North Korean Conventional Artillery

A Means to Retaliate, Coerce, Deter, or Terrorize Populations
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RAND’S ARROYO CENTER has carefully studied the threat posed by the massive numbers of North Korean artillery systems within range of major South Korean population centers. If fired at civilian targets, those nearly 6,000 systems could potentially kill more than 10,000 people in only an hour. Even brief, narrowly tailored attacks could destroy key industrial facilities and seriously harm the South Korean economy. This threat gives North Korea the power to coerce the South Korean government, or to retaliate against South Korean military or political actions, even without resorting to its chemical or nuclear arsenals. It is a threat the United States and its allies must always keep in mind when planning to deal with potential crises on the Korean Peninsula.

We assessed the potential threat from North Korean artillery strikes first by estimating the number of artillery systems within range of South Korean population centers. Second, we determined the population densities of the potential target areas from U.S. national laboratory and South Korean census data. Then, we estimated the number of people who could be wounded or killed in attacks, based on the rates of fire and lethal effects of the North Korean artillery and assumptions about the fractions of people in the target areas who would be outdoors, indoors, and below ground (in the subway system). We looked at smaller and larger attacks, with durations from one minute to one hour, to provide a range of potential consequences. Finally, we provide historical examples of civilian and military casualties in wars to help put in perspective the losses that could be incurred within the short time-spans of the North Korean strikes assessed in our case studies.

A key insight from our analysis is that because the Democratic People’s Republic of Korea (DPRK) shelling could kill many thousands in just an hour, with little warning, it would be difficult for the Republic of Korea (ROK) and the United States, once the bombardment had begun, to halt it, or otherwise protect the ROK population, before it could do very serious harm. Therefore, it is in the interests of all actors concerned to deescalate as quickly as possible once a provocation cycle starts and avoid the conditions that could lead to a costly and bloody exchange of military firepower.

We have developed a series of visualizations that helps bring into sharp relief the danger this threat poses to the Korean people and the United States. The following infographics will be a useful tool for defense leaders, policymakers, and the informed public in understanding this important aspect of the complex situation on the Korean peninsula.
우리군대제일주의를
A Means to Retaliate, Coerce, Deter, or Terrorize Populations

NORTH KOREAN MILITARY CAPABILITY
The North Korean Army could use its rocket and tube artillery, firing high-explosive (HE) shells, to threaten civilian populations, infrastructure, and industry in South Korea. This gives North Korea the power to coerce the South Korean government, or to retaliate against South Korean military or political actions, even without resorting to its chemical or nuclear arsenals. If these artillery systems were to fire chemical or nuclear weapons, their threat to civilian populations would rise dramatically. While the recent U.S–South Korean–North Korean dialogue may reduce the risk of conflict or a resumption of the Korean War, this initiative is still quite new and its results uncertain. Until a lasting peace is achieved, and North Korea’s massive artillery force is dismantled, it remains a potent threat.

This assessment looks at the potential consequences of North Korean artillery strikes on South Korea, and the numbers of casualties and fatalities that might result from them. It shows that, with little warning, the DPRK could cause thousands of casualties in just a minute and more than 100,000 in an hour. The DPRK’s options for carrying out these strikes range from focusing on Seoul to distributing its fire across the length of the demilitarized zone (DMZ). Thus, this assessment highlights the challenges that the Republic of Korea (ROK) and the United States would face in attempting to halt the strikes, or otherwise protect the ROK population, before they could do very serious harm. That, in turn, shows the importance to all actors of deescalating as quickly as possible once a provocation cycle starts and avoiding what could turn into a very costly and bloody military exchange.

FIVE CASE STUDIES
The five case studies in this assessment explore different scenarios in which North Korean artillery is fired into South Korea to coerce the future behavior of South Korea or the United States or to retaliate for military actions against North Korea. We chose the five case studies to illustrate the range of options available to North Korea and reveal how even a brief strike could cause serious damage, such that the artillery must remain an important consideration in U.S. policy decisions dealing with the North Korean threat.

CHEMICAL AND NUCLEAR WEAPONS
North Korea has thousands of tons of chemical agent, much of it weaponized for use with artillery. North Korea could have up to 100 nuclear devices—and may have the ability to build uranium weapons small enough to employ with its rocket artillery. These weapons of mass destruction pose a significant threat to the South Koreans and to all Americans on the Korean Peninsula. But in the following visualizations we chose to omit chemical and nuclear weapons in order to isolate the effects of conventional artillery and the substantial risk it poses to South Korean population centers. Before detailing the North Korean conventional artillery case studies, we provide a brief overview of North Korean artillery capabilities, terrain, and vulnerable South Korean population centers.
Background

North Korean Artillery, South Korean Populations, & Civilian Casualties

NORTH KOREAN ARTILLERY AND POSTURE

The DPRK military is among the world’s largest, with close to 1.2 million active duty personnel, roughly the same number of active duty personnel maintained by the United States. Though much of the DPRK’s equipment is outmoded, and its defense spending is lower than that of neighboring countries, the regime’s forward-deployed military posture along the DMZ, which includes roughly half of the Korean People’s Army, ensures that Pyongyang’s conventional artillery remains a constant threat to South Korea and its people.

North Korea currently has an estimated 4,800 medium-range artillery pieces arrayed across the DMZ that can fire artillery shells and rockets as far as 25 kilometers. Its long-range artillery (LRA)—close to 950 pieces—can reach the South Korean capital of Seoul and its surrounding population centers. Much of the DPRK’s artillery is located in heavily fortified hardened artillery sites (HARTS) with air defense capabilities deployed to their rear. These physical protective measures make air strikes and counter-battery fire against the DPRK artillery a challenge for U.S. and ROK forces.

POPULATIONS AT RISK

South Korea is the 27th most populated country in the world, with more than 51 million people. Seoul alone has a very dense population of 10 million, with 25 million occupying the greater Seoul metropolitan area, which extends east and west of the city and northward to the DMZ. These people are vulnerable to attack by the DPRK’s forward-deployed medium-range artillery, and downtown Seoul is vulnerable to the DPRK LRA deployed near the North Korean city of Kaesong.

UNDERSTANDING THE NUMBERS AT RISK: COMPARING ROK POPULATIONS TO U.S. CITY AND STATE POPULATIONS

<table>
<thead>
<tr>
<th>Seoul</th>
<th>New York City + Philadelphia</th>
<th>Greater Seoul Metropolitan Area</th>
<th>Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td>~10 M</td>
<td>8.6 M</td>
<td>1.5 M</td>
<td>~25 M</td>
</tr>
</tbody>
</table>

ANALYZING CIVILIAN CASUALTIES

To estimate numbers of casualties and fatalities, we obtained population density data (people per square kilometer) from a U.S. national laboratory database and the South Korean census. We used the data to identify high-population-density areas that could be targeted by DPRK artillery. For more detail on the methodology and assumptions behind the case study estimates, see pages 4–5.

CASUALTY TERMS:

- Casualty – any civilians who have died, or suffered wounds or disease caused by wartime events
- Fatality – deaths caused by wartime events
- “Panic” fatalities and casualties – deaths or injuries caused by mass panic (e.g., deaths from crowd rushes or stampedes)
- “Worried well” – People who experience fear and distress as a result of wartime events. Worried well issues present significant problems for medical caregivers, emergency management personnel, and policymakers. Their impact is most acutely felt immediately after an attack, when medical institutions have a limited capacity to treat large numbers of patients or lack hospital beds.

2 Based on 2017 population estimates. M = millions.
The Process of Estimating Casualties

**ASSESSING ARTILLERY**
To estimate numbers of casualties and fatalities from potential DPRK artillery strikes, we first identified the numbers of DPRK artillery systems (cannons and rocket launchers) with ranges over 10 km that are normally located within range of South Korea. These are the medium- and long-range systems associated with DPRK I, II, IV, and V Corps, which are deployed along the DMZ, and the artillery divisions supporting them.

To facilitate the analysis, we divided the DPRK systems into groups associated with each DPRK forward corps and identified the highest-population-density areas in South Korea targetable by each type of system in each group. We identified specific target areas for each type of system in each DPRK corps group based on the five cases presented:

- **Case 1.** Economic strike — LG P10 Plant, Paju
- **Case 2.** Coercive strike — DMZ demonstration
- **Case 3.** Coercive strike — Seoul demonstration
- **Case 4.** Artillery barrage — attack along the DMZ
- **Case 5.** Artillery barrage — attack on Seoul, the "Sea of Fire"

For each case, we assessed the number of artillery rounds (shells and rockets) of each type (size) that could be fired into each target area. We estimated maximum rates of fire attainable by each type of artillery system over one minute and one hour from unclassified South Korean and U.S. military sources.

**ASSESSING TARGETED POPULATIONS**
We identified the populations in South Korea within range of the DPRK artillery systems in each case study using South Korean population density data (people per square kilometer) from a U.S. national laboratory database and the South Korean census. To assess the potential for the greatest impact on the vulnerable populations, we assumed that the attacks would take place during evening rush hour, when both vehicle and pedestrian traffic are at their highest.

The number of people attacked in each case was based on assumptions regarding the fractions of people present who would be outdoors, indoors, and below ground (in the subway system and assumed not to be vulnerable). We estimated direct casualties and fatalities among those people using historical Soviet artillery norms and recent U.S. military casualty and fatality breakdowns. For the attacks lasting one hour, we made assumptions about people taking cover and reducing their vulnerability after five minutes into the attacks. To the direct casualty and fatality estimates, we added estimated casualties and fatalities from panic (based on U.S. Department of Homeland Security estimates, as well as the number of uninjured people who might present themselves at medical facilities for treatment, i.e., the “worried well” (based on data from recent attacks and disasters).

**ESTIMATE MODIFIERS**
Finally, we accounted for factors that could mitigate the effects of DPRK artillery attacks: ROK and U.S. counterfires from aircraft and artillery, DPRK inaccuracy, and DPRK dud ammunition. These reduced our estimates of South Korean civilian casualties and fatalities caused by some DPRK systems by as much as 50 percent. These reduced estimates are presented in the document as “Modified Casualty Estimates” with each case. We also accounted for the fact that estimates of panic fatalities that would result from attacks or disasters vary widely among experts. The modified values represent a lower bound on such estimates.
For each case study, the population targeted is the population of the areas effectively attacked by each artillery system type and the shells it fires.

“Area targeted”

Area targeted is the area that can be effectively attacked by the number of rounds fired by each type of DPRK artillery system. For a given number of rounds, larger-caliber rounds can effectively attack a larger area than smaller-caliber rounds.

“Population targeted”

For each case study, the population targeted is the population of the areas effectively attacked by each artillery system type and the shells it fires.
Setting the Stage

A HYPOTHETICAL PROVOCATION CYCLE

A hypothetical provocation cycle provides a backdrop to the five case studies and a framework for estimating the potential loss of civilian life. Each case presents and visualizes how the Democratic People’s Republic of Korea (DPRK) might respond to U.S. military strikes on North Korea.

1. Summit discussions between United States and North Korean leaders abruptly end with accusations made by both sides. The United States imposes the harshest possible economic sanctions upon North Korea and its trading partners.

2. DPRK fires two intermediate-range ballistic missiles (IRBMs) with inert warheads in an attempt to bracket Guam.

3. The first IRBM hits in waters north of Guam, but the second goes off course and strikes the Joint U.S. Air Force and Navy Base on Guam, killing five and wounding ten U.S. service members.

(Image) North Korean People’s Army artillery units on the front in this image released by North Korea’s Korean Central News Agency (KCNA) in Pyongyang December 2, 2016.
The Case Studies

As a result, the U.S. President orders a significant U.S. conventional military strike heavily targeting the DPRK Navy, Air Force, and selected missile sites along with command and control centers.

In response to the U.S. military strike, North Korea orders a limited conventional artillery strike targeting vulnerable populations in South Korea.

1. Economic strike — LG OLED P10 Plant
2. Coercive strike — DMZ demonstration
3. Coercive strike — Seoul demonstration
4. Artillery barrage — Along the DMZ
5. Artillery barrage — Seoul “Sea of Fire”
LG FACTORY POPULATION TARGETED  16,000

LG P10 OLED PLANT — PAJU, SOUTH KOREA
LG Display is one of the world’s largest manufacturers and suppliers of thin-film transistor liquid crystal display (TFT-LCD) panels, and organic light emitting diode (OLED) displays. Currently the P10 facility in Paju is the largest OLED production plant in the world.

Facility: ~100 x 72m (~14 soccer fields)
Estimated value: $8.9 billion
Worker population: ~16,000 employees
SCENARIO: DPRK coercive strike on LG OLED plant

ARTILLERY SYSTEMS: 12, medium-range artillery

BARRAGE: ~210 rounds in 5 minutes

AREA TARGETED: 0.10 km²

ESTIMATED PLANT VALUE: $8.90 billion

The DPRK launches a surprise artillery barrage on the LG P10 complex in Paju using six 152mm howitzers and six 122mm multiple rocket launchers (MRLs). The brief attack would employ only 12 artillery pieces but could potentially cause thousands of casualties if launched during LG’s peak production hours. A DPRK strike on such a significant economic target would be detrimental to the South Korean economy, possibly to international economies, and have adverse psychological effects on the ROK population.

TOTAL CASUALTIES: ~8,550

ESTIMATES:

<table>
<thead>
<tr>
<th>HE casualties</th>
<th>HE fatalities</th>
<th>Panic casualties</th>
<th>Panic fatalities</th>
<th>“Worried well”</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,900</td>
<td>790</td>
<td>650</td>
<td>130</td>
<td>7,450</td>
</tr>
</tbody>
</table>

MODIFIED CASE TOTAL CASUALTIES: ~6,550

NOTE: The number of workers and factory size were taken into account, and the estimates include assumptions regarding the effect of the machinery inside buildings on the casualties produced by the rocket attacks.

4 Because the factory is a single facility targeted by the attack, all of the workers who did not become casualties were considered to be “worried well.”

5 Problems with targeting inaccuracy and dud rounds plus the effects of U.S./ROK counterfires could reduce HE casualties by as much as 50%.

6 Estimates of panic fatalities that would result from attacks or disasters vary widely among experts. The modified values represent a lower bound.
DPRK MEDIUM-RANGE ARTILLERY

Much of the attention paid to the DPRK’s conventional artillery capabilities is directed at their long-range artillery located on the Kaesong Heights. However, the DPRK has thousands of medium-range artillery pieces that can easily range as far as 20km into South Korea and target significant population centers.

FORWARD CORPS — IV/II/V/I

<table>
<thead>
<tr>
<th>ARTILLERY</th>
<th>RANGE (est)</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>152mm SP-ART</td>
<td>17.4km</td>
<td>72</td>
</tr>
<tr>
<td>122mm SP-ART</td>
<td>-24km</td>
<td>72</td>
</tr>
<tr>
<td>152mm T-ART</td>
<td>24km</td>
<td>480</td>
</tr>
<tr>
<td>122mm MRL</td>
<td>20km</td>
<td>240</td>
</tr>
</tbody>
</table>

CALCULATING CASUALTY ESTIMATES

We used LandScan raster data to calculate the population density in Korea as points, or a “gridcode” with an assigned population density value. After selecting the points that intersect the region under DPRK artillery attack, the points are sorted based on population density from highest to lowest. For each case, as needed, a relevant number of points were selected; in this case study, the top 25 highest density points for each circle. For more on the methodology behind the estimates, see pages 4–5.
## DMZ Demonstration

**Scenario:** DPRK coercive strike along the DMZ without warning

**Artillery Systems:** 864, medium-range artillery

**Barrage:** ~10,000 rounds in 1 minute

**Area Targeted:** 8.1 km²

The DPRK conducts a one-minute coercive strike using all available forward corps medium-range artillery to target cities and population centers along the entire length of the DMZ — from Gimpo in the west to Goseong in the east. When contrasted with Case 4, a one-minute LRA attack on Seoul, which would cause about four times as many casualties, it highlights the particular threat posed by the DPRK’s ability to strike the highest-population areas in South Korea.

### Total Casualties: ~4,500

<table>
<thead>
<tr>
<th></th>
<th>HE Casualties</th>
<th>HE Fatalities</th>
<th>Panic Casualties</th>
<th>Panic Fatalities</th>
<th>“Worried well”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 2</td>
<td>3,800</td>
<td>380</td>
<td>720</td>
<td>20</td>
<td>41,470</td>
</tr>
</tbody>
</table>

### Modified Estimates:

<table>
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<tr>
<th></th>
<th>HE Casualties</th>
<th>HE Fatalities</th>
<th>Panic Casualties</th>
<th>Panic Fatalities</th>
<th>“Worried well”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 2</td>
<td>2,860</td>
<td>290</td>
<td>720</td>
<td>1</td>
<td>32,900</td>
</tr>
</tbody>
</table>

**Modified Case Total Casualties:** ~3,580

* Problems with targeting inaccuracy and dud rounds plus the effects of U.S./ROK counterfires could reduce HE casualties by as much as 50%.
A DPRK artillery barrage into downtown Seoul could produce tens of thousands of civilian casualties. Such a strike, even of short duration like the one in this case, could also produce devastating effects on the Seoul economy. Such effects would have significant international economic ramifications as well. About half of the South Korean population lives in the greater Seoul metropolitan area; South Korea has the world’s 11th-largest economy; and it’s the world’s 5th-largest trading country, with annual exports of over $1.2 trillion.
Seoul Demonstration

**SCENARIO:** DPRK LRA strike on Seoul without warning

**ARTILLERY SYSTEMS:** 54, 240mm MRLs

**BARRAGE:** ~1,188 rounds in 1 minute

**AREA Targeted:** 2.4km²

The DPRK launches a surprise rocket barrage on downtown Seoul using II Corps 240mm MRLs. Though the brief attack would employ only 54 rocket launchers, it could cause tens of thousands of casualties and induce public panic that might have powerful detrimental effects on the ROK economy and international economies.

**TOTAL CASUALTIES: ~18,350**

**ESTIMATES:**

<table>
<thead>
<tr>
<th>HE casualties</th>
<th>HE fatalities</th>
<th>Panic casualties</th>
<th>Panic fatalities</th>
<th>“Worried well”</th>
</tr>
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<tr>
<td>14,900</td>
<td>1,500</td>
<td>3,450</td>
<td>70</td>
<td>168,600</td>
</tr>
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</table>

**MODIFIED ESTIMATES:**

<table>
<thead>
<tr>
<th>HE casualties</th>
<th>HE fatalities</th>
<th>Panic casualties</th>
<th>Panic fatalities</th>
<th>“Worried well”</th>
</tr>
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<tr>
<td>11,180</td>
<td>1,120</td>
<td>3,450</td>
<td>3</td>
<td>135,100</td>
</tr>
</tbody>
</table>

**MODIFIED CASE TOTAL CASUALTIES: ~14,630**
### FORWARD CORPS + SECOND ECHelon — IV/II/V/I

<table>
<thead>
<tr>
<th>MED-RANGE ART</th>
<th>RANGE (est)</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>152mm SP-ART</td>
<td>17.4km</td>
<td>774</td>
</tr>
<tr>
<td>130mm SP-ART</td>
<td>24km</td>
<td>432</td>
</tr>
<tr>
<td>122mm SP-ART</td>
<td>24km</td>
<td>774</td>
</tr>
<tr>
<td>152mm T-ART</td>
<td>24km</td>
<td>480</td>
</tr>
<tr>
<td>122mm T-ART</td>
<td>15.4km</td>
<td>1,440</td>
</tr>
<tr>
<td>122mm MRL</td>
<td>20km</td>
<td>948</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LRA</th>
<th>RANGE (est.)</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>170mm SP-ART</td>
<td>60km</td>
<td>432</td>
</tr>
<tr>
<td>240mm MRL</td>
<td>60–65km</td>
<td>432</td>
</tr>
</tbody>
</table>

### Camp Casey — Population ~8,800:
(More than 6,300 military personnel and 2,500 civilians)

Camp Casey is located within a valley, 20km south of the DMZ, in the village of Tongduchon, and is home to the U.S. Army’s 2nd Infantry Division (2ID). The 2ID is the major ground combat unit in Korea and is the only permanently forward-stationed division the U.S. Army.
DMZ Barrage

SCENARIO: DPRK strike along the ROK’s northern border without warning

ARTILLERY SYSTEMS: 5,700, long- and medium-range artillery

BARRAGE: ~385,000 rounds in 1 hour

AREA TARGETED: 73.25 km²

The DPRK launches a massive barrage without warning, using 5,700 long- and medium-range artillery pieces, along the entire length of the DMZ. The attack showers all major population centers—Incheon, Seoul, Gimpo, Paju, Yeoncheon, Dongducheon, Cheorwon, Yangu, and Goseong—as well as the U.S. Army base, Camp Casey, which is home to more than 6,300 military personnel.

TOTAL CASUALTIES: ~205,600

ESTIMATES:

<table>
<thead>
<tr>
<th>HE casualties</th>
<th>HE fatalities</th>
<th>Panic casualties</th>
<th>Panic fatalities</th>
<th>“Worried well”</th>
</tr>
</thead>
<tbody>
<tr>
<td>160,900</td>
<td>16,100</td>
<td>44,700</td>
<td>900</td>
<td>1,895,700</td>
</tr>
</tbody>
</table>

MODIFIED ESTIMATES:

<table>
<thead>
<tr>
<th>HE casualties</th>
<th>HE fatalities</th>
<th>Panic casualties</th>
<th>Panic fatalities</th>
<th>“Worried well”</th>
</tr>
</thead>
<tbody>
<tr>
<td>102,640</td>
<td>10,260</td>
<td>32,020</td>
<td>30</td>
<td>1,244,000</td>
</tr>
</tbody>
</table>

MODIFIED CASE TOTAL CASUALTIES: ~134,700
TOTAL POPULATION TARGETED: ~1,380,000

LRA | RANGE (est) | NUMBER
--- | --- | ---
170mm SP-ART | 60km | 162
240mm MRL | 60–65km | 162
The DPRK launches a massive barrage without warning on the most densely populated areas in downtown Seoul, using 324 LRA pieces from the Kaesong Heights and North Korean Army II Corps plus 50% from adjacent corps. The DPRK’s forward-deployed LRA is capable of striking the city, which is home to 10 million people, with thousands of HE munitions in a single volley.

**Scenario:** DPRK LRA strike on Seoul without warning

**Artillery Systems:** 324, 170mm cannon/240mm MRLs

**Barrage:** ~14,000 rounds in 1 hour

**Area Targeted:** 25 km²

The DPRK launches a massive barrage without warning on the most densely populated areas in downtown Seoul, using 324 LRA pieces from the Kaesong Heights and North Korean Army II Corps plus 50% from adjacent corps. The DPRK’s forward-deployed LRA is capable of striking the city, which is home to 10 million people, with thousands of HE munitions in a single volley.

**Total Casualties:** ~130,000

**Estimates:**

<table>
<thead>
<tr>
<th>HE casualties</th>
<th>HE fatalities</th>
<th>Panic casualties</th>
<th>Panic fatalities</th>
<th>“Worried well”</th>
</tr>
</thead>
<tbody>
<tr>
<td>101,200</td>
<td>10,120</td>
<td>28,300</td>
<td>560</td>
<td>1,193,500</td>
</tr>
</tbody>
</table>

**Modified Estimates:**

<table>
<thead>
<tr>
<th>HE casualties</th>
<th>HE fatalities</th>
<th>Panic casualties</th>
<th>Panic fatalities</th>
<th>“Worried well”</th>
</tr>
</thead>
<tbody>
<tr>
<td>66,200</td>
<td>6,600</td>
<td>21,400</td>
<td>20</td>
<td>809,800</td>
</tr>
</tbody>
</table>

**Modified Case Total Casualties:** ~87,600
The Cost of War

Comparing the Case Studies with Historical Events: Estimated Casualties and Fatalities (1945–2019)

- **CASE 1**: Strike on LG Plant
  - Casualties: 8,550
  - Fatalities: 920
  - Duration: 1 HR

- **CASE 2**: DMZ Demonstration
  - Casualties: 4,550
  - Fatalities: 400
  - Duration: 1 MIN

- **CASE 3**: Seoul Demonstration
  - Casualties: 18,350
  - Fatalities: 1,570
  - Duration: 1 MIN

- **CASE 4**: Barrage along the DMZ
  - Casualties: 205,600
  - Fatalities: 17,000

- **CASE 5**: Barrage on Seoul
  - Casualties: 130,000
  - Fatalities: 1,068

- **SEPT. 11, 2001 TERRORIST ATTACK**:
  - Casualties: 5,319
  - Fatalities: 2,982

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PUTTING THE NUMBERS INTO PERSPECTIVE  The general public often equates war casualties with the soldiers who were engaged in active battle. Less thought is given to the people who live in the nations where wars take place, but it is important to understand the larger toll of warfare—that civilian casualties will invariably occur, and often in large numbers. We provide historical examples of both civilian and military casualties to help provide perspective on the losses that can be incurred within the short time spans of the DPRK strikes as presented in the five case studies.
Concluding Thoughts

This graphic assessment has considered the consequences of the DPRK’s use of limited conventional artillery strikes on South Korea as a means to coerce, retaliate, deter, or terrorize its population centers.

North Korea has multiple options to strike the South with its conventional artillery, which can fire shells that travel from 20 kilometers to 150 kilometers and can reach ROK population centers—from small to large—along the entire width of the Korean Peninsula. If the DPRK conducts a limited artillery strike, with either relatively small numbers of shells over short periods of time or larger amounts over longer and sustained periods, the potential amount of death and destruction caused to ROK civilians and the ROK economy would be significant.

A key insight from the five scenarios presented is that the supreme challenge for the ROK, the United States, and their allies is avoiding a situation in which the DPRK feels compelled to strike the South with its conventional artillery; if the DPRK did initiate such a strike, the objective of the ROK, the United States, and their allies should be to stop the shelling while avoiding further escalation.

Because DPRK shelling could kill many thousands in just an hour, with little warning, it would be difficult for the ROK and the United States, once the bombardment had begun, to halt it, or otherwise protect the ROK population, before it could do very serious harm. Nevertheless, while the casualties such an attack could cause would be terrible, they would still pale in comparison with the casualties that could result from a nuclear attack against Seoul or other ROK cities, should the conflict continue to escalate.

Therefore, it is in the interests of all actors concerned to deescalate as quickly as possible once a provocation cycle starts and avoid the conditions that would lead to a military exchange in firepower from any of the sides. If such an exchange occurs, the results will be highly costly and bloody.


Oak Ridge National Laboratory, LandScan Datasets, undated. As of June 5, 2017: https://landscan.ornl.gov/landscan-datasets


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