of skin, necessitating care by plastic surgeons, early in the treatment.

c) Precarious blood supply: The distal-third of tibia is particularly prone to delayed and non-union because of its precarious blood supply.

d) Hinge joints proximally and distally: Both, the proximal and distal joints (the knee and ankle) are hinge joints.

Mechanism. The tibia and fibula may be fractured by a direct or indirect injury.

Direct injury: Road traffic accidents are the commonest cause of these fractures, mostly due to direct violence. The fracture occurs at about the same level in both bones. Frequently the object causing the fracture lacerates the skin over it, resulting in an open fracture.

Indirect injury: A bending or torsional force on the tibia may result in an oblique or spiral fracture respectively. The sharp edge of the fracture fragment may pierce the skin from within, resulting in an open fracture. The fracture may be closed or open, and may have various patterns. It may occur at different levels (upper, middle or lower-third). Occasionally, it may be a single bone fracture i.e., only the tibia or fibula is fractured. Displacements may be sideways, angulatory or rotational. Occasionally, the fracture may remain undisplaced.

Treatment. For the purpose of treatment, fractures of the tibia and fibula may be divided into two types: closed or open.

Closed fractures: Treatment of closed fractures, both in children and in adults, is by closed reduction under anaesthesia followed by an above-knee plaster cast. In children, it is possible to achieve good alignment in most cases, and the fracture unites in about 6 weeks. In adults, the fracture unites in 16-20 weeks. Sometimes, reduction is not achieved, or the fracture displaces in the plaster. In both these cases open reduction and internal fixation is required. The trend is changing with the availability of

minimally invasive techniques such as of closed nailing. More and more unstable tibial fractures are being treated with closed interlock nailing.

Open fractures: The aim in the treatment of open fractures is to convert it into a closed fracture by judicious care of the wound, and maintain the fracture in good alignment. Following methods can be used for treating the fracture, depending upon the grade of open fracture:

- Grade I: Wound dressing through a window in an above-knee plaster cast, and antibiotics.

- Grade II: Wound debridement and primary closure (if less than 6 hours old), and above-knee plaster cast. The wound may need dressings through a window in the plaster cast.

- Grade III: Wound debridement, dressing and external fixator application. The wound is left open.

The trend is changing, from primarily conservative treatment to operative treatment, in care of open tibial fractures. More and more open fractures in grade I and II are being fixed internally.

In a number of other cases, a delayed operation (ORIF) is done once the wound is taken care of.

Technique of closed reduction: Under anaesthesia, the patient lies supine with his knees flexed over the end of the table. The surgeon is seated on a stool, facing the injured leg. The leg is kept in traction using a halter, made of ordinary bandage, around the ankle. The fracture ends are manipulated and good alignment achieved. Initially, a below-knee cast is applied over evenly applied cotton padding. Once this part of the plaster sets, the cast is extended to above the knee.

Wedging: Sometimes, after a fracture has been reduced and the plaster applied, check X-ray shows a little angulation at the fracture site. Instead of cutting open the plaster and reapplying it, it is better to wedge the plaster as shown in. In this technique, the plaster is cut circumferentially at the level of the fracture, the angulation corrected by forcing open the cut on the concave side of the angulation, and the plaster reinforced with additional plaster bandages. Once the fracture becomes 'sticky' (in about 6 weeks), above-knee plaster is removed and below-knee PTB

(patellar tendon bearing) cast is put. Use of modern, synthetic casting tapes (made of plastic polymer) has made 'plaster' treatment more convenient. Once the fracture has partly united, the cast can be replaced by removable plastic supports (braces), and the joints mobilised.

Role of operative treatment: Open reduction and internal fixation is necessary when it is not possible to achieve a satisfactory alignment of a fracture by non-operative methods. The internal fixation device used may be a plate or an intramedullary nail depending upon the configuration of the fracture. Interlock nailing provides the possibility of internally fixing a wide spectrum of tibial shaft fractures. With the availability of facilities, operative treatment has now become a method of preference. The bones forming the ankle joint are a frequent site of injury. A large variety of bending and twisting forces result in a number of fractures and fracture-dislocation at this joint. All these injuries are sometimes grouped under a general title 'Pott's fracture'.

It is based on the mechanism of injury. It is believed that a specific pattern of bending and twisting forces results in specific fracture pattern. Different types of ankle injuries have been classified on the basis of five basic mechanisms. These are as follows:

- a) Adduction injuries.
- b) Abduction injuries.
- c) Pronation-external rotation injuries.
- d) Supination-external rotation injuries.
- e) Vertical compression injuries

Operative methods: More and more surgeons are now resorting to internal fixation for all displaced fractures of ankle without attempting closed reduction. This is done because by operative reduction, it is possible to achieve perfect alignment as well as stable fixation of fragments. This allows early motion of the ankle joint, thereby improving overall results.

This approach is justified in hospitals where trained staff and all equipment necessary for such work is available.

References

1. B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda. Use of bios in diaphysis fractures of the shin bones. "Экономика и социум" №12 (115) 2023. p. 190-194.
2. B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda. Optimization of the treatment in open fractures of the shin bones. "Экономика и социум" №12 (115) 2023. P. 186-190.
3. Giannoudis P.V., Papakostidis C., Roberts C. A review of the management of open fractures of the tibia and femur. 2006 - 88 (3) – p. 281–289.

A NEW APPROACH TO THE TREATMENT OF FRACTURES OF THE PROXIMAL HUMERUS

Davlatov B.N.¹, Nuriddinov B.B.², Botirov N.T.³

¹*Davlatov Bakhodir Nabiyevich - Doctor of medical sciences, Associate Professor,*

²*Nuriddinov Bakhodir Bakhtiyorjon ugli – Master,*

³*Botirov Nozim Turakhonovich – Master,*

ANDIJAN STATE MEDICAL INSTITUTE

ANDIJAN, REPUBLIC OF UZBEKISTAN

Abstract: *the tibia is the major weight bearing bone of the leg. It is connected to the less important bone, the fibula, through the proximal and distal tibiofibular joints.*

Keywords: *fracture both bones of leg, proximal, direct or indirect injury, open tibial fractures.*

Like fractures of forearm bones, these bones frequently fracture together, and are referred to as ‘fracture both bones of leg’. The following are some of the characteristics of these bones.

a) **A subcutaneous bone:** This is responsible for the large number of open tibial fractures; also, often there is loss of bone through the wound.

b) **Fractures in this region** are often associated with *massive loss* of skin, necessitating care by plastic surgeons, early in the treatment.

c) **Precarious blood supply:** The distal-third of tibia is particularly prone to delayed and non-union because of its precarious blood supply. The major source of blood supply to the bone is the medullary vessels. The periosteal blood supply is poor because of few muscular attachments on the distal-third of the bone. The fibula, on the other hand is a bone with many muscular attachments, and thus has a rich blood supply.

d) **Hinge joints proximally and distally:** Both, the proximal and distal joints (the knee and ankle) are hinge joints. So, even a small degree of rotational mal-alignment of the leg fracture becomes noticeable.

The tibia and fibula may be fractured by a direct or indirect injury.

Direct injury: Road traffic accidents are the commonest cause of these fractures, mostly due to direct violence. The fracture occurs at about the same level in both bones. Frequently the object causing the fracture lacerates the skin over it, resulting in an open fracture.

Indirect injury: A bending or torsional force on the tibia may result in an oblique or spiral fracture respectively. The sharp edge of the fracture fragment may pierce the skin from within, resulting in an open fracture.

Diagnosis:

The diagnosis is usually confirmed by X-ray examination. Evaluation of the anatomical configuration of the fracture on X-ray helps in reduction.

Treatment: For the purpose of treatment, fractures of the tibia and fibula may be divided into two types: closed or open.

Open fractures: The aim in the treatment of open fractures is to convert it into a closed fracture by judicious care of the wound, and maintain the fracture in good alignment. Following methods can be used for treating the fracture, depending upon the grade of open fracture:

- *Grade I:* Wound dressing through a window in an above-knee plaster cast, and antibiotics.

- *Grade II:* Wound debridement and primary closure (if less than 6 hours old), and above-knee plaster cast. The wound may need dressings through a window in the plaster cast.

- *Grade III:* Wound debridement, dressing and external fixator application. The wound is left open. The *trend is changing*, from primarily conservative treatment to operative treatment, in care of open tibial fractures. More and more open fractures in grade I and II are being fixed internally. In a number of other cases, a delayed operation (ORIF) is done once the wound is taken care of.

Technique of closed reduction: Under anaesthesia, the patient lies supine with his knees flexed over the end of the table. The surgeon is seated on a stool, facing the injured leg. The leg is kept in traction using a halter, made of ordinary bandage, around the ankle (Fig-21.1). The fracture ends are manipulated and good alignment achieved, a below-knee cast is applied over evenly applied cotton padding. Once this part of the plaster sets, the cast is extended to above the knee.

Wedging: Sometimes, after a fracture has been reduced and the plaster applied, check X-ray shows a little angulation at the fracture site. Instead of cutting open the plaster and reapplying it, it is better to *wedge* the plaster as shown in. In this technique, the plaster is cut circumferentially at the level of the fracture, the angulation corrected by forcing open the cut on the *concave* side of the angulation, and the plaster reinforced with additional plaster bandages.

Currently, the method most surgeons use for treating tibia fractures is intramedullary nailing. During this procedure, a specially designed metal rod is inserted into the canal of the tibia. The rod passes across the fracture to keep it in position. The intramedullary nail is screwed to the bone at both ends.

Intramedullary nails are usually made of titanium. They come in various lengths and diameters to fit most tibia bones.

Intramedullary nailing is not ideal for fractures in children and adolescents because care must be taken to avoid crossing the bone's growth plates.

Plates and screws. During this operation, the bone fragments are first repositioned (reduced) into their normal alignment. They are held together with screws and metal plates attached to the outer surface of the bone.

Plates and screws are often used when intramedullary nailing may not be possible, such as for fractures that extend into either the knee or ankle joints.

External fixation. In this type of operation, metal pins or screws are placed into the bone above and below the fracture site. The pins and screws are attached to a bar outside the skin. This device is a stabilizing frame that holds the bones in the proper position so they can heal.

Open reduction and fixation is necessary when it is not possible to achieve a satisfactory alignment of a fracture by non-operative methods.

The internal fixation device used may be a plate or an intramedullary nail depending upon the configuration of the fracture. Interlock nailing provides the possibility of internally fixing a wide spectrum of tibial shaft fractures. With the availability of facilities, operative treatment has now become a method of preference. Pain after an injury or surgery is a natural part of the healing process. Your doctor and nurses will work to reduce your pain, which can help you recover faster.

Medications are often prescribed for short-term pain relief after surgery or an injury. Many types of medicines are available to help manage pain. These include acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs), gabapentinoids, muscle relaxants, opioids, and topical pain medications. Your doctor may use a combination of these medications to improve pain relief, as well as minimize the need for opioids. Some pain medications may have side effects that can impact your ability to drive and do other activities. Your doctor will talk to you about the side effects of your medications.

Be aware that although opioids help relieve pain after surgery or an injury, they are a narcotic and can be addictive. Opioid dependency and overdose has become a critical public

health issue in the U.S. It is important to use opioids only as directed by your doctor. As soon as your pain begins to improve, stop taking opioids. Talk to your doctor if your pain has not begun to improve within a few days of your treatment.

Most tibial shaft fractures take 4 to 6 months to heal completely. Some take even longer, especially if the fracture was open or broken into several pieces or if the patients uses tobacco products.

References

1. *B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda.* Use of bios in diaphysis fractures of the shin bones. "Экономика и социум" №12(115) 2023. p. 190-194.
2. *B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda.* Optimization of the treatment in open fractures of the shin bones. "Экономика и социум" №12(115) 2023. P. 186-190.
3. *Beltsios M., Savvidou O., Kovanis J., Alexandropoulos P., Papagelopoulos P.* External fixation as a primary and definitive treatment for tibial diaphyseal fractures. *Strategies Trauma Limb Reconstr.* 2009;4(2):81–87.

MODERN TREATMENT AND CLINICAL STRUCTURE OF OPEN FRACTURES OF THE TIBIAL BONE SHAFT IN POLYTRAUMA

Davlatov B.N.¹, Abdukhalimov O.O.², Khamidov S.M.³

*¹Davlatov Bakhodir Nabiyevich - Doctor of medical sciences,
Associate Professor,*

²Abdukhalimov Obidjon Odiljon ugli – Master,

*³Khamidov Sul-tonbek Maksudbek ugli – Master,
ANDIJAN STATE MEDICAL INSTITUTE
ANDIJAN, REPUBLIC OF UZBEKISTAN*

Abstract: *the decision to attempt closed treatment on tibial shaft fractures can be challenging. At our institution, we attempt treatment of nearly all closed, isolated tibial shaft fractures.*

Keywords: *tibia fractures, Cast treatment, anatomical reduction of medial and lateral malleoli, successful.*

Fractures without displacement: It is usually sufficient to protect the ankle in a below-knee plaster for 3-6 weeks. Good, ready-made braces can be used in place of rather uncomfortable plaster cast.

Fractures with displacement: Aim of treatment is to ensure anatomical reduction of the ankle-mortise. This means, ensuring anatomical reduction of medial and lateral malleoli, and reduction of the talus accurately within the mortise.

Internal fixation: In general, operative reduction and internal fixation may be used in cases where closed reduction has not been successful, or the reduction has slipped during the course of conservative treatment.

The following techniques of internal fixation are used depending upon the type of fracture.

Medial Malleolus Fracture

- Transverse fracture – compression screw, tension-band wiring;

- Oblique fracture – compression screws;

- Avulsion fracture – tension-band wiring;

Lateral Malleolus Fracture

- Transverse fracture – tension-band wiring

- Spiral fracture – compression screws

- Comminuted fracture – buttress* plating

- Fracture of the lower third of fibula – 4-hole plate

Posterior Malleolus

- Involving less than one-third of the articulating surface of the tibia – no additional treatment;

- Involving more than one-third of the articulating surface of the tibia – internal fixation with compression screws;

- Tibio-fibular syndesmosis disruption – needs to be stabilised by inserting a long screw from the fibula into the tibia.

All major ligament injuries e.g., that of deltoid ligament, lateral ligament should be repaired.

Conservative methods: It is often possible to achieve a good reduction by manipulation under general anaesthesia. The essential feature of the reduction is to concentrate on restoring the alignment of the foot to the leg. By doing so the fragments automatically fall into place. Once reduced, a below-knee plaster cast is applied. If the check X-ray shows a satisfactory position, the plaster cast is continued for 8-10 weeks. The patient is not allowed to bear any weight on the leg during this period. Check X-rays are taken frequently to make sure the fracture does not get displaced. If everything goes well, the plaster is removed after 8-10 weeks and the patient taught physiotherapy to regain movement at the ankle.

External fixation: This may be required in cases where closed methods cannot be used e.g., open fractures with bad crushing of the muscles and tendons, with skin loss around the ankle.

Simple types of ankle injuries are almost free of complications. More serious fracture-dislocation may be complicated because of improper treatment. Sometimes, the nature of injury is such that perfect functions cannot be restored. The following complications may occur:

1. **Stiffness of the ankle:** Following immobilisation in plaster, stiffness occurs. In ankle injuries, recovery takes a long time because of the tendency for gravitational oedema which may hinder mobilisation exercises. It is most common in elderly persons. With persistent treatment, using limb elevation, crepe bandage and active toe movements, oedema subsides. It may be necessary to continue ankle exercises for a long period (6-8 months).

It is the term used for ligament injuries of the ankle. Commonly, it is an inversion injury, and the lateral collateral ligament is sprained. Sometimes, an eversion force may result in a sprain of the medial collateral ligament of the ankle.

Diagnosis: The patient gives history of a twisting injury to the ankle followed by pain and swelling over the injured ligament. Weight bearing gives rise to excruciating pain. In cases with

complete tears, patient gives a history of feeling of 'something tearing' at the time of the injury.

There may be swelling and tenderness localised to the site of the torn ligament. If a torn ligament is subjected to stress by the following manoeuvres, the patient experiences severe pain:

- Inversion of a plantar-flexed foot for anterior talo-fibular ligament sprain.
- Inversion in neutral position for complete lateral collateral ligament sprain.
- Eversion in neutral position for medial collateral ligament sprain.

Treatment: It depends upon the grade of sprain:

- Grade I: Below-knee plaster cast for 2 weeks followed by mobilisation.
- Grade II: Below-knee cast for 4 weeks followed by mobilisation.
- Grade III: Below-knee cast for 6 weeks followed by mobilisation.

Current trend is to treat ligament injuries, in general, by 'functional' method i.e., without immobilisation. Treatment consists of rest, ice packs, compression, and elevation (RICE) for the first 2-3 days. The patient begins early protected range of motion exercises. Methods are devised by which during mobilisation, stress is avoided on 'healing' ligaments, and the muscles around the joint are built up. For this approach, a welldeveloped physiotherapy unit is required. For grade III ligament injury to the ankle, especially in young athletic individuals, operative repair is preferred by some surgeons.

References

1. B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda. Use of bios in diaphysis fractures of the shin bones. "Экономика и социум" №12 (115) 2023. p. 190-194.
2. B.N. Davlatov, J.J. Tukhtayev, O. Abdukhalilov, Sh. Melikuzizoda. Optimization of the treatment in open fractures of the shin bones. "Экономика и социум" №12 (115) 2023. P. 186-190.

3. *Giovannini F., de Palma L., Panfighi A., Marinelli M.* Intramedullary nailing versus external fixation in Gustilo type III open tibial shaft fractures: a meta-analysis of randomised controlled trials. *Strategies Trauma Limb Reconstr.* 2016; 11(1):1–4.
4. *Henley M.B., Chapman J.R., Agel J., Harvey E.J., Whorton A.M., Swiontkowski M.F.* Treatment of type II, IIIA, and IIIB open fractures of the tibial shaft: a prospective comparison of unreamed interlocking intramedullary nails and half-pin external fixators. *J Orthop Trauma.* 1998; 12(1):1–7.
5. *Holbrook J.L., Swiontkowski M.F., Sanders R.* Treatment of open fractures of the tibial shaft: ender nailing versus external fixation. A randomized, prospective comparison. *J Bone Joint Surg Am.* 1989; 71 (8):1231–1238.
6. *Gasser B., Tiefenboeck T.M., Boesmueller S., Kivaranovic D., Bukaty A., Platzer P.* Damage control surgery - experiences from a level I trauma center. *BMC Musculoskelet Disord.* 2017; 18(1):391.
7. *Foote C.J., Guyatt G.H., Vignesh K.N. et al.* Which surgical treatment for open tibial shaft fractures results in the fewest reoperations? A network meta-analysis. *Clin Orthop Relat Res.* 2015; 473(7):2179–2192.

THE DESIGN FEATURES OF THE LANDSCAPING SYSTEM IN URBANIZED AREAS OF TURKMENISTAN Erkayeva A.¹, Syahedov O.², Babayev A.³, Niyazmenliyev M.⁴

¹*Erkayeva Ayman - Geodesy Department Chair,*

²*Syahedov Ovlyaguly - senior lecturer,*

³*Babayev Abdyrahman - student,*

⁴*Niyazmenliyev Meylis - student,*

TURKMEN STATE ARCHITECTURE AND CONSTRUCTION
INSTITUTE
ASHGABAT, TURKMENISTAN

Abstract: *the relevance of environmental protection works carried out in Turkmenistan in the field of increasing the area of forests in order to ensure national environmental safety is substantiated. The features of the design of the landscaping system in relation to urbanized territories, including around large cities of our country, are shown.*

Keywords: *environmental safety, environmental protection, urban and suburban areas, landscaping, planting of tree seedlings.*

Over the centuries, the Turkmen people have formed original traditions of careful and harmonious attitude to nature, striving to turn their beloved land into a blooming garden. The environmental policy of our state is based on these environmental principles. The natural conditions of our country for many centuries have contributed to the enrichment of the local flora and the emergence of agriculture. Historical data confirm that there were large oases here in ancient times, and our ancestors successfully developed the culture of agriculture, grew various types of fruit trees.

Environmental aspects of caring for the environment also have their place in such government programs as: "The revival of a new era of a powerful state: The National Program of socio-economic development of Turkmenistan in 2022-2052"; The Program of the President of Turkmenistan for socio-economic

development of the country in 2022-2028"; "The Program of socio-economic development of Turkmenistan and investments for 2024".

Being an active participant in the international dialogue in such an extremely relevant area as the environmental sphere, Turkmenistan stands for deepening and developing positive cooperation in the UN format, effective partnership with other major organizations and structures. Environmental programs and projects implemented at the national and regional levels increase the effectiveness of activities in this area. It should be noted the great importance of the constructive initiatives put forward by Turkmenistan at various high-level forums, which have received broad support from the international community. In accordance with the national traditions of respect for nature, effective measures are being taken in the country to protect the environment, rational use of natural resources, and the development of a "green" economy [1, 2].

So every year in the spring, large-scale landscaping campaigns are held in our country, during which thousands of trees are planted. These environmental events are a confirmation that the traditions of our wise ancestors are now receiving new content. It should be noted that there are more and more young people among the participants of these actions from year to year. Mass actions on planting seedlings, which have become a good tradition in our country, contribute to the creation of new park and forest areas, the enrichment of the Turkmen flora and the formation of a favorable climate, which is an important condition for ensuring environmental safety of the environment. The creation of unique green areas, parks, and the enrichment of local flora is one of the main directions of the integrated development of urban and suburban areas. Currently, the areas occupied by juniper plantations have expanded in the vicinity of Ashgabat. These plants strengthen the soil, retain subsurface moisture and resist mudflows, largely preventing their formation.

The modern space of the park is not only a fragment of the natural landscape that improves the ecological component of the urban environment, but also an area of active use of smart

technologies and geoinformation systems. Innovative technologies serve as a means of educational activity, allowing you to use applications with convenient maps and the identifier of plants, birds or insects. For densely built-up centers of modern cities, where there are no more territorial reserves for the development of green areas, compensatory landscaping techniques are becoming important: green roofs, mobile container and vertical landscaping. Such techniques are innovative and promising. The advantages of container landscaping are obvious: it can be resorted to all year round, used in places where engineering communications pass. It is also important that planting a tree in a container practically eliminates the ingress of reagents into the ground in winter [3].

Green spaces help to combat the negative effects of the greenhouse effect. Today, global warming is one of the main problems of mankind. Global warming has arisen as a result of an excess of greenhouse gases in the atmosphere. Reflecting off the earth's surface, solar heat is trapped in a layer of greenhouse gases, and as a result, the global temperature level is constantly rising. And trees, during the process of photosynthesis, process the released carbon dioxide into oxygen, improving the quality of atmospheric air.

Trees provide oxygen and purify the air. A hectare of mature trees can provide oxygen to more than forty people per year. They also absorb odors and gases of pollutants such as nitrogen oxides, ammonia, and sulfur dioxide. Trees eliminate water pollution and soil erosion. They act as a sponge that filters groundwater and, with their root system, hold the soil together and slow down wind speed and water flow. In addition, green spaces protect against harmful ultraviolet rays. Trees reduce UV exposure by about fifty percent, thereby protecting children in schoolyards and playgrounds [4, 5].

The results of numerous studies have proven that contemplating green trees relaxes people and reduces their mental fatigue and tension. The harmonious combination of natural vegetation with decorative plantings in park complexes in the cities of our country is one of the important factors in the concept

of landscape gardening, when naturally growing trees and shrubs are organically complemented by man-made massifs that will delight many more generations of citizens, love and thrifty attitude that enhance the beauty of these "green belts".

References

1. *Текаев Ш.Д., Бердиев А.А., Болмаммедов Ы.Ч., Гурбанов И.Г.* Проведение мониторинга системы «Эконет» Туркменистана на основе данных искусственного спутника // *Academy*. 2022. № 2 (73).
2. *Аминов Х.Х.* Проблемы, возникающие в следствии интеграции жизни современного человека и окружающей среды // *Вестник науки и образования*. 2023. № 1 (132). Часть 1.
3. *Кербанов Ýо.А.* Türkmenistanyň ekologiýa boýunça halkara konwensiýalary we şertnamalary. Aşgabat.: 2022. (In Turkmen)
4. *Byashimov A., Ishanov M., Berdiyeva Ay., Ozbekov N.* Some aspects of environmental safety in the oil and gas industry of Turkmenistan // *Colloquium/* 2023. №7 (166).
5. *Абрамов А.В.* Социально-экономические аспекты устойчивого развития городов в условиях изменения климата. // *Научные труды Вольного экономического общества России*. 2011. vol. 147.

ENGINEERING EDUCATION AS A FUNDAMENTAL RESOURCE FOR SUSTAINABLE DEVELOPMENT

**Rozyeva J.¹, Sapardurdyev O.², Begmuradova B.³,
Komekova T.⁴**

¹*Rozyeva Jennet -student,*

²*Sapardurdyev Orazguly - student,*

³*Begmuradova Bahargul - lecturer,*

⁴*Komekova Toybibi- lecturer,*

*TURKMEN STATE ARCHITECTURE AND CONSTRUCTION
INSTITUTE
ASHGABAT, TURKMENISTAN*

Abstract: *the characteristics of the current level of development of higher engineering and technical education are given. The feasibility of introducing information technologies into the process of training future engineers is indicated. The conclusion is made about the need to systematically improve the professional qualities of future engineering specialists.*

Keywords: *innovative development, technological sphere, engineering education, fundamental knowledge.*

In the modern period, engineering education is characterized by accelerated innovative development. The main role in this process belongs to scientific and technological progress. As experts note in their scientific works, the dynamic nature of the development of the technological sphere affects not only social relations, but also the person himself. Thus, artificial intelligence is already superior to humans in many skills, largely possessing some abilities that humans do not have.

It must be emphasized that digital information technologies are cross-industry in nature. That is, progress in any branch of science and technology is impossible without their active implementation [1]. It is information technologies in modern scientific and technological development that are an innovative interdisciplinary element in the timely solution of various practical problems of social production.

Today, engineering activities are becoming the most important fundamental resource of modern social development. At the same time, it is the most important element that ensures the competitiveness of the social product in the context of the development of various technologies. Engineering activity is an interconnected system that includes research and design subsystems that ensure the production of innovations in various fields and environments [2, 3].

The engineering approach is in demand in any innovative activity. However, it is important to use in the production process not only technical experience, but also the sociocultural knowledge of a specialist, which contributes to the development of the creative nature of engineering activity. A modern engineer

is directly involved in the sociocultural space, and his professional development occurs in the conditions of digital modernization of such important spheres of society as politics and economics. Engineering activity is becoming an independent sphere in modern culture. Therefore, it is so important to train a generalist with both scientific, technical and social and humanitarian knowledge [4].

The processes outlined above require changes in approaches to the formation of professional qualities of engineers. Engineering education in the context of the new technological paradigm of social development presupposes, first of all, not a large volume and broad content of educational material, but the educational technologies used in the educational process and the interactive attitude of participants in the educational process.

Combining research activities with the practice of creating and using innovative technologies contributes to the formation of qualitatively new integrated economic systems capable of innovative breakthroughs. Modern technological progress creates new requirements for knowledge of technology, society and human life in the unfolding technological future to discuss the question of how, who and under what conditions constructs and manages the future. Thus, in the new education system, which meets the requirements of modern technological development, high demands are placed on higher education teachers. He must be a creative teacher, allowing participants in the educational process to obtain and transform the necessary knowledge. At the same time, the most important task in the process of educational communication becomes the productive translation of acquired knowledge into economics and the ability to use it in practice.

Modern higher engineering educational institutions are entering a new frontier of educational practices based on comprehensive interdisciplinary research. Therefore, fundamental engineering knowledge, knowledge of mathematics and computer science, as well as comprehensive social and humanitarian training in psychology, sociology, and philosophy will be needed. Today, when higher education is undergoing major changes throughout the world, it is necessary not only to understand the tasks facing

engineering higher education institutions, but also to accumulate the best world achievements and practices, and to take into account the innovative experience of creating a modern educational environment of a higher educational institution [5].

Thus, engineering education in the context of the new technological paradigm of social development in many foreign countries is actively practicing the so-called STEAM education - a major direction, the focus of which is the development of an interdisciplinary approach in education. This path allows us to overcome the limitations of the subject-based approach in technical disciplines, expanding the area of search for solutions beyond the framework of the technocratic method. Much attention is paid to the active synthesis of natural sciences, information technology, engineering, mathematics, innovative approaches, as well as social technologies and art. Such training helps to combine the entire spectrum of professional, general professional and universal competencies in the preparation of a modern technical specialist.

Thus, robotics as part of STEAM education is taught by involving students in working with special constructors, solving problems taken from everyday practice, requiring the use of knowledge from various sciences. Great importance is attached to working in teams, implementing completed projects, developing design skills, and the ability to present the result.

The orientation of business towards projective activity as an effective technology for the implementation of strategic plans and, in connection with this, an increase in the share of collective creative work actualizes the presence of such social and communicative competencies among engineers as cooperation and the ability to conduct a constructive dialogue. And working at international levels requires engineers not only to speak foreign languages, but also to understand cross-cultural communication. Already today, research shows that socio-behavioral competencies are very relevant for employers when employing graduates of higher engineering educational institutions.

Thus, engineering education in the context of the new technological paradigm of social development is an important

factor in the formation of engineering personnel for the sustainable development of society.

References

1. *Нюдюрмагомедов А.Н.* Педагогическая экология в современном профессиональном образовании // *Academy*. 2022. № 2 (73).
2. *Erkayeva A., Ozbekov N., Rachmanova C., Orazov B.* The theoretical aspects of teaching geoinformation technologies to students of higher technical institutes // *Проблемы педагогики*. 2024. № 2 (66).
3. *Боровков А.И.* Современное инженерное образование. СПб. 2012.
4. *Федоров И.* Инженерное образование: состояние, проблемы, перспективы // *Высшее образование в России*. 2008. № 1.
5. *Полат Е.С.* Новые педагогические и информационные технологии в системе образования. Москва. 2000.

THE MAIN DIRECTIONS OF INNOVATIVE DEVELOPMENT OF TURKMENISTAN

Byashimov P.¹, Kakabayeva M.², Sopyev D.³, Salayeva O.⁴

¹Byashimov Polat- senior lecturer,

²Kakabayeva Myakhri- trainee lecturer,

³Sopyev Dayanch- student,

⁴Salayeva Ovezgul- student,

TURKMEN STATE ARCHITECTURE AND CONSTRUCTION
INSTITUTE
ASHGABAT, TURKMENISTAN

Abstract: *the main directions of economic and social transformation of Turkmenistan for the modern period are shown. The innovative orientation of the development of all sectors of public production is indicated. The conclusion is made about the compliance of the implemented state programs with the Goals of sustainable development.*

Keywords: *innovation, diversification, sustainable development.*

A new significant step designed to help strengthen the economic power of independent and neutral Turkmenistan was the adoption of the Program for Socio-Economic Development of Turkmenistan and Investments in 2024. They are based on the priorities outlined in the concept document "The Revival of a new era of a powerful state: The National Program of socio-economic development of Turkmenistan in 2022-2052" [1, 2], as well as in the "Program of the President of Turkmenistan on socio-economic development of the country in 2022-2028" and "The National Program of the President of Turkmenistan on the transformation of social and living conditions of the population of villages, towns, cities of etrap and etrap centers for the period up to 2028".

The concept of the development of the Motherland, currently being implemented, provides for the modernization, diversification and liberalization of the economy, an effective

combination of market elements and state regulation, the widespread introduction of new technologies and innovations, and the active integration of our state into the system of global economic relations. The above-mentioned documents identify priority tasks for each branch of the national economy and regions, the successful implementation of which is designed to ensure the further prosperity of the country and the well-being of Turkmen people. Among the key goals, first of all, an increase in the social and living standards of the population, including improving housing and social security, as well as improving the employment system of citizens, has been identified.

In this context, it is planned to consistently increase the incomes of Turkmen citizens, bring the system of regulating labor relations in line with the realities of the time, and create additional jobs in the regions. The priority is to strengthen the macroeconomic stability and economic power of the country, accelerate the transition of the national economy to market relations, improve activities in the field of financial market development, cash inflow and securities circulation.

At the same time, special importance is attached to the wide use of the potential of the socio-economic development of the Motherland, increasing the level of industrialization of the national economy, ensuring the dynamic growth of industries and services, as well as innovative industry, the active introduction of digital technologies in all sectors, the introduction of information and communication technologies, strengthening the interconnectedness of production and science. It is planned to use enterprises for processing and manufacturing finished products at full capacity, increase the potential of export-oriented complexes and diversify the production of import-substituting goods. At the same time, great attention is paid to the growth of industries based on innovative technologies.

Along with ensuring the country's food security, it is planned to implement specific measures to increase crop yields, expand livestock production opportunities, and increase the number of livestock and poultry. Special importance is also attached to the increase in the number of akhal-teke horses and turkmen alabai.

The creation of industrial and industrial free economic zones in each province, trade, service, transport and logistics, agro-industrial and complex free economic zones should be carried out taking into account the peculiarities of each of the regions. In order to achieve these objectives, it is planned to take practical steps to increase public investment activity, attract domestic and foreign investments. Further development of the social sphere is envisaged, in particular, improving the activities of scientific and educational institutions, providing highly qualified personnel to industries, bringing international cooperation in this area to a new level, primarily through the training of specialists and scientists with world-class scientific knowledge. Along with this, it is planned to further develop high-performance sports and children's sports, and strengthen the role of the mass physical education movement. Particular importance is attached to the successful implementation of the Saglyk State Program, issues of maternal and child health, proper measures for the prevention and treatment of diseases, ensuring the availability of medical services and the development of the pharmaceutical industry. An equally important aspect is the further improvement of the cultural sphere. In this plan, tasks have been set for the development of national crafts, carpet making, song and music art, for the fundamental study, preservation and popularization of the ancestral cultural heritage, ensuring careful protection, study and restoration of historical and cultural monuments, and it is also planned to carry out works that meet the requirements of the time in the field of domestic and international tourism.

The main goal of economic development is to create and develop a competitive, highly efficient innovative economic system through sectorial and structural transformations in Turkmenistan, and an active investment policy. Among the priorities are the technical and technological modernization of domestic enterprises in accordance with international standards, which will increase labor productivity. Special attention is paid to updating the technological and regional investment infrastructure in order to direct funds for the construction of new facilities, as well as for the expansion of production facilities, reconstruction

of enterprises, and technical re-equipment. A significant aspect is the state support of the non-governmental sector and an increase in its share in the economy, the expansion of the sphere of activity of small and medium-sized businesses in various industries, the development of various forms of public-private partnership and ownership. In this context, it should be noted that work is relevant to ensure effective management of state property, denationalization and privatization of state property through competitive bidding [3].

Thus, at the state level, it is envisaged to invest a set of measures for the development of key sectors of the economy and velayats, including the construction of large innovative joint ventures, export-oriented and import-substituting industries, improving food security, creating new jobs in all regions of the country, and maintaining social security of the population. It should be noted that, based on the accumulated positive national experience and tremendous achievements, Turkmenistan is making confident steps towards prosperity and progress. In general, the socio-economic strategy of President Serdar Berdimuhamedov, one of the main goals of which is to ensure the interests of every Turkmen, fully meets the Sustainable Development Goals of the United Nations.

References

1. *Berdimuhamedow G.M.* Türkmenistan Durnukly ösüşini maksatlaryna ýetmegiň ýolunda. Aşgabat. Türkmen döwlet neşirýat gullugy. 2018. (In Turkmen).
2. Berkarar döwletiň täze eýýamynyň Galkynyşy: Türkmenistany 2022-2052-nji ýyllarda durmuş-ykdysady taýdan ösdürmegiň milli Maksatnamasy. Aşgabat. Türkmen döwlet neşirýat gullugy. 2022. (In Turkmen).
3. *Gambarova R., Saliyeva V.* Socio-economic aspects of sustainable development // Вестник науки и образования. 2023. № 1 (132). Часть 1.

CULTURAL AND HUMANITARIAN COOPERATION OF TURKMENISTAN IN THE FIELD OF STUDYING THE UNIQUE HERITAGE OF MAGTYMGULY FRAGI

Kuliyeva B.¹, Berdyev M.², Amandurdyev I.³, Allakuliyev E.⁴

¹*Kuliyeva Bagty - lecturer,*

²*Berdyev Murad- lecturer,*

³*Amandurdyev Ismailmurad - student,*

⁴*Allakuliyev Eziz - student,*

*TURKMEN STATE ARCHITECTURE AND CONSTRUCTION
INSTITUTE*

ASHGABAT, TURKMENISTAN

Abstract: *examples of successful interactions on the study of the unique literary heritage of the great poet and thinker Magtymguly Fragi are given. Shown are successful examples of joint events dedicated to the 300th anniversary of the poet's birth, organized in countries such as Uzbekistan, the People's Republic of China, Russia, Armenia and Japan.*

Keywords: *literary heritage, cultural and humanitarian cooperation, Magtymguly Fragi, humanism.*

In May 2024, the 300th anniversary of the birth of the great Turkmen classical poet Magtymguly Fragi will be widely celebrated in Turkmenistan. The literary heritage of the outstanding thinker and poet belongs not only to the Turkmen people, but to the whole world. In this regard, the cultural and humanitarian cooperation of Turkmenistan with foreign countries in the field of studying the literary heritage of the brilliant thinker has intensified [1, 2]. Thus, holding various festive joint events in honor of the anniversary of Magtymguly Fragi in accordance with the Resolution of the President of the Republic of Uzbekistan “On the wide celebration of the 300th anniversary of the great Turkmen poet and thinker Magtymguly Fragi.”

In June 2023, a seminar and literary evening were organized at Ningxia University of the People's Republic of China, dedicated

to the 300th anniversary of the birth of Magtymguly, where teachers and students exchanged their knowledge about the life and work of the poet, read his poems in Chinese, Turkmen and Russian. .

During this seminar, a short survey was conducted among students: “How do you understand Magtymguly?” As a result, all opinions boiled down to the fact that, filled with selfless and sincere love for his Motherland and people, the great poet called on the Turkmen tribes to unity. As noted, the deep ideological content of Magtymguly’s works is one of the components of the powerful philosophy of the countries of the East. The concepts of good and evil that he reveals in his works, his calm observation of human life, practical philosophical instructions - all this has a pronounced coloring of Eastern philosophy.

Therefore, his poetry is very close to the Chinese reader. A collection of Magtymguly's poems was translated into Chinese and published in this friendly country. Magtymguly's poems represent the richest treasury of the Turkmen national spirit and national culture of the Turkmen people [3]. In his poems, the poet describes such excellent qualities of the Turkmen people as kindness, hard work, strength, courage, perseverance and optimism. Magtymguly’s poetry gives a deep understanding and insight into the national spirit of the Turkmen people. His poems have always played an important role in the formation of the Turkmen national character and national spirit. Thus, Magtymguly’s poetry can help modern Chinese youth become more deeply acquainted with the Turkmen national character and culture of Turkmenistan.

A concert dedicated to the 300th anniversary of the birth of Magtymguly Fragi is planned to be held at the Museum and Exhibition Complex of the Russian Academy of Arts. The large-scale dedication concert “The Fount of the Mind of Magtymguly Fraga” will be attended by cultural and artistic figures of the Russian Federation and Turkmenistan. The mono-opera “Monologues of Magtymguly Fragi”, written by the famous Turkmen composer Mamed Huseynov, will be performed here. A large-scale vocal and instrumental work for soprano, cello and

orchestra was created in the period 2007-2013. The mono-opera includes five parts, which are based on the poet's poems "Calling", "Beginnings", "Sadness", "Truth", "Good and Evil" [4] containing philosophical reflections in poetic form about human life, fate, and spiritual quests.

In the Republic of Armenia, at the Yerevan State University, a lecture was held dedicated to the work of the great Turkmen poet and thinker Magtymguly Fragi. Teachers from the Turkmen State University named after Magtymguly gave lectures on the work of Magtymguly, during which students became familiar with the biography of the poet, his creative heritage and patriotic poems. Of particular interest was the artistic style of the language and the form of Magtymguly's poetry, as well as his ideological views.

It should be noted that strong partnerships have been established between the two leading universities of Turkmenistan and Armenia. As part of this cooperation, conferences, forums, round tables, lectures and master classes are regularly held with the participation of faculty and students from both countries. There is an active exchange of experience with the aim of further developing interaction between universities of the two friendly states.

A series of classes on Magtymguly's humanitarian views was held at the University of Tsukuba and Higashiosaka High School in Japan, which included lectures by Turkmen students who are studying at leading Japanese higher education institutions. Japanese students also actively participated in the events, expanding their knowledge of Turkmen culture. As part of the educational cycle, the University of Tsukuba also organized an exhibition dedicated to the works of Magtymguly Fragi and the national heritage of Turkmenistan. The events held contributed to strengthening cultural ties between the two countries. In March 2024, Geneva hosted a solemn event dedicated to the 300th anniversary of the birth of the outstanding Turkmen poet and thinker Magtymguly Fragi, organized by the Permanent Mission of Turkmenistan to the UN Office in Geneva at the Palais des Nations. The cultural event was attended by high-ranking representatives of the UN, UNESCO, diplomats from the

countries of the region and Europe, representatives of international organizations, NGOs, the media and the Turkmen diaspora. The speakers noted Magtymguly's humanistic ideas about peace, friendship and mutual respect between peoples, his contribution to the formation of the Turkmen nation and the significance of his heritage as part of world culture. As part of the event, books of Magtymguly's poems in different languages and figurines of the poet were donated to the UN Office in Geneva. Video materials about his life and work were also shown, and an exhibition of decorative and applied arts was organized.

Thus, although the world and social environment have undergone significant changes over the past several centuries, the importance of the great Turkmen poet-thinker and his poetry has not diminished. Magtymguly's ideas became even more valuable for building a harmonious personality and forming a unified national state.

References

1. *Mammedov A.* Magtymguly in the literature of Turkic peoples. Ashgabat: 2023 (in Turkmen).
2. *Amansyakhedov M.* The poetic personality of Magtymguly Fragi. Ashgabat: 2023 (in Turkmen).
3. *Geldiev G.* Names of places and countries in the works of Magtymguly and their poetics. Ashgabat: 2023. (in Turkmen).
4. *Buran A.* Sözi ganatlandyran şahyr – Magtymguly. Istanbul: 2023. (in Turkmen).

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