

## Section 2. Engineering sciences in general

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### **FIRE AND EXPLOSION PREVENTION FOR RESIDENTIAL AREA IN VIETNAM – SITUATION AND SOLUTIONS**

**Abstract.** In urban areas in Vietnam as well as in other countries around the world, residential areas are planned to be built and developed with high density. Along with that is the potential risk of fire and explosion affecting the lives, activities, health and lives of people. The article is based on assessing the current situation, proposing solutions to improve the effectiveness of fire and explosion prevention for residential areas in Vietnam, and at the same time, the experience of countries around the world can refer to the organization implementing this work.

**Keywords:** Prevention of fire and explosion; residential area; Vietnam.

#### **1. Make a problem**

According to statistics, in Vietnam, there are: 83.564 residential areas, including 4.923 residential areas with high risk of fire and explosion; 23.257.601 houses for households; 1.257.508 houses combined with production and business, of which 302.849 establishments are not included in Appendix I; 42.912 establishments listed in Appendix III; 911.747 establishments under Appendix IV of Decree No. 136/2020/ND-CP. According to statistics from June 1, 2022 to December 15, 2022, there were 983 fires in Vietnam, killing 65 people, injuring 36 people and property damage was estimated at 932,140 billion VND. Of which, 538 fires occurred in households and houses in combination with production and business (accounting for 54.7%), killing 29 people (accounting for 44.6%), injuring 20 people (accounting for 55,55%), property damage was nearly 37 billion VND (accounting for 4%), specifically: (1) There were 400/538 fires at household houses, killing 22 people, injuring 07 people, and causing

damage property damage was estimated at 17.7 billion VND; (2) there were 138/538 fires at houses in combination with production and business, killing 07 people, injuring 13 people, and causing damage to property estimated at 19.3 billion VND [1]. The above figures show serious damage, especially when fires and explosions occur in residential areas; On that basis, researching and proposing solutions to contribute to the high efficiency of fire and explosion prevention for residential areas in Vietnam is urgent and has profound significance in current practice.

#### **2. Reality**

##### **2.1. Result**

– Propaganda and building movement of all people for fire prevention, fighting and rescue:

Actively coordinate with the Department of Information and Communications, information and communication agencies and authorities at all levels to strengthen propaganda on the mass media, directly to agencies, organizations, residential areas and people; promoting propaganda and mobilizing

people to install the 114 Fire Alarm application, use Zalo of the Police Department of Fire Prevention, Firefighting and Rescue, participate in building and maintaining the models and movements created strong change in awareness, consciousness and responsibility of Party committees, local authorities, mass organizations, neighborhood groups and people for fire prevention, fighting and rescue. In it, there are many good and effective ways to do it, such as:

- + Regarding propaganda: Maintain weekly and monthly broadcasts on local radio and television stations; posting news and articles on the portal of the Provincial Police, Zalo and Facebook application platforms to attract many people to access and follow; send free SMS to mobile subscribers; propaganda on the commune-level loudspeaker system, bus screens, lottery tickets, leaflets, banners, billboards, posters in crowded places ...; integrate propaganda on fire prevention and fighting in activities of cell branches and residential groups in residential areas; hand out fire prevention manuals to households; mobilize people to install and use the application Fire Alarm 114 and Zalo Police Department of Fire Prevention, Fire Fighting and Rescue. Specific results: Published 4.893 times of reportages, instructional clips, news articles on television; propagated 526.298 times of propaganda on radio stations at grassroots, communes, wards and townships; issued 2.583.429 leaflets, 113.327 banners and slogans; propaganda on social networking platforms Zalo, Facebook 744.159 times; send 46.386.583 SMS to people's phone numbers; organized 490.758 direct propaganda sessions with 2.617.499 participants; integrated propaganda through activities of cell branches and residential groups was 100.666 times; 390.887 people downloaded and used the application, 4.072.563 million visits to the Fire Alarm application 114 [1].

- + Regarding the campaign to open the second escape route: 38/63 localities have basically completed the mobilization of 100% of houses with 02 floors or more to have 02 escape routes that have opened the second escape route. Specific results:

There are 4.602.140/5.086.748 households that have opened the second exit through the balcony, loggia, the entrance to the roof (reaching 90%); mobilize 4,207.310 households to equip themselves with fire-fighting equipment [1].

- + Regarding propaganda, mobilizing people to install and use the application Fire Alarm 114 and Zalo Fire Prevention, Firefighting and Rescue Police Department: There were 390.887 turns of people downloading and using the application, 4.072.563 million visits to the 114 Fire Alarm application, thereby, helping people have more forms to report fires, explosions, accidents, incidents and information channels to update news on fire prevention, fighting and rescue [1].

- Regarding the establishment and organization of activities of the civil defense force: 81.738 civil defense teams have been established out of a total of 87.376 unit subject to the requirement to establish a civil defense team (accounting for 93.54%) with 808,118 members (of which, ranked 15.006 teams well; fairly rated 38.125 teams; averaged 25.020 teams; rated weakly 1.041 teams; unclassified 2.546 teams), thereby promoting efficiency in firefighting and extinguishing many fires before the police force of fire prevention, fighting and rescue arrives at the scene, meeting the motto "4 on the spot" [1].

- Building a safety model of fire prevention and fighting in residential areas.

Work closely with local Party committees and authorities to promote propaganda and mobilize people to participate in building safety models and movements on fire prevention and fighting, especially the model of "Safety Interaction Teams on fire prevention and fighting" and "Public firefighting points" in residential areas, specifically:

- + Building and replicating models of fire prevention and fighting safety: Currently, the whole country has built, replicated and effectively maintained many models and movements of fire prevention and fighting safety in residential areas residential areas such as: Model of safe residential area for fire prevention

and fighting; my house has a fire extinguisher; install public firefighting points in deep alleys; household safety in fire prevention and fighting according to the motto 4 on the spot; safe residential groups for fire prevention and fighting; women's shock team in fire prevention and fighting; mobilize the socialization of fire prevention and fighting to cover fire extinguishers in residential areas; household safety in fire prevention and fighting; 3 have 3 know, 3 fire prevention and fighting safety; cult, wallize; donate land to widen the alley; registration not to occur fire; fire prevention and fighting mailboxes; wards, communes and townships fire prevention and fighting safety points; 4-layer fire prevention and fighting model on fire prevention and fighting; itinerant propaganda; The family has at least 2 escape routes and has a fire extinguisher and means of escape; fire truck.

+ Building and replicating models of fire prevention and fighting safety groups and public firefighting points: 1.191 models of fire prevention and fighting safety groups have been built nationwide, and 556 fire fighting points have been built public fire. Continuing to replicate 3.058 models of fire prevention and fighting safety groups, 3.176 public firefighting points, there are now 4.249 models of fire prevention and fighting safety groups nationwide, 3.732 fire fighting points public.

– Safety inspection on fire prevention and fighting

From June 1, 2022 up to now, 13.623.331 turns of 24.515.109 households, houses for living in combination with production and business have been inspected. Through the inspection results, 4.292.489 omissions were detected, 245.546 violations were detected, and 14.206 violations were handled with an amount of more than 19.1 billion VND. Major violations exist: Failure to ensure fire prevention between living areas, emergency exit stairs and parking, production and business areas; there is 01 emergency exit on the 1<sup>st</sup> floor and install many layers of protective doors (wing doors, folding doors, rolling doors ...), installing tiger cages, iron cages, billboards at the lot, balcony, doors windows obstructing the 2<sup>nd</sup> exit of the house (emer-

gency exit) ...; the electrical system does not meet the requirements for fire prevention and fighting, and an additional connector is added to the line in service of production and business; there are not enough means, fire alarm, fire fighting equipment, rudimentary demolition tools..., especially in production and business areas. There are 907 cases of being temporarily suspended from operation; 261 cases are under active suspension [1].

– Construction and practice of fire fighting, rescue and rescue plans

Has built 9,944 fire fighting plans and 6,820 rescue plans; organized practice of 2,629 fire fighting plans and 2,934 rescue plans [1].

## 2.2. Comment

– *Advantage*

Police forces of fire prevention, fighting and rescue of local police in Vietnam have actively advised the People's Committees of the same level to issue many documents on implementing fire prevention and fighting work. under the direction of the Prime Minister, the Ministry of Public Security (Directive No. 32/CT-TTg of the Prime Minister; Plan No. 273/KH-BCA-C07 of the Ministry of Public Security); promulgating plans and focusing, drastic in implementation; directing 100% of district and commune police departments to advise the People's Committees of the same level to direct the implementation of mobilizing people to participate in building models of fire prevention and fighting safety teams, public fire fighting spots... in residential area.

– Party committees and local authorities have paid attention to, directed and organized the implementation of state management responsibilities for fire prevention and fighting according to decentralization. The awareness and sense of responsibility for fire prevention and fighting of the heads of establishments, households, owners of production and business households and people have changed positively, voluntarily overcoming shortcomings, violations of the law violations on fire prevention and fighting, opening a second escape route through the balcony, loggia, equipping with

portable fire extinguishers, participating in fire prevention and fighting activities in residential areas; In many localities, there were no fires of this type.

– *Survive, limit*

+ The work of advising the People's Committees of the same level to promulgate documents directing and implementing fire prevention and fighting work at the Police in some localities is still slow and not drastic progress has not been guaranteed: 11/63 localities have not yet issued a resolution stipulating the regular level of support for captains and vice captains of people's squads; 25/63 localities still have households that have not opened a second escape route, but as required, have 02 escape routes.

+ The propaganda and building of the all-people movement for fire prevention and fighting is not suitable for the target audience, not directly to the people, and the effectiveness is not high. The construction of the model of fire prevention and fighting safety groups and public fire fighting points in some localities has focused on completing the number according to the target; the model has not been actively replicated or the model has not yet met the guidance of the Ministry of Public Security and the Vietnam Fire Prevention and Fighting Police Department.

+ The inspection and guidance for households, houses for living in combination with production and business has not yet ensured the quality, and all contents have not been checked according to the instructions of the Fire Prevention and Fighting Police Department and rescue – Vietnam's Ministry of Public Security, failing to detect all existences and violations of fire prevention and fighting; Proposals and instructions to overcome violations are not in accordance with regulations, do not provide requirements for implementation time.

+ The Party committees and administrations of districts and communes have not been drastic in fulfilling their responsibilities for state management of fire prevention, fighting and rescue, specifically: Safety conditions have not been regularly maintained. Regarding fire prevention and fighting for residential ar-

reas, there has not been a civil defense team in 100% of residential areas, members are mainly part-time (street guards, militia and self-defense forces, veterans, etc.), operation is a formality, lack of means and equipment for fire prevention, fighting and rescue. Commune-level police have not actively advised and assisted chairpersons of commune-level People's Committees to fully implement their responsibilities for state management of fire prevention, fighting and rescue as prescribed in Clause 2, Article 52. Decree No. 136/2020/ND-CP.

+ Heads of households, business households and people have not seriously performed their responsibilities for fire prevention, fighting and rescue: (1) Failing to remedy shortcomings and violations already approved by the agency management inspection, recommendations or form implementation, deal; not interested in investing in equipment, equipment for fire prevention, fighting and rescue, or having equipment but not periodically checking and maintaining it, leading to damage ...; (2) not actively participating in fire prevention and fighting activities in residential areas (participating in propaganda sessions, civil defense forces, building safety models on fire prevention and fighting); (3) Fire and explosion also occurred, causing serious damage to people and property, causing public concern and concern in society in some localities.

– Causes of the existence, limitations

+ In many existing residential areas in Vietnam, the traffic infrastructure is not guaranteed for the operation of fire engines, there is no urban fire fighting water supply system, there are many types of production facilities and goods warehouses, residential houses combined with production activities alternately in residential areas (including constructions and construction establishments that are not licensed according to regulations) often fail to meet requirements for fire prevention, fighting and rescue.

+ Awareness and awareness of complying with the provisions of the law on fire prevention, fighting and rescue of a part of households, business households

and people in Vietnam is still limited serious; psychologically, subjectively, neglectfully, disregard fire prevention, fighting and rescue at places of residence, production and business; failing to actively research and participate in fire prevention, fighting activities and rescue in residential areas; lack of knowledge and skills to handle fires and explosions and escape skills.

+ The awareness of the authorities on fire prevention, fighting and rescue is not really comprehensive and profound, and has not mobilized the effective coordination of all levels and sectors in the implementation of the project a set of fire prevention and fighting solutions for residential areas, households, houses in combination with production and business form, following the quantity, has not brought into full play the effectiveness of putting people as the focus and subject of fire prevention and fighting in households and residential areas. Commune-level People's Committees are not fully aware of their roles and responsibilities, have not been proactive and drastic in directing and organizing the performance of state management of fire prevention, fighting and rescue at commune level. In some localities, some places are completely assigned to the commune-level police to implement, but do not pay attention to directing, inspecting and supervising the organization of implementation.

+ Sense of responsibility, professional knowledge of fire prevention, fighting and rescue of a division of leaders, commanders and officers and soldiers of the police unit and locality in Vietnam, especially The commune-level police have not yet met the requirements or have not properly and fully fulfilled their assigned responsibilities; the staff of the commune-level Public Security Department is still lacking, concurrently holding many other tasks, and the implementation has not been timely and effective; leaders and commanders have not regularly supervised the performance of tasks of units and individuals, have not timely detected and handled officials who have not fully performed their assigned tasks, or been loose in management.

### 3. Solution

– Continue to seriously carry out the work of grasping the situation and basic investigation, not letting the situation of not knowing the “state of fire prevention and fighting”, “missing”, “missing” the area and ensuring 100% of establishments under the management of fire prevention and fighting that are able to make management records according to regulations; identify and make a list of key areas and areas (residential areas with high risk of fire and explosion, craft villages...), establishments that are likely to cause particularly serious consequences when fires and explosions occur in the area population to strengthen management measures on fire prevention, fighting and rescue.

– Guide 100% of households, residential houses combined with production and business from 2 floors or more to open a second emergency exit; 100% of houses for living in combination with production and business are equipped with portable fire extinguishers and rudimentary demolition tools; 100% of households have a plan to handle fire and explosion situations, escape and practice the plan.

– Strengthen communication directly to establishments, households and people; renovate propaganda contents, forms and methods suitable to each audience, coordinate with press and media agencies to promote propaganda and dissemination of legal knowledge and skills on fire prevention, fighting and rescue; complete a set of guiding criteria for building fire prevention and fighting safety models, building and replicating advanced examples in the all-people movement for fire prevention, fighting and rescue. Organize fire prevention, fighting and rescue for the civil defense force to improve efficiency in handling fire, explosion, incidents and accidents right from the moment they arise; mobilize people to install the Fire Alarm app 114, Zalo Police Department of Fire Prevention, Fighting and Rescue.

– Organize training for household heads, business household owners and people in residential areas. To proceed to ensure that 100% of households

and houses in combination with production and business have at least 01 person who is propagated, trained and mastered basic knowledge and skills on fire prevention, fighting and rescue, specifically: Fire prevention and fighting responsibilities of householders and individuals living and working in the household; fire hazards and fire prevention measures; how to handle fires in households; Note in escape, fire fighting and rescue, install and use Fire Alarm App 114, Zalo Police Department of Fire Prevention, Fighting and Rescue.

- Organize survey and statistics of households living in combination with production and trading of adjacent flammable and explosive goods and substances; quarters in residential areas, craft villages, densely populated alleys and alleys (households, houses for living in combination with production and business, inns, old collectives ...) with a length of 50m or more that the fire truck cannot approach the residential area. Make a list of joint fire prevention and fighting safety groups ensuring that 100% of houses for living in combination with production and business mentioned above join the joint group; “Public fire fighting point” at alleys and alleys and deploying to replicate.

- Carry out safety inspection on fire prevention and fighting for 100% of households and houses in combination with production and business; urge, guide and inspect the heads of households, business households, and heads of establishments to overcome shortcomings and violations in fire prevention, fighting and rescue already approved by competent authorities check and recommend. Handle 100% of violations on fire prevention, fighting and rescue detected during the inspection according to regulations.

- Completing the development of the Individual Housing Standard – General design requirements; promulgate a Resolution stipulating the regular level of support for the captain and Vice captain of the civil defense team; Regulations on the mechanism of responsibility of the heads and assigns of the People’s Committees of districts and communes in perform-

ing the function of state management of fire prevention, fighting and rescue in the province local.

- To seriously and effectively implement construction investment management when: (1) Formulating and approving construction planning projects or adjusting urban construction plannings according to the Planning Law must ensure the following contents: prescribed in Article 10 of Decree No. 136/2020/ND-CP [3]; (2) carry out the appraisal and approval of fire prevention and fighting designs, issue construction permits, take over for fire prevention and fighting, and put the works into operation for household houses may convert their functions in part or in whole into production and business according to the provisions of the law on construction, fire prevention and fighting; inspect and strictly handle violations.

- Reviewing business and storage facilities of chemicals with high risk of fire and explosion interspersed in residential areas to make plans for relocation, ensuring safety conditions for fire prevention, fighting and rescue; invest in equipping urban fire-fighting water supply systems in residential areas, especially fire-fighting water supply and arrange locations for initial fire-fighting equipment in neighborhoods and alleys...

- Strengthen inspection, supervision, and promptly correct the leadership, direction and organization of the implementation of fire prevention, fighting and rescue activities at the Departments, branches and local authorities; report to competent authorities for consideration of responsibility for irresponsible units and individuals in directing and managing fires and explosions that cause serious consequences in residential areas, households and houses in the combination of production and business.

#### **4. Conclusion**

In Vietnam as well as in other countries around the world, along with socio-economic development, the potential risk of fire and explosion in residential areas is increasing. Accordingly, the study and assessment of the results obtained, pointed out the

advantages, limitations and causes of the limitations, from which, proposed solutions to improve the effectiveness of fire and explosion prevention and control in the areas population in Vietnam. Hopefully, this is

a useful reference source in the prevention of fire and explosion in residential areas for countries around the world with similar or similar characteristics to the development of residential areas in Vietnam.

### **References:**

1. Ministry of Public Security (2023). Report on the situation and results of 06 months of implementation of the Plan No. 273/KH-BCA-C07 dated June 1, 2022 of the Ministry of Public Security on strengthening fire prevention, fighting and rescue disaster for residential areas, households, houses in combination with production and business, Hanoi.
2. The Ministry of Public Security (2020). Circular No. 150/2020/TT-BCA dated December 31, 2020 of the Ministry of Public Security stipulating the equipment for fire prevention, fighting and rescue for the civil defense force, grassroots fire prevention and fighting force, specialized fire prevention and fighting force, Hanoi.
3. Government (2020). Decree No. 136/2020/ND-CP dated November 24, 2020 of the Government detailing a number of articles and measures to implement the Law on Fire Prevention and Fighting and the Law on Amendments and Supplements a number of articles of the Law on Fire Prevention and Fighting, Hanoi.
4. Prime Minister (2018). Directive No. 32/CT-TTg dated December 5, 2018 of the Prime Minister on strengthening fire prevention and fighting work in residential areas, Hanoi.
5. National Assembly (2001). Law on fire prevention and fighting, Hanoi.
6. National Assembly (2013). Law amending and supplementing a number of articles of Law on fire prevention and fighting, Hanoi.