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Developing and Improving Guidelines for the Management of Ammunition in NATO Technical Working Groups – An Interview with Lieutenant Colonel György Miklósi

The present publication is an interpretation of a professional discussion between two experts both of whom have decades of experience in the field of ammunition life cycle management. The report discusses the process of developing ammunition life cycle guidelines for NATO.² It will cover the different working groups, their structures, their working procedures, their relationships and the methodology used to develop ammunition management guidelines. In terms of international relations, the publication briefly discusses the cooperation and communication between the NATO Working Groups on Ammunition and the other UN³ and EU⁴ Task Forces with similar tasks. The interview was conducted with one of the most knowledgeable experts in this field in Hungary, Lieutenant Colonel György Miklósi, who provides a comprehensive overview of the aforementioned topics and details the tasks to be carried out by the Ministry of Defence and the Hungarian Defence Forces in the development and implementation of new domestic regulations on ammunition handling compatible with NATO guidelines. The interview does not neglect to mention the obstacles and contains valuable insights as a thought provoker or discussion starter.

Keywords: *ammunition, life cycle management, NATO guidelines, international cooperation*

In the course of my research, the issue of regulation has arisen in several cases. We follow these guidelines in all aspects of our professional activities and apply them in our work. It is based on these guidelines that we report to our superiors, direct and hold our subordinates accountable.

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² North Atlantic Treaty Organization.

³ United Nations.

⁴ European Union.

The regulations in effect today were never revoked date back to the 1980s. The organisational structures referred to in them have been modified and many of the regulations have become obsolete and outdated. From time to time, the need for the modernisation and revision of the regulations has been raised, but no major changes have been made so far. Since our join to NATO in 1999, we have been involved in many professional activities and played a significant international role, but the general guidelines of this alliance have not taken a foothold in the Hungarian Defence Forces. Although several STANAGs⁵ have been ratified and implemented, their deep integration into the system has not yet been achieved.

Regarding this issue, I had a professional discussion with Lieutenant Colonel György Miklósi, one of the most knowledgeable experts on the subject.

Lieutenant Colonel György Miklósi has decades of experience in the field of central ammunition and financial management. He started his work in this field in the 1990s at the HDF⁶ Ammunition Supply Centre in Pusztavacs, and later he worked at the HDF Armament Technical Service Headquarters. After the HDF Directorate General of Logistics, the HDF Joint Logistics and Support Command, and the MoD⁷ Development and Logistics Agency, he joined the MoD Armament and Quartermaster Office, where his work covered an increasing number of areas but the issue of ammunition supply remained a constant focus. He is currently Deputy National Armaments Director Representative at the NATO HQ in Brussels. Ammunition supply and management – overall ammunition lifecycle management – is an important part of his work, alongside a number of other specific areas. Our longstanding professional relationship and recent consultative meetings have prompted me to interview him to support my previous research.

TT: Lt. Colonel, can you please briefly describe your current position and your activities in this field?

MGY: Representatives of the National Armaments Directors (NADREPs) and Deputies are the members of the CNAD⁸ community. CNAD is the senior NATO committee responsible for promoting the cooperation between countries in the armaments field. The mission is to enable multinational (MN) cooperation on delivery of interoperable military capabilities to improve the effectiveness of NATO forces over the whole spectrum of current and future operations.

As the highest-level of armaments body, CNAD provides senior level advises and reports on armaments issues directly to the NAC,⁹ which is the principal political decision-making body of NATO. It is tasked with identifying collaborative opportunities for research, development and production of military equipment, including ammunition (only conventional, nuclear excluded). It is responsible for a number of cooperative armaments projects that aim to equip NATO forces with cutting-edge capabilities. Ongoing common funded programmes

⁵ Standardization Agreement.

⁶ Hungarian Defence Forces.

⁷ Ministry of Defence.

⁸ Conference of National Armaments Directors.

⁹ North Atlantic Council.

are the JISR,¹⁰ AFSC,¹¹ AGS¹² and BMD¹³ battle management. Since 2017, I am – as Deputy NADREP – the national delegate for these programmes.

TT: In this responsible position, how does the coordination between nations work, and how are NATO and national positions developed? What is its organisational operating mechanism?

MGY: The CNAD meets in plenary sessions twice a year at the level of NADs¹⁴ under the chairmanship of the NATO ASG DI.¹⁵ Since 2016, Mr. Camille Grand is the ASG DI. The NADs – usually military generals, ministry/government commissioners, high-level executive officers – in the plenary session discuss the current armaments status and future challenges, tasks. The Hungarian NAD is Mr. Gáspár Maróth, Government Commissioner for Defence Development. Overall CNAD guidance is provided through the Management Plan, which translates NATO's strategic objectives into specific ones for the armaments community and defines priorities for day-to-day cooperation. The NAD's national representatives at NATO HQ in Brussels, the NADREPs meet in PS¹⁶ formally twice a month, ensuring the continuous implementation of the CNAD's objectives. NADREPs serves as the focal point regarding major CNAD programmes, oversight main armaments groups, identify the military–technological–acquisition implications of cooperative activities for NATO and nations, coordinate armaments cooperation initiatives, analyse armament development trends, promote innovation efforts and EDT¹⁷ technologies usage in order to maintain the NATO military edge. The NADREPs regularly coordinate and arrange with the members of the NATO International Staff, NATO and Partner nations NADREPs, Hungarian NAD's Office, Defence Policy Department and Military Representative Office. In particular cases the NADREPs consult with MoD Hungary and Defence Command officers, technical–procurement–legal–industry experts, both orally and in writing, formal and informal.

TT: I understand that, according to this, national representatives are in constant coordination with the national military and ministerial organisations, and, on a cyclical basis, with NATO organisations. How do you supervise and provide professional guidance for the projects launched?

MGY: The CNAD and its subordinate structure focus on the collaborative development, acquisition and interoperability of defence equipment. The CNAD sets priorities and gives guidance to its substructure, which consists of thousands of military and civilian experts from Allies and Partner nations. It aims at identifying opportunities for cooperation between interested nations to share risks and costs of development, research and technology and to achieve economies of scale, industrial cooperation, standardisation for greater interoperability.

¹⁰ Joint Intelligence, Surveillance and Reconnaissance.

¹¹ Alliance Future Surveillance and Control.

¹² Alliance Ground Surveillance.

¹³ Ballistic Missile Defence.

¹⁴ National Armaments Directors.

¹⁵ Assistant Secretary General for Defence Investment.

¹⁶ Permanent Session.

¹⁷ Emerging and Disruptive Technologies.

The Army, Air Force and Naval MAGs¹⁸ and their respective sub-groups support the work of the Conference and are responsible to it for all activities in their fields. Assistance on industrial matters is provided by the NATO Industrial Advisory Group (NIAG), enabling the CNAD to benefit from the advice of the industry on how to enhance the NATO–industry relationship, as well as assists the Conference in exploring opportunities for international collaboration. Other groups under the CNAD are active in fields of life cycle management (AC/327–LCMG), codification (AC/135–GNDC) and last but not least the ammunition safety (AC/326–CASG).

TT: The matter of ammunition safety is a very actual issue in Hungary these days. Professionals have produced and discussed several reports on this problem, and I myself have conducted and published several studies. I would say that, as the commander of an ammunition storage base, this is a vital issue for me. It is an area of great importance, but one that has received very little publicity. Can you provide some information on the ongoing activities of the AC/326 Working Group?

MGY: The number of ammunition-related ongoing activities are in the L2 and L3 sub-structure, under the NAAG, the Integrated Capability Group Indirect Fire (ICG IF) responsible for interoperability development of artillery items (e.g. 155 mm guided projectiles). Land Capability Group Land Engagement (LCG LE) deals with armoured vehicles and associated weapon systems, ammunitions (e.g. 120 mm × 570 ammunition for smooth-bore tank gun standardisation). Land Capability Group Dismounted Soldier Systems (LCG DSS) SG/1 is responsible for the standardisation of all technical aspects of small arms ammunition up to and including 40 mm, as well as verify the battlefield interchangeability of NATO qualified ammunition through detailed testing. The primary mission of NAFAG ACG/2 on Effective Engagement is to achieve interoperability between NATO and national forces by developing and providing standardisation in the area of air weapons systems (e.g. STANAG 3820 on 27 mm × 145 ammunition and links for aircraft guns).

Ammunition related MN projects

To carry out its missions and tasks, NATO needs Allies to invest in interoperable, cutting-edge and cost-effective equipment. To that end, NATO plays an important role in helping nations decide how and where to invest in their defence. NATO also supports Allies in identifying and developing multinational cooperative projects to deliver the key defence capabilities needed for Alliance security. The aim is to drive down costs of economies with scale while improving operational values through increased commonality of equipment, training, doctrine and procedures.

TT: The involvement and objective of the CNAD is understandable from the above, but technically how are the projects set up and run?

¹⁸ Main Armaments Groups, respectively AC/225 – NATO Army Armaments Group (NAAG), AC/224 – NATO Air Force Armaments Group (NAFAG), AC/141 – NATO Navy Armaments Group (NNAG).

MGY: Under the coordination of CNAD, NATO Allies and Partners have initiated several HVPs,¹⁹ which are being developed (currently 14 accepted projects). HVPs focus on delivering the most critical capabilities in an accelerated manner by creating political commitments in the form of agreements signed by Defence Ministers. The initial high level signed document is the LOI,²⁰ which outlines the general cooperation idea, usually without any financial and legal obligation. It is followed by the signature of a MOU,²¹ a legally binding document specifying the details of cooperation. The MOUs provide the necessary legal framework for the execution of the implementation phase towards the delivery of the specific capability. The high-level political involvement dramatically increases the prospect of tangible progress.

In the implementation phase of most projects, the NSPA²² plays an important role of intermediary between the nations and industry. This can happen at different levels: the Agency can invite the industry to present solutions for Allies and partners to acquire, be involved in the procurement process, or even negotiate on behalf of nations with industry.

TT: This seems to be the standard procedure for ammunition and technical warfare materials then. Does the above-mentioned AC/326 Working Group operate on the basis of these principles?

MGY: The CNAD Ammunition Safety Group (AC/326 CASG) is established under the CNAD to be responsible for ammunition life cycle safety in support of CNAD priorities. Aims are: ensuring the safety and suitability for service (S3) of munitions, during all the phases of their operational and logistical life; minimising the associated risks by introducing safer munitions; integrating munitions risk management into NATO planning and operations. Through its sub-groups, the CASG provides the forum for NATO members, PfP,²³ MD,²⁴ ICI,²⁵ invited PAG,²⁶ Singapore and South Africa to develop common standards and procedural guidance on munitions and explosive safety in order to foster interoperability in NATO-led operations, promote the potential for interchangeability of ammunition, and establish a basis for coordinated procurement of munitions and explosives. The CASG sub-groups are:

SG/A on Energetic materials (EMT) develops standards intended to ensure that the energetic materials used in munitions and explosives serve their intended purpose and that they do not deteriorate and become liable to spontaneous explosion during the life time of the parent munitions or explosive device. The technical areas addressed are: qualification and selection of energetic materials; specification of energetic materials and their constituent materials; testing of their chemical, mechanical and physical properties to ensure continuing suitability for service; testing energetic materials sensitivity, sensitiveness and explosiveness. Major standardisation activities currently: review of AOP-7 Policy, Data Requirements, and Tests for the Qualification of Energetic Materials for Military Use; STANAG and AOP-4022 Speci-

¹⁹ High Visibility Projects.

²⁰ Letter of Intent.

²¹ Memorandum of Understanding.

²² NATO Support and Procurement Agency.

²³ Partnership for Peace.

²⁴ Mediterranean Dialogue.

²⁵ Istanbul Cooperation Initiative.

²⁶ Partners Across the Globe, Australia, Iraq, Japan, the Republic of Korea, New Zealand.

fication for RDX (Hexogene); STANAG and AOP-4487 Friction Sensitivity Test; STANAG and AOP-4583 Specification for N-Butyl NENA.

SG/A on Initiations systems (IST) is concerned with the safe operation of initiation systems and develops design principles, safety criteria and test techniques for land, air and sea employed munitions. The group also addresses the interoperability of military fuses. Current major standardisation activities are: review of STANAG 4809 and AOP-67 Safety Design Requirements for Remotely Controlled SAF Systems; STANAG and AOP-4187 Fuzing Systems Safety Design Requirements. Liaison with Interservice Ammo WG should be mentioned regarding fuse date discussions.

SG/B on Ammunition Systems Design and Assessment addresses the design requirements for the development of munitions that are safe and suitable for service (S3) and the testing, qualification and classification methods and procedures to ensure S3 compliance. An integral part of the work is to assess the military environment that munitions are exposed to, this including the climatic, mechanical and electromagnetic environments, and to test for the safe operation of munitions in these environments. Modern technology has enabled the development of munitions that do not detonate if exposed to fire or other external stimuli, yet retain their operational performance. The groups develop NATO standards related to the Insensitive Munitions (IM). Current main standardisation activities are: review of STANAG 4629/2 S3 Procedures and AAS3P Series. The IMHM²⁷ is a NATO Smart Defence Project on munition health management (MHM), in connection with this activity the SG/B approved STANAG/AOP 4844 document for ratification.

SG/C on In-Service and Operational Safety Management addresses the hazards of munitions and explosives, using as a basis the UN hazard classification system for dangerous goods, and provides guidance on methods and procedures to ensure the safe and secure storage, processing and disposal of all types of munitions and explosives. Ongoing work includes the analysis of testing and trials results for new, or new types of munitions and for new methods of storage and disposal. The data provided by nations on trials and accident analyses also enables the group to provide guidance on risk assessment of munition and explosive storage configurations. SG/C has a few, but very important and dense publications. These are STANAG 4440 / AASTP²⁸-1 NATO Guidelines for the Storage of Military Ammunition and Explosives (Edition C v1 is under preparation), STANAG 4442 / AASTP-4 Vol. 1. Application of Risk Analysis to the Storage and Transport of Military Ammunition and Explosives (Ed.B v1 is under preparation), STANAG 4802 / AASTP-4 Vol. 2 (complements STANAG 4442, Ed.B v1 under preparation), STANAG 4657 / AASTP-5 NATO Guidelines for the Storage, Maintenance and Transport of Ammunition on Deployed Missions or Operations (Ed.B v1 is under preparation).

CASG has a strong and valuable cooperation with MSIAC.²⁹ MSIAC is not a CNAD working group, but a NATO project office funded and directed by Member Nations (currently with 15 participating nations, excluding Hungary), which was established in 1991. MSIAC provides

²⁷ Integrated Munitions Health Management.

²⁸ Allied Ammunition Storage and Transport Publication.

²⁹ Munitions Safety Information Analysis Center.

technical advice and support to the CASG and its sub-groups. In 2020, the Center completed a historical review of artillery gun accidents as well as issued TNT exudation, crystal growth and ageing technical report. Provided SG/A support to AOP-7 and AOP 4488 update/rewrite and to Gun Launch Setback Ignition WG for development an assessment protocols STANREC for acceptability of explosive for gun launch. Regarding SG/B they supported the update of STANAG 4439/AOP-29 and STANAG 4123/AASTP-3, the review of STANAG 4375, STANAG 4297/AOP-15, STANAG/AOP-4396 and as a support to MHM reviewed the draft AOP-4844 NATO handbook. Support of SG/C is also considerable, as taking part in update to AASTP-1 Part I, hosting the virtual AASTP-4 Risk Analysis Working Group (RAWG) meeting, they supported the Accident/Incident Working Group. Overall, MSIAC link to AC/326 will continue and it takes about 20% of MSIAC time.

The strategic goal of the MSIAC is to help nations eliminating safety risk from unintended reactions of munitions throughout their lifecycle. To assist its member nations to realise this goal, the project gathers, stores, exchanges and analyses information and technology related to munition safety and insensitive munitions. The project has played a key role in advancing underpinning knowledge and science and assisting nations develop and implement safety policy. Over the years, MSIAC has played a central role in facilitating efforts of member nations to design, develop, procure and use safer munitions. One of the main activities is answering technical questions across all munitions safety areas of interest, covering munition systems, propulsion, materials, insensitive munitions, test and evaluation, warheads, transport and storage. MSIAC also produces technical reviews of munitions safety areas of concern and has published hundreds of open and limited reports (only available to member nations), including CASG-related materials. MSIAC organises, facilitates, conducts and supports technical working groups and meetings (to discuss and resolve policies and practical issues), as well as workshops (to discuss and review more complex issues, developing technical consensus, arranging cooperative test and evaluation programs and facilitating munitions safety advances). Outstanding NATO certified training courses are the one-week AASTP-1 and -5 lecture series. MSIAC analyses the requirements and needs of members and the international community and develops user friendly technical software, databases, training, analysis, design, tools and products to address members' needs (e.g. Insensitive Munitions Policy Database). MSIAC provides and facilitates interactive visits to member nations where briefings, presentations and training are provided to participants on international and MSIAC developments in munitions safety.

UN efforts and link

TT: In addition to NATO membership, we are also members of several international organisations, such as the UN and the EU. The question may arise as to how the various international organisations relate to each other on technical issues and how they monitor each other's achievements. This is an important question as the direction to be followed in the development of each nation's regulations in this respect needs to be determined, possibly

considering the achievements of each organisation, as different rules on a given issue cannot be properly followed. What is their level of interaction and how far do they keep up with each other's scientific achievements? To what extent do national experts receive help in this decision-making process?

MGY: CASG SG/C has a direct link with the UNODA³⁰ Office. UNODA proposed changes to QD³¹ tables and indicated that IATG³² 02.20, Quantity Separation Distances would need to be amended once SG/C developed AASTP-1 Ed C v1 have been published. The IATG is part of the UN SafeGuard Programme. It is expected that new tables will provide increased clarity to the different effects of explosives. At the UN discussions, the NATO QD standards are characterised as international best practices. Overall, the SG/C work is seen as vital to UN ammunition and explosives safety policies.

The SG/C in 2019 informed the CASG members on the new document, created by the United Nations. The Manual on Ammunition Management is an essential reference for Member States, troop/police contributing countries (T/PCCs), military commanders, police commissioners and staff officers in UN peace operations. The manual was developed by the Department of Peace Operations and the Department of Operational Support with the support of experts from member states and consultation with field missions and United Nations Mine Action Service.

Over the years, thousands of weapons and millions of rounds of ammunition items have been deployed in UN peace operations. Stockpiling of ammunition with the absence of standardised management systems may pose significant risk. In order to integrate the technical principles of ammunition management, it became imperative to embark on producing the manual with comprehensive control measures in the overall storage, safety and logistical aspects, scales of ammunition and firing training in the field missions. The manual is based on the IATG, and standardises some good practices and approaches developed in the field missions, with a vision to improve and enhance safety and security of ammunition in the field. The manual covers the contingent owned ammunition for T/PCCs to promote and strengthen the safety of ammunition stockpiles, improve storage facilities and the logistical aspects of ammunition under field storages. It serves as a guiding tool to T/PCCs personnel in peace operations during the pre-deployment phase, deployment and repatriation. The manual is subdivided into 5 chapters: Standards and Good Practices of Ammunition Storage; Levels of Operational Ammunition; Shelf Life of Ammunition; Expiration, Replenishment and Disposal; Training.

³⁰ United Nations Office for Disarmament Affairs.

³¹ Quantity Distances.

³² International Ammunition Technical Guidelines.

ENNSA³³

ENNSA is part of the European Defence Agency (EDA). Member States and industry can cooperate under the umbrella of ENNSA on the improvement on harmonisation of Member States' qualification practices as offering communication between national ammunition safety authorities and related experts. Safety policies and procedures are important factors, having a direct effect not only on safety, but also on procurement cost and interoperability. European harmonisation in this field would contribute to the implementation of the Common Security and Defence Policy (CSDP) by enhancing among others interoperability and interchangeability, facilitating cooperation amongst MS especially on Pooling and Sharing, strengthening the ammunition European Defence Technological and Industrial Base (EDTIB), improving harmonisation among members, while also supporting their coordination and finally creating the prerequisites for a common European ammunition market. To develop the situation in Europe and fill the identified gaps, in 2010 the establishment of the ENNSA was decided by the EDA Steering Board.

The main goals are to recognise national procedures and organisations involved in the munitions safety qualification processes; appreciation, assessment and evaluation of the use and implementation of ammunition safety standards and procedures in relation to military requirements; analysis of national ammunition safety standards/procedures used or the way that international standards on ammunition safety are being implemented at a national basis; explore possibilities of achieving a level of harmonisation (or to take coordinated action) on ammunition safety requirements and analysis procedures; investigation of best practices on safety analysis procedures.

A three-level organisation was established for the ENNSA network. The first (executive) level is ENNSA group, which represents the decision-making body. The second (senior) level providing the ENNSA Qualification Forum, in charge of planning of specific activities. The third level the T&E Activities Working Groups (TAWG), which are ad-hoc established for specific activities and held at subject matter expert (SME) level.

ENNSA has no direct link to CNAD, nevertheless this organisation accept NATO developed standards (CASG managed included) and MSIAC is invited for their meeting to foster communication and harmonisation efforts.

NADREP Champion

As a member of the CNAD community I volunteered two NADREP "Champion" positions, namely the CNAD Level-1 CASG and Level-2 ICG IF. The "Champions" initiative was launched by the International Staff (IS) to help in the oversight of the work of the CNAD substructure and to provide a conduit for the passage of information to/from CNAD. "Champions" are a kind of liaison officers and provide a mechanism to bring regular feedback to CNAD on the work

³³ European Network of National Authorities on Ammunition.

in the particular subgroups and help the substructure informing them on higher level plans, trends, initiatives. NADREPs are aware of full spectrum CNAD high-level activities, guidance and connection between the different NATO organisations, these are important information for the lower level expert groups. In addition, the concerns at the substructure (for example administration support issues) could be conveyed by the “Champion” to the IS for settling. Following the CASG and ICG IF meetings I make a written report to CNAD PS regularly, highlighting the most relevant activities, plans, complementing with my observations.

There is no strict requirement for “Champions” to be an SME, but without at least basic knowledge, the coordination work is unfeasible. I was the first Hungarian NADREP/Deputy who has been undertaken the ICG IF and CASG liaison. As my end of tour is approaching and most probably there will be no continuity in this field, although the national delegate appointment would be crucial. I have been lobbying for a long time to have experts at CASG and its SG/C.

TT: Finally, in your opinion, which directions and principles can Hungary follow in order to achieve the most efficient and workable system of regulations and optimal ammunition life cycle management in the shortest possible time?

MGY: Hungary should adapt the NATO standards, publications ASAP and increase the communication between Allied nations, related NATO, EU, UN organisations. MSIAC organised workshops and courses could provide essential knowledge for ammunition supervisors and managers. The comprehensive Zrínyi military modernisation and rearmament program changes the entirety of the Hungarian Defence Forces (HDF), the whole DOTMLPFI³⁴ spectrum. The goal is that the HDF should become a significant power for the region to guarantee peace, security and stability in central Europe. Therefore, the transformation of the Hungarian ammunition management system is an inevitable action.

Thank you for this detailed and in-depth conversation that has touched upon the broader context of this topic.

Summary

The conversation with Lieutenant Colonel Miklósi was extremely enlightening. Updating the regulatory framework on ammunition safety is a priority issue these days. At present, the relevant regulations originally laid down in the 1980s are still in force and have not been repealed, so they must be complied with. In addition, the entire infrastructure has been set up in accordance with the above regulations.

Of course, the AASTP-1 NATO STANAG, introduced in 2017, should also be applied as a basic regulation, but the reality of today's world – the level of preparedness and qualification of the staff – does not allow it to be used in its original language, while it has not been properly translated, either. The fact that the requirements for objects have not been examined is not negligible.

³⁴ Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities, Interoperability.

Within the NATO organisation, several organisational units and their sub-groups are working towards ensuring the highest possible level of safe operation. Research results and experience shared by other organisations are taken as a basis and, after the required process, the basic guidelines will be refined.

The NATO, UN and EU elements specialised in this field strive to harmonise their directives, make use of each other's results and continuously improve their activities in the field of ammunition safety.

For Hungary as a member of NATO the way forward is compliance with the latter organisation's guidelines. Hungarian representatives hold positions at several levels, so this should not be a major obstacle. In order to achieve this goal, the professional senior management should endeavour to enforce the policy it considers to be the best in this field.

The current regulations are good in their basic principles, although they take a different approach to ammunition safety than similar NATO regulations. They also require modernisation. It could be a solution to harmonise them with NATO guidelines, thus building on the strengths of both perspectives to achieve a national regulatory system, based on Hungarian realities, but with a 'safety first' approach.

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